National Marine Electronics Association



NMEA 2000 ®

Appendix B.1 -- Parameter Groups

STANDARD FOR SERIAL-DATA NETWORKING OF MARINE ELECTRONIC DEVICES

NMEA 2000® -- is a Registered Trademark of the National Marine Electronics Association, Inc.

Version 3.002 February 2023

Copyright© NMEA 1999-2023

ISO Acknowledgment

PGN: 059392 hex: E800

This message is provided by ISO 11783 for a handshake mechanism between transmitting and receiving devices. This message is the possible response to acknowledge the reception of a "normal broadcast" message or the response to a specific command to indicate compliance or failure. The application layer is responsible for determining when this message is desired, outside of network management requirements specified by this standard (e.g. response to ISO Request message). The destination address of this PGN shall always contain a destination specific address.

Note 1: Version 1.000 of the NMEA 2000 Standard required the destination address to be the global address of 255.

Note 2: It is prohibited to request this PGN.

Single Fra	ame: Yes	Priority Default: 6	Defaul	t Update R	Rate:	milliseconds Fr	requency: NA	cycles per second
Destination	n: <mark>Address</mark>	Query Support: Proh	ibited C	ommand Sup	pport: Prohibited	ACK Rqmnts: Nor	ne	
Field #	Field Na	ame						
1	Control E	Byte		•	ield Size: ield Size: 8		equest Parameter ommand Parameter:	Prohibited Prohibited
	DD177	ISO 11783 ACK Status			0x01 = Nega	ive Acknowledgment; tive Acknowledgment; supported but access det F = Reserved	nied;	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to	construct bit fields
2	Group Fu	unction Value		•	ield Size: ield Size: 8		equest Parameter ommand Parameter:	Prohibited Prohibited
	DD178 Group Function Value				specific grou	ion of PGN being acknown p function of a PGN being PGN being acknowled	ng acknowledged or dec	lined. This field is
	DF52	Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to	construct bit fields
3	NMEA R	eserved		•	ield Size: ield Size: resv		equest Parameter ommand Parameter:	
	DD001	Reserved field			Variable nun	nber of reserved bits, all	set to logic "1"	
	DF52 Used to alig	Bit field gn subsequent data on a byte	bit(n) boundary.	Range:	Variable	Resolution: 1	Used to	construct bit fields
4	PGN of R	Requested Information		•	ield Size: ield Size: <mark>24</mark>		equest Parameter ommand Parameter:	Prohibited Prohibited
	DD009	PGN			24-bit Param first	eter Group Number (PG	N) expressed in binary,	LSB is transmitted
	DF52	Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to	construct bit fields

ISO Request PGN: 059904 hex: EA00

ISO 11783 defines this message to provide a method for requesting the transmission of a PGN from a network device or devices. As defined by ISO, this message has a data length of 3 bytes with no padding added to complete the single frame. The appropriate response to this message is based on the PGN being requested, and whether the receiver supports the requested PGN.

See section 5.4.3 of 11783-3:2018(E) for the rules governing the response to this PGN.

Single Fra	ngle Frame: Yes Priority Default: 6		Default	Update Rate:	millis	econds	Frequency:	NA	cycles per s	second
Destination	: <mark>Address</mark>	Query Support: <mark>C</mark>	<mark>Optional</mark> Con	mmand Support:	Optional		lequested dat cknowledge v			
Field#	Field Na	me								
1	PGN being	g requested		Byte Field S Bit Field S	ize: Size: <mark>24</mark>		Request Paral Command Pai		Optional Optional	
	DD009	PGN			24-bit Parameter G first	roup Number (PGN) expressed	in binary, I	LSB is transm	itted
	DF52 Bit field			Range: Var	riable	Resolution	1	Used to	construct bit f	ields

ISO Transport Protocol, Data Transfer

PGN: 060160 hex: EB00

ISO 11783 defines this PGN as part of the transport protocol method used for transmitting messages that have 9 or more data bytes. This PGN represents a single packet of a multipacket message and is used in conjunction with PGN 60416. Once a connection has been established or a broadcast announcement has been made, this message is transmitted using the timing and handshake requirements in section 3.10 of 11783-3 until all the message's packets are transmitted or the transmission is aborted. Although this PGN is addressable, when used with the Broadcast Announce Message (BAM) method, the destination shall be 255.

Single Fran	ne: Yes	Priority Default: 6	Defaul	t Update Ra	ate:	milliseconds	Frequency:	NΑ	cycles per se	econo
Destination	Addres	S Query Support: Optiona	al Co	ommand Supp	oort: Optional	ACK Rqmnts: N	None			
Field #	Field N	lame								
1	Sequence number of multi-packet fram DD180 Multi-packet frame counter			Byte Fie Bit Fi	eld Size: eld Size: <mark>8</mark>]	Request Param Command Para		Optional Optional	
	DD180	Multi-packet frame counter			Valid range	e 0x01 to 0xFF				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	n: 1	Used to	construct bit fie	elds
2	Multi-packet packetized data			Byte Fie Bit Fi	eld Size: eld Size: <mark>56</mark>]	Request Parameter Command Parameter:			
	DD181 Multi-packet packetized data				_	anized as seven 8-bit b would in a standard (i.e 0xFF.	•			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1: 1	Used to	construct bit fie	elds

ISO Transport Protocol, Connection Management - RTS group function

hex: EC00

PGN: 060416

ISO 11783 defines this group function PGN as part of the transport protocol method used for transmitting messages that have 9 or more data bytes. This PGN's role in the transport process is determined by the group function value found in the first data byte of the PGN. RTS - When the group function is Request To Send (RTS), the PGN is asking a specific node on the network for permission to transmit a larger than 8 byte message to the node. This process is referred to as opening a connection. For a complete description of this PGN's usage and timing requirements see section 3.10 of 11783-3.

Single Fr	ame: Yes	Priority Default: 6	Default	Update R	ate:	milliseconds	Frequency:	N/	Cycles per	second
Destinatio	n: <mark>Address</mark>	Query Support: Optional	Со	mmand Sup	pport: Optional		Refer to Section 11783-3	on 3.10 d	of ISO	
=ield #	Field Na	me								
1	RTS Grou	p Function Code		•	eld Size: ield Size: 8		Request Para Command Pa		Optional Optional	
	DD179 Group Function, Connection Ma DF52 Bit field bi			nent	0x11 = Clea 0x13 = End 0x20 = Broa 0xFF = Abo	of Message; adcast Announce Mes		Reserved		
		Bit field RTS message, set = 0x10	bit(n)	Range:	Variable	Resolution	: 1	Used to	construct bit f	ields
2	Total mes	sage size, bytes			eld Size: 2 ield Size:		Request Para Command Pa		Optional Optional	
	DD007 Generic numeric ID, medium				Number of r	oute, waypoint, event	, mark, etc.			
	DF54 Integer, 16 bit unsigned uir Only values in the range of 9 to 1785 are allowed			Range:	0 to 65,532	Resolution	i 1 bit	Unit-les	ss number	
3	Total num	ber of frames to be transmi	tted	•	eld Size: ield Size: 8		Request Para Command Pa		Optional Optional	
	DD180	Multi-packet frame counter			Valid range	0x01 to 0xFF				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit f	ields
4	NMEA Re	served		•	eld Size: ield Size: resv	8	Request Para Command Pa			
	DD001	Reserved field			Variable nui	mber of reserved bits,	all set to logic "	1"		
	DF52 Used to alig	Bit field n subsequent data on a byte bou	bit(n) ndary.	Range:	Variable	Resolution	² 1	Used to	construct bit f	ields
5	PGN of m	ulti-packet message		•	eld Size: ield Size: 24		Request Para Command Pa		Optional Optional	
	DD009	PGN			24-bit Paran first	neter Group Number (PGN) expressed	in binary,	LSB is transm	itted
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	: 1	Used to	construct bit f	ields

ISO Transport Protocol, Connection Management - CTS group function PGN: 060416

ield#	Field Na	ame						
1	CTS Gro	up Function Code		•	eld Size: ield Size: 8		Request Parameter Command Paramet	-
	DD179	Group Function, Connection	n Managen	nent	0x11 = C1 $0x13 = En$ $0x20 = Br$ $0xFF = Ab$	equest to Send; ear to Send; ad of Message; roadcast Announce Messa port; kF, 0x12, 0x14 to 0x1F, 0		ed
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Use	d to construct bit fields
	This is the	CTS message, set = 0x11						
2	Number	of frames that can be sent		,	eld Size: ield Size: 8		Request Parameter Command Paramet	- p
	DD180	Multi-packet frame counter			Valid rang	ge 0x01 to 0xFF		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Use	d to construct bit fields
3	Number	of next frame to be transmit	ted	•	eld Size: ield Size: 8		Request Parameter Command Paramet	- 1
	DD180	Multi-packet frame counter			Valid rang	ge 0x01 to 0xFF		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Use	d to construct bit fields
4	NMEA R	eserved		•	eld Size: ield Size: res		Request Parameter Command Paramet	
	DD001	Reserved field			Variable n	number of reserved bits, a	ll set to logic "1"	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Use	d to construct bit fields
	Used to alig	gn subsequent data on a byte bo	undary.					
5	PGN of n	nulti-packet message		•	eld Size: ield Size: <mark>24</mark>	_	Request Parameter Command Paramet	-
	DD009	PGN			24-bit Par first	ameter Group Number (P	(GN) expressed in bina	ary, LSB is transmitted
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Use	d to construct bit fields

ISO Transport Protocol, Connection Management - EOM group function PGN: 060416

ield#	Field Na	ame							
1	EOM Gro	oup Function Code		,	eld Size: ield Size: <mark>8</mark>		Request F Command	Parameter Parameter:	Optional Optional
	DD179	Group Function, Connection	Managen	nent	0xFF = Abort;	o Send;		E = Reserved	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields
	This is the	EOM message, set = 0x13							
2	Total me	ssage size, bytes		-	eld Size: 2 ield Size:		Request F Command	Parameter Parameter:	Optional Optional
	DD007	Generic numeric ID, medium	ı		Number of rou	te, waypoint, event,	mark, etc.		
	DF54 Only values	Integer, 16 bit unsigned s in the range of 9 to 1785 are all	uint16 owed.	Range:	0 to 65,532	Resolution:	1 bit	Unit-les	ss number
3	Total nur	mber of frames received		•	eld Size: ield Size: <mark>8</mark>		Request F Command	Parameter Parameter:	Optional Optional
	DD180	Multi-packet frame counter			Valid range 0x	01 to 0xFF			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields
4	NMEA R	eserved		•	eld Size: ield Size: resv 8	3	Request F Command	Parameter Parameter:	
	DD001	Reserved field			Variable numb	er of reserved bits, a	ll set to logi	c "1"	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields
	Used to all	gn subsequent data on a byte boo	undary.						
-		nulti-packet message		,	eld Size:		Request F		Optional
5	PGN of n	muni-packet message		Bit F	ield Size: 24		Command	Parameter:	Optional
5	PGN of n			Bit F		er Group Number (F			•

ISO Transport Protocol, Connection Management - BAM group function PGN: 060416

Field #	Field Name						
1	BAM Group Function Code		•	eld Size: eld Size: 8]	Request Parame Command Param	eter Optional meter: Optional
	DD179 Group Function, C	onnection Managen	nent	0x11 = Cle $0x13 = Enc$ $0x20 = Brc$ $0xFF = Ab$	d of Message; padcast Announce Mess		served
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to construct bit fields
	This is the BAM message, set = 0	0x20					
2	Total message size, bytes		•	eld Size: 2 eld Size:		Request Parame Command Param	eter Optional meter: Optional
	DD007 Generic numeric II	O, medium		Number of	route, waypoint, event,	mark, etc.	
	DF54 Integer, 16 bit un Maximum value = 1785	signed uint16	Range:	0 to 65,532	Resolution:	1 bit	Unit-less number
3	Total number of frames to b	oe transmitted	•	eld Size: eld Size: 8]	Request Parame Command Param	eter Optional meter: Optional
	DD180 Multi-packet frame	counter		Valid range	e 0x01 to 0xFF		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to construct bit fields
4	NMEA Reserved		•	eld Size: ield Size: <mark>resv</mark>	8	Request Parame Command Parar	
	DD001 Reserved field			Variable nu	umber of reserved bits, a	all set to logic "1"	
	DF52 Bit field Used to align subsequent data or	bit(n) n a byte boundary.	Range:	Variable	Resolution:	1	Used to construct bit fields
5	PGN of multi-packet messa	ge	•	eld Size: ield Size: <mark>24</mark>]	Request Parame Command Parar	eter Optional meter: Optional
	DD009 PGN			24-bit Para first	ameter Group Number (I	PGN) expressed in	binary, LSB is transmitted
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to construct bit fields

ISO Transport Protocol, Connection Management - Abort group function PGN: 060416

Field #	Field Na	ame						
1	Abort Gr	oup Function Code		•	eld Size: ield Size: 8]	Request Parameter Command Paramete	Optional r: Optional
	DD179	Group Function, Connection	Managen	nent	0x11 = Clea 0x13 = End 0x20 = Bro 0xFF = Abo	l of Message; adcast Announce Messa		d
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used	to construct bit fields
	This is the	Abort message, set = 0xFF						
2	NMEA R	eserved		•	eld Size: ield Size: resv	32	Request Parameter Command Paramete	r:
	DD001	Reserved field			Variable nu	mber of reserved bits, a	all set to logic "1"	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used	to construct bit fields
	Used to alig	gn subsequent data on a byte bo	undary.					
3	PGN of n	nulti-packet message		•	eld Size: ield Size: <mark>24</mark>		Request Parameter Command Paramete	Optional r: Optional
	DD009	PGN			24-bit Parai first	meter Group Number (F	PGN) expressed in binar	ry, LSB is transmitted
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used	to construct bit fields

ISO Address Claim PGN: 060928

hex: EE00

This network management message is used to claim a network address and to respond with device information (NAME) requested by the ISO Request (PGN 059904) or Complex Request Group Function (PGN 126208).

This parameter group is always transmitted with a destination address global.

This PGN contains several fields that are Request Parameters.

These Request Parameters can be used independently or in any combination. A node receiving an ISO Request (PGN 059904) for this PGN shall respond by providing this PGN.

- If a Complex Request Group Function (PGN 126208) requesting this PGN is received, the receiving node shall respond in the following manner:
- If no Request Parameter fields have been specified with the Complex Request, then the response is to return this PGN, just like responding to the ISO Request (PGN 59904) described above.
- If the Complex Request (PGN 126208) specifies one or more Request Parameter fields, then the response shall be filtered by the one or more fields and field values contained within the request.

For example, if the Complex Request for this PGN contained a value for field 2, the Manufacturer's Code, then the device would respond with this PGN, if and only if the device's Manufacturer Code matched the value requested.

If the device's Manufacturer code did not match the value requested, then the response would depend on whether the request was global or addressed.

A global request containing one or more requested field values that do not match requires no response, while an addressed request containing requested field values, in which one or more do not match, requires a response with the Acknowledge Group PGN (126208), containing the appropriate error codes for each of the requested fields, such as "0x3 = Request or command parameter out-of-range", for the fields that did not match.

ISO Requests for Address Claim parameter group are restricted in address mode and request frequency by the Main NMEA 2000 document, section 8.3.2, "Address to NAME Association Tables".

The ISO Address Claim parameter group is not to be used as a heartbeat message.

Single Fra	le Frame: Yes Priority Default: 6			Defaul	t Update R	ate:	milliseconds	Frequency:	NA	cycles per	second
Destination	n: <mark>Addres:</mark>	S Query	/ Support: <mark>Required</mark>	d Co	ommand Sup	oort: <mark>Optional</mark>	ACK Rqmnts.	Refer to Section 11783-5	on 6.4 of	ISO	
ield#	Field Na	ame									
1	Unique N	Unique Number (ISO Identity Numb			Byte Fie Bit Fi	eld Size: eld Size: <mark>21</mark>]	Request Para Command Pa		Optional Optional	
	DD173	NMEA Uni	que Number				iber assigned by mar ed device is unique,				
	DF52 Bit field			bit(n)	Range:	Variable	Resolution	on: 1	Used to	construct bit f	fields
2	Manufac	turer Code			Byte Field Size: Bit Field Size: 11]	Request Para Command Pa		Required Optional	
	DD172	NMEA Mar	nufacturer Code			Assigned by	y NMEA Committee				
	DF52	Bit field		bit(n)	Range:	Variable	Resolution	on: 1	Used to	construct bit f	fields

ISO Address Claim
PGN: 060928
hex: EE00

3	Device Instance Lower (ISO ECU Instan			•	eld Size: ield Size: 3		Request Parame Command Param		Required Optional	
	DD201	Generic instance 2 (3-bit)			0x0 to 0x7 =	instance 0 to 7				
	DF52	Bit field	bit(n)	_	Variable	Resolution.	_	Used to	construct bit field	s
	intended to	nation of fields 3 & 4 make up the be unique on the network. Whe the same Class & Function code	n NMEA De							
4	Device Instance	nstance Upper (ISO Functior	ı	Byte Fi	eld Size:		Request Parame	eter	Required	
		,		Bit F	ield Size: 5		Command Parai	meter:	Optional	
	DD174	Generic instance (5-bit)			0x00 to 0x11	F = Instance 0 to 31;				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit field	s
	intended to	nation of fields 3 & 4 make up the be unique on the network. Whe the same Class & Function code	n NMEA De							
5	Device F	function (ISO Function)		•	eld Size:		Request Parame	eter	Required	
				Bit F	ield Size: 8		Command Parai	meter:	Optional	
	DD171	NMEA Function Code			Dependent of Codes, Appe	on NMEA Device Clasendix B6.	s DD170, reference	e NME.	A Class & Function	1
	DF52	Bit field	bit(n)	Range:	Variable	Resolution.	1	Used to	construct bit field	s
6	NMEA R	eserved		•	eld Size:		Request Parame	eter		
				Bit F	ield Size: 1		Command Parai	meter:		
	DD175	Dominant Bit			Set = 0					
	DF52	Bit field	bit(n)	Range:	Variable	Resolution.	1	Used to	construct bit field	S
7	Device C	Class		•	eld Size: ield Size: 7		Request Parame Command Param		Required Optional	
	DD170	NMEA Device Class			Dependent of Appendix B	on Industry Group DD 6.	168, reference NM	IEA Cla	ss & Function Coo	les,
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit field	s
8	System	Instance (ISO Device Class I	nstance)	-	eld Size: ield Size: <mark>4</mark>		Request Parame Command Param		Required Optional	
	DD169	Generic instance (4-bit)			0x0 to $0xF =$	Instance number 0 to	15;			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution.	1	Used to	construct bit field	S

ISO Address Claim
PGN: 060928
hex: EE00

9	Industry (Group		•	eld Size: ield Size: <mark>3</mark>		Request Parameter Command Parameter:	Required Optional
	DD168	Industry Group		nd Forestry; occess onary (Gen-Se SAE SAE	ts)			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
	Marine Indu	stry Group, set = 4						
10	NMEA Re	served (ISO Self Configurab	le)	•	eld Size: ield Size: resv 1		Request Parameter Command Parameter:	Optional Optional
	DD001	Reserved field			Variable number of r	reserved bits, a	ll set to logic "1"	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields

ISO Commanded Address

PGN: 065240 hex: FED8

ISO 11783 defined this message to provide a mechanism for assigning a network address to a node. The NAME information in the data portion of the message must match the name information of the node whose network address is to be set. ISO 11783-5 requires this message to be sent using the BAM Transport Protocol method. The appropriate response to this message is defined in section 5.2.3 of 11783-5.

Single Fr	ame: No	Priority Default: 6	Defaul	t Update R	ate:	milliseconds	Frequency:	NA	cycles per sed	cond
Destinatio	n: <mark>Global</mark>	Query Support: Required	Co	ommand Sup	port: Optional		Refer to Section 1783-5	6.4 of IS	SO	
ield#	Field N	ame								
1	Unique N	Number (ISO Identity Number))	•	eld Size: ield Size: <mark>21</mark>		Request Paran Command Para		Optional Optional	
	DD173	NMEA Unique Number				ber assigned by manu ed device is unique, re				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1: 1	Used to co	onstruct bit field	ds
2	Manufac	turer Code		•	eld Size: ield Size: 11		Request Paran Command Para		Required Optional	
	DD172	NMEA Manufacturer Code			Assigned by	NMEA Committee				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	n: 1	Used to co	onstruct bit field	ds
3	Device Ir	nstance Lower (ISO ECU Insta	ance)	•	eld Size: ield Size: 3		Request Paran Command Para		Optional Optional	
	DD201	Generic instance 2 (3-bit)			0x0 to 0x7 =	= instance 0 to 7				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1: 1	Used to co	onstruct bit fiel	ds
4	Device Ir Instance	nstance Upper (ISO Function)		Byte Fie	eld Size:		Request Paran	neter C	Optional	
				Bit F	ield Size: 5		Command Para	ameter: C	Optional	
	DD174	Generic instance (5-bit)			0x00 to 0x1	F = Instance 0 to 31;				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to co	onstruct bit fiel	ds
5	Device F	unction (ISO Function)		•	eld Size: ield Size: 8		Request Paran Command Para		Required Optional	
	DD171	NMEA Function Code			Dependent of Codes, App	on NMEA Device Cla endix B6.	ss DD170, referen	ce NMEA	Class & Function	on
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1: 1	Used to co	onstruct bit field	ds
6	NMEA R	eserved		•	eld Size: ield Size: 1		Request Paran Command Para			
	DD175	Dominant Bit			Set = 0					
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	n: <mark>1</mark>	Used to co	onstruct bit fiel	ds
7	Device C	Class		•	eld Size: ield Size: <mark>7</mark>		Request Paran Command Para		Required Optional	
	DD170	NMEA Device Class			Dependent of Appendix B	on Industry Group DD 6.	168, reference NI	MEA Class	& Function Co	des,
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	n: 1	Used to co	onstruct bit field	ds

ISO Commanded Address PGN: 065240

hex: FED8

8	System Instance (ISO Device Class	s Instance)	,	eld Size: iield Size: 4		Request Parameter Command Parameter:	Optional Optional	
	DD169 Generic instance (4-bit)			0x0 to $0xF =$	Instance number 0 to	5 15;		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	Used to construct bit		
9	Industry Group		•	eld Size: ield Size: 3		Request Parameter Command Parameter:	Required Optional	
	DD168 Industry Group			 3 = Construct 4 = Marine 5 = Industruct 	Itural and Forestry; action; ; ial - Process I - Stationary (Gen-Seed for SAE	ets)		
	DF52 Bit field Marine Group, set = 4	bit(n)	Range:	Variable	Resolution:	1 Used to	o construct bit fields	
10	Reserved (ISO Self Configurable)		,	eld Size: ield Size: resv	1	Request Parameter Optional Command Parameter: Optional		
	DD001 Reserved field			Variable num	ber of reserved bits, a	, all set to logic "1"		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	1 Used to	o construct bit fields	
11	New Source Address		•	ield Size:		Request Parameter Command Parameter:	Optional Optional	
	DD176 Network Address			0xFC (252) = 0xFD (253) = 0xFE (254) =	Reserved; Reserved;	ole NMEA network addre	ess space;	
	DF52 Bit field Only values less than 252 shall be used.	bit(n)	Range:	Variable	Resolution:	1 Used to	o construct bit fields	

NMEA - Request group function

PGN: 126208 hex: 1ED00

The Request / Command / Acknowledge Group type of function is defined by first field. The message will be a Request, Command, or Acknowledge Group Function.

The Request Group Function is defined as follows: This message requests the transmission of a specific set of data in a Parameter Group by setting variable parameters within the Parameter Group specified by the field number. Field number and parameter value may appear in any order in this message.

When multiple fields and parameters are specified the request is treated as an "AND" function. This PGN may be used to set the transmission interval and the delay before the first transmission. NMEA encourages manufacturers to provide the capability of altering the values of transmission time for NMEA certified products on the network. When the values of transmission time or delay before the first transmission are altered, they should be maintained after power cycling.

All parameter value fields of this request must be padded if necessary to ensure byte boundaries are adhered to. Note 1: Acknowledge Requirements - Requested data as scheduled or Acknowledge Group Function with acknowledgement error codes.

Single Fra	ame: No	Priority Default: 3	Default	Update Ra	ate:	milliseconds	Frequency:	NA	cycles per second
Destinatio	n: Address	Query Support: Required	Co	mmand Supp	oort: Optional	ACK Rqmnts:	Note 1		
ield#	Field Nam	е							
1	Request Gre	oup Function Code		Byte Fie	ld Size: 1		Request Param	neter	Required
				Bit Fie	eld Size:		Command Para	meter:	Required
	DD144 Gr	oup Function, Request/Cor	nmand/A	cknowledg	1 = Commar 2 = Acknow 3 = Read Fig 4 = Read Fig 5 = Write Fi	0 ,			
		nteger, 8 bit unsigned quest message, set = 0x00.	uint8	Range:	0 to 252	Resolution	n: 1 bit	Unit-les	s number
2	Requested I	PGN		Byte Fie			Request Param		Required
				Bit Fie	eld Size: 24		Command Para		•
	DD009 PC	3N			24-bit Paran first	neter Group Number	(PGN) expressed in	binary,	LSB is transmitted
	DF52	Bit field	bit(n)	Range:		Resolution	n: 1	Used to	construct bit fields
3	Transmissio	on interval		-	ld Size: 4 eld Size:		Request Param Command Para		Optional Optional
	DD035 Da	ata transmit interval			0x0000 000 0xFFFF FFF	al between data transi 00 = Turn-off transm E = Restore Default F = Do not change in	ission, Interval		
	DF65	Γime interval, standard	uint32	Range:	0 to ~4.295x10	E+6 s Resolution	n: 1x10E-3 s		
	0xFFFF FFFF	in this field and 0xFFFF in field	d 4: Trans	mit now with	hout changing tin	ning variables.			
4	Transmissio	on interval offset		Byte Fie Bit Fie	ld Size: 2		Request Param Command Para		Optional Optional
	DD036 Da	ata transmit offset			0x0 = transn	nsmit time from time nit immediately o not change offset.	of request commar	nd:	
	DF66	Γime interval, .01sec	uint16	Range:	0 to 655.32s	Resolution	n: 1x10E-2sec		
	0xFFFF in this	field and 0xFFFF FFFF in field	d 3: Trans	mit now with	hout changing tin	ning variables.			

PGN: 126208 hex: 1ED00

Byte Field Size: 1 Number of Pairs of Request Parameters to Request Parameter 5 Optional follow Bit Field Size: Command Parameter: Optional **DD006** Generic counter, short Numeric count, event counter, sequence counter **DF53** Range: 0 to 252 Resolution: 1 bit Unit-less number Integer, 8 bit unsigned uint8 Byte Field Size: Field number of first requested parameter Request Parameter 6 Optional Bit Field Size: Command Parameter: Optional **DD005** Generic numeric ID, short Number of route, waypoint, event, mark, etc. Integer, 8 bit unsigned Range: 0 to 252 Resolution: 1 bit Unit-less number **DF53** uint8 Byte Field Size: Request Parameter 7 Value of first requested parameter Optional Bit Field Size: Command Parameter: Optional **DD000** Undefined Resolution: undefined DF00 Undefined Undefined Range: undefined Application specific, defined at time of use. Requested parameter size and type is dependent on the PGN and the specific request parameter field. 8 Variable Number of fields, Field number 6 Byte Field Size: Request Parameter Optional repeated Bit Field Size: Command Parameter: Optional **DD005** Generic numeric ID, short Number of route, waypoint, event, mark, etc. Range: 0 to 252 Integer, 8 bit unsigned Resolution: 1 bit Unit-less number uint8 Byte Field Size: Variable Number of fields, Field number 7 Request Parameter 9 Optional Bit Field Size: n Command Parameter: Optional **DD000** Undefined DF00 Undefined Undefined Range: undefined Resolution: undefined Application specific, defined at time of use. Requested parameter size and type is dependent on the PGN and the specific request parameter field.

NMEA - Request group function

NMEA - Command group function

ield#	Field N	ame								
1	Commar	nd Group Function Code			eld Size: 1 ield Size:			Request Paran Command Para		Required Required
	DD144	Group Function, Request/Com	nmand/ <i>A</i>	Acknowled	1 = Cor 2 = Acl 3 = Rea 4 = Rea 5 = Wr	quest Message, mmand Messag knowledge Mes ad Fields Messa d Fields Reply tte Fields Mess tte Fields Reply	ssage, age, Message, age,			
	DF53 This is the	Integer, 8 bit unsigned Command message, set = 0x01.	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number
2	Commar	nded PGN		•	eld Size: ield Size: 2	4		Request Paran Command Para		Required Required
	DD009	PGN			24-bit l first	Parameter Grou	ıp Number (F	(GN) expressed in	n binary,	LSB is transmitted
	DF52	Bit field	bit(n)	Range:	Variable		Resolution:	1	Used to	construct bit fields
3	Priority S	Setting		•	eld Size: ield Size: <mark>4</mark>			Request Paran Command Para		Optional Optional
	DD182 Priority, Set				0x8 = 0 $0x9 = r$	0x7 = comman lo not change peturn priority to 0xF = reserved	oriority; o default;	value;		
	DF52	Bit field	bit(n)	Range:	Variable		Resolution:	1	Used to	construct bit fields
4	NMEA R	eserved		•	eld Size: ield Size: <mark>re</mark>	esv 4		Request Paran Command Para		
	DD001	Reserved field		Variable number of reserved bits,				all set to logic "1"		
	DF52 Used to ali	Bit field gn subsequent data on a byte bour	bit(n) ndary.	Range:	Variable		Resolution:	1	Used to	construct bit fields
5	Number to follow	of Pairs of Commanded Parar	neters	Byte Fi	eld Size: 1			Request Paran		Optional
				Bit F	ield Size:			Command Para	ameter:	Optional
	DD006	Generic counter, short			Numer	c count, event				
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number
6	Field nu	mber of first commanded para	meter		eld Size: 1 ield Size:			Request Paran Command Para		Optional Optional
	DD005	Generic numeric ID, short			Numbe	r of route, way	point, event,	mark, etc.		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number
7	Value of	first command parameter			eld Size: ? ield Size: n			Request Paran Command Para		Optional Optional
	DD000	Undefined								
	DF00	Undefined U	ndefine	d Range:	undefined		Resolution:	undefined	1.1	tion specific, define
	Commande	ed parameter size and type is depe	ndent on	the PGN a	and the speci	ic command p	arameter field	d.	at time	of use.

PGN: 126208

							h	ex: 1ED00
8	Variable Number of fields, Field num	ber 6 B	Byte Fie	eld Size: 1		Request Parame	eter	Optional
			Bit Fi	eld Size:		Command Para	meter:	Optional
	DD005 Generic numeric ID, short Number of route, waypoint, event, mark, etc.							
	DF53 Integer, 8 bit unsigned	uint8 Ra	ange:	0 to 252	Resolution:	1 bit	Unit-les	s number
9	Variable Number of fields, Field num	ber 7 B	Byte Fie	eld Size: ?		Request Parame	eter	Optional
	•		Bit Fi	eld Size: n		Command Parameter:		Optional
	DD000 Undefined							
	DF00 Undefined Commanded parameter size and type is de	Undefined Rependent on the	•		Resolution: arameter field		Applica at time	tion specific, defined of use.

NMEA - Command group function

NMEA - Acknowledge group function

ield#	Field N	ame							
1	Acknowl	edgment Group Function C	ode		eld Size: 1 ield Size:		Request Parame Command Para		Required Required
	DD144	Group Function, Request/C	ommand/ <i>A</i>	Acknowlec	1 = Com 2 = Acki 3 = Reac 4 = Reac 5 = Writ	nest Message, mand Message, nowledge Message, I Fields Message, I Fields Reply Message, e Fields Message, e Fields Reply Message			
	DF53 This is the	Integer, 8 bit unsigned Acknowledgement message, se	uint8 t = 0x02.	Range:	0 to 252	Resolutio	n: 1 bit	' <mark>1 bit U</mark> nit-le	
2	Request	ed or Commanded PGN # b edged	eing	Byte Fi	eld Size:		Request Parame	eter	Required
				Bit F	ield Size: 24		Command Para	meter:	Required
	DD009	PGN			24-bit Pa first	rameter Group Number	(PGN) expressed in	binary,	LSB is transmitted
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: <u>1</u>	Used to	construct bit field
3	PGN erro	or code		•	eld Size: ield Size: 4		Request Parame Command Para		Optional Optional
	DD037	Error codes, Acknowledgen	iciit		0x1 = PC $0x2 = PC$ $0x3 = AC$ $0x4 = RC$ $0x5 = DC$	o Error/Acknowledge, GN not supported, GN temporarily not avail access denied, equest or Command is no efiner Tag is not support and or Write is not support	ot supported,		
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: 1	Used to	construct bit field
4	Transmi	ssion Interval / Priority erro	r code		eld Size: ield Size: 4		Request Parame Command Para		Optional Optional
	DD139	Error codesTransmit interva	l acknowl	edgement	0x1 = Tr $0x2 = Tr$ $0x3 = Ac$	o Error/Acknowledge, ansmit Interval /Priority ansmit interval is less th access denied. equest is not supported.		culation	n interval,
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: <mark>1</mark>	Used to	construct bit field
	For read or	r write, group function acknowled	lgement, th	is field sha	ll be set to 0x0	•			
5	Number Paramet	of Requested or Commanders	ed	Byte Fi	eld Size: 1		Request Parame	eter	Optional
				Bit F	ield Size:		Command Para	meter:	Optional
	DD006	Generic counter, short			Numeric	count, event counter, se	quence counter		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolutio	n: 1 bit	Unit-le	ss number
	If Field 3 is	s 0x4 or you are replying to a rea	nd or write g	roup functi	on, this field sl	nall be set to 0xFF. Valu	e 0xFF indicates		

NMEA - Acknowledge group function

6	First para	ameter error code	•	ield Size: Field Size: 4	Request Paral Command Pal		Optional Optional	
	DD141	Error Codes Command Acknow	ledgement	0x1 = Inva 0x2 = Tem 0x3 = Req 0x4 = Acc 0x5 = Req	Error/Acknowledge; lid request or command parameter field; porarily unable to comply; uest or command parameter out-of-range ess denied; uest or Command is not supported; d or Write is not supported;	ply; neter out-of-range; t supported;		
	DF52	Bit field b	oit(n) Range:	Variable	Resolution: 1	Used to	construct bit fields	
7	Variable repeated	Number of fields, Field number	•	ield Size:	·	Request Parameter Optional Command Parameter: Optional		
	DD141	Error Codes Command Acknow		0x0 = No I 0x1 = Inva 0x2 = Tem 0x3 = Req 0x4 = Acc 0x5 = Req	Error/Acknowledge; lid request or command parameter field; porarily unable to comply; uest or command parameter out-of-range ess denied; uest or Command is not supported; d or Write is not supported;	or/Acknowledge; request or command parameter field; rarily unable to comply; t or command parameter out-of-range; denied; t or Command is not supported;		
	DF52	Bit field b	oit(n) Range:	Variable	Resolution: 1	Used to	construct bit fields	

NMEA - Read Fields - group function

ield#	Field Name						
1	Complex Request Group Function Cod	de	-	ield Size: 1 ield Size:			Parameter Optional Optional
	DD144 Group Function, Request/Com	nmand/A	cknowled	1 = Com 2 = Ack 3 = Read 4 = Read 5 = Writ	uest Message, innand Message, nowledge Message, d Fields Message, d Fields Reply Mess te Fields Message, te Fields Reply Mess		
	DF53 Integer, 8 bit unsigned This is the Read Fields message, set = 0x03	uint8	Range:	0 to 252	Reso	lution: 1 bit	Unit-less number
2	PGN Number		•	ield Size: ield Size: <mark>24</mark>		•	Parameter Optional Optional
	DD009 PGN			24-bit Pa	arameter Group Nun	nber (PGN) expre	ssed in binary, LSB is transmitted
	DF52 Bit field	bit(n)	Range:	Variable	Reso	lution: 1	Used to construct bit fields
3	Manufacturer's Code		•	ield Size: ield Size: <mark>11</mark>			Parameter Optional d Parameter: Optional
	DD172 NMEA Manufacturer Code			Assigne	d by NMEA Commi	ttee	
	DF52 Bit field When Field 2 (PGN number) contains a non-p	bit(n) proprietar		Variable mber, this field		lution: 1 e message.	Used to construct bit fields
4	NMEA Reserved		•	ield Size: ield Size: <mark>re</mark>	sv 2	•	Parameter d Parameter:
	DD001 Reserved field			Variable	number of reserved	bits, all set to log	gic "1"
	DF52 Bit field When Field 2 (PGN number) contains a non-p	bit(n) proprietar		Variable mber, this field		<i>lution:</i> 1 e message.	Used to construct bit fields
5	Industry Group		•	ield Size: ield Size: 3			Parameter Optional Optional
	DD168 Industry Group			2 = A 3 = C 4 = M 5 = In C	n-Highway; gricultural and Fores onstruction;		
	DF52 Bit field When Field 2 (PGN number) contains a non-p	bit(n)		Variable		lution: 1	Used to construct bit fields
6	Unique ID	, opnout	Byte Fi	ield Size: 1	To the mercue in the	Request	Parameter Optional d Parameter: Optional
	DD005 Generic numeric ID, short			Number	of route, waypoint,		
	DF53 Integer, 8 bit unsigned This field links the read fields reply group fund	uint8		0 to 252		lution: 1 bit	Unit-less number

NMEA - Read Fields - group function PGN: 126208 hex: 1ED00

7	Number	of Selection Pairs		•	eld Size:	1		Request Param		Optional	
				BIT F	ield Size:			Command Para	ameter:	Optional	
	DD006	Generic counter, short		_		eric count, even	_				
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-le:	ss number	
8	Number	of Parameter Pairs to be Re	ead	•	eld Size: ield Size:	1		Request Paran Command Para		Optional Optional	
	DD006	Generic counter, short			Num	eric count, even	t counter, sequ	counter, sequence counter			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-le	ss number	
9	Field Nu	mber of First Selection Pair	,		eld Size:	1		Request Param Command Para		Optional Optional	
	DD005	Generic numeric ID, short			Num	ber of route, way	ypoint, event,	mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-le:	ss number	
10	Field Val	lue of First Selection Pair		•	eld Size: ield Size:	? n		Request Paran Command Para		Optional Optional	
	DD000	Undefined									
	DF00	Undefined	Undefine	l Range:	undefine	d	Resolution:	undefined	Applica at time	ntion specific, def of use.	ined
11	Variable	Number of fields, field 9 re	peated	•	eld Size: ield Size:	1		Request Paran Command Para		Optional Optional	
	DD005	Generic numeric ID, short			Num	ber of route, way	ypoint, event,	mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-le	ss number	
12	Variable	Number of Fields, field 10 r	repeated	•	eld Size: ield Size:	? n		Request Paran Command Para		Optional Optional	
	DD000	Undefined									
	DF00	Undefined	Undefined	∄ Range:	undefine	d	Resolution:	undefined	Applica at time	ntion specific, def of use.	ined
13	Field Nu Read	mber of First Parameter Pa	ir to be	Byte Fi	eld Size:	1		Request Paran	neter	Optional	
				Bit F	ield Size:			Command Para	ameter:	Optional	
	DD005	Generic numeric ID, short			Num	ber of route, way	ypoint, event,	mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-le	ss number	
14	Variable	Number of Fields, field 13 r	repeated	Byte Field Size: 1 Request Parameter Command Parameter: Command Parameter				Optional Optional			
	DD005	Generic numeric ID, short			Num	ber of route, way	ypoint, event,	mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-le	ss number	

NMEA - Read Fields Reply - group function

Field #	Field Name		
1	Complex Request Group Function Code	Byte Field Size: 1 Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD144 Group Function, Request/Command	/Acknowledge 0 = Request Message, 1 = Command Message, 2 = Acknowledge Message, 3 = Read Fields Message, 4 = Read Fields Reply Message, 5 = Write Fields Message, 6 = Write Fields Reply Message	
	DF53 Integer, 8 bit unsigned uints This is the Read Fields Reply message, set = 0x04	Range: 0 to 252 Resolution	Unit-less number
2	PGN Number	Byte Field Size: Bit Field Size: 24	Request Parameter Command Parameter: Optional Optional
	DD009 PGN	24-bit Parameter Group Number (PGN) expressed in binary, LSB is transmitted
	DF52 Bit field bit(n	Range: <mark>Variable Resolution</mark>	Used to construct bit fields
3	Manufacturer's Code	Byte Field Size: Bit Field Size: 11	Request Parameter Optional Command Parameter: Optional
	DD172 NMEA Manufacturer Code	Assigned by NMEA Committee	
	DF52 Bit field bit(n When Field 2 (PGN number) contains a non-proprie	Resolution Ary PGN number, this field is not included in the mes	
4	NMEA Reserved	Byte Field Size: Bit Field Size: resv 2	Request Parameter Command Parameter:
	DD001 Reserved field	Variable number of reserved bits,	all set to logic "1"
	DF52 Bit field bit(n	Range: Variable Resolution	Used to construct bit fields
	When Field 2 (PGN number) contains a non-proprie	ary PGN number, this field is not included in the mes	ssage.
5	Industry Group	Byte Field Size: Bit Field Size: 3	Request Parameter Optional Command Parameter: Optional
	DD168 Industry Group	0 = Global; 1 = On-Highway; 2 = Agricultural and Forestry; 3 = Construction; 4 = Marine; 5 = Industrial - Process Control - Stationary (Gen-Stationary) 6 = Reserved for SAE 7 = Reserved for SAE	ets)
	DF52 Bit field bit(n	Range: <mark>Variable Resolution</mark>	Used to construct bit fields
	When Field 2 (PGN number) contains a non-proprie	ary PGN number, this field is not included in the mes	ssage.
6	Unique ID	Byte Field Size: Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD005 Generic numeric ID, short	Number of route, waypoint, event,	, mark, etc.
	DF53 Integer, 8 bit unsigned uints This field links the read fields group function with the		1 bit Unit-less number

NMEA - Read Fields Reply - group function

7	Number of Selection Pairs			•	eld Size: ield Size:	1		Request Param Command Para		Optional Optional	
	DD006	Generic counter, short			Num	neric count, event	counter, sequ	ience counter			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	
8	Number	of Parameter Pairs to be R	ead	•	eld Size: ield Size:	1		Request Param Command Para		Optional Optional	
	DD006	Generic counter, short			Num	neric count, event	counter, sequ	ience counter			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	
9	Field Nu	mber of First Selection Pai	r		eld Size: ield Size:	1		Request Param Command Para		Optional Optional	
	DD005	Generic numeric ID, short			Num	iber of route, way	point, event,	mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	
10	Field Val	ue of First Selection Pair		•	eld Size: ield Size:	? n		Request Param Command Para		Optional Optional	
	DD000	Undefined									
	DF00	Undefined	Undefined	Range:	undefine	ed	Resolution:	undefined	Applica at time	tion specific, defir of use.	ed
11	Variable	Number of fields, field 9 re	epeated	•	eld Size: ield Size:	1		Request Param Command Para		Optional Optional	
	DD005	Generic numeric ID, short			Num	ber of route, way	point, event,	mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	
12	Variable	Number of Fields, field 10	repeated	•	eld Size: ield Size:	? n		Request Param Command Para		Optional Optional	
	DD000	Undefined									
	DF00	Undefined	Undefined	Range:	undefine	ed	Resolution:	undefined	Applica at time	tion specific, defir of use.	ed
13	Field Nu Read	mber of First Parameter Pa	air to be	Byte Fi	eld Size:	1		Request Param		Optional	
				Bit F	ield Size:			Command Para	meter:	Optional	
	DD005	Generic numeric ID, short			Num	ber of route, way	point, event,	mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	
14	Field Val	ue of First Parameter Pair	to be Read		eld Size: ield Size:	? n		Request Param Command Para		Optional Optional	
	DD000	Undefined									

NME	A - Read Fields Reply - group fu		PGN: 126208 hex: 1ED00			
15	Variable Number of Fields, field 13 repeated	Byte Field Size: 1 Bit Field Size:	Request Parameter Command Parameter:	Optional Optional		
	DD005 Generic numeric ID, short	Number of route,	waypoint, event, mark, etc.	, mark, etc.		
	DF53 Integer, 8 bit unsigned uint8	Range: 0 to 252	Resolution: 1 bit Unit-le	ss number		
16	Variable Number of Fields, field 14 repeated	Byte Field Size: ? Bit Field Size: n	Request Parameter Command Parameter:	Optional Optional		
	DD000 Undefined					
	DF00 Undefined Undefine	ed Range: undefined	Resolution: undefined Application at time	ation specific, defined of use.		

NMEA - Write Fields - group function

Field #	Field Na	ame								
1	Complex	Request Group Function Co	ode	Byte Fi	eld Size ield Size			Request Param Command Para		Optional Optional
	DD144	Group Function, Request/Co	mmand/A	cknowled	1 = 2 = 3 = 4 = 5 =	Request Message Command Message Acknowledge M Read Fields Mes Read Fields Rep Write Fields Mes Write Fields Rep	age, essage, ssage, ly Message, ssage,			
	DF53 This is the	Integer, 8 bit unsigned Write Fields message, set = 0x0	uint8 5	Range:	0 to 25	72	Resolution:	1 bit	Unit-le	ss number
2	PGN Nur	nber		Byte Fid Bit F	eld Size ield Size			Request Param Command Para		Optional Optional
	DD009	PGN			24 fir		oup Number (I	PGN) expressed in	binary,	LSB is transmitted
	DF52	Bit field	bit(n)	Range:	Variab	le	Resolution:	1	Used to	construct bit fields
3	Manufac	turer's Code		Byte Fi	eld Size ield Size			Request Param Command Para		Optional Optional
	DD172	NMEA Manufacturer Code			As	signed by NMEA	Committee			
	DF52 When Field	Bit field I 2 (PGN number) contains a non-	bit(n) -proprietary	<i>Range:</i> PGN nun			Resolution: led in the mes	-	Used to	construct bit fields
4	NMEA R	eserved		Byte Fid Bit F		resv 2		Request Param Command Para		
	DD001	Reserved field			Va	riable number of i	reserved bits, a	all set to logic "1"		
	DF52	Bit field	bit(n)	Range:	Variab	le	Resolution:	1	Used to	construct bit fields
	When Field	12 (PGN number) contains a non-	-proprietary	PGN nun	nber, this	field is not includ	led in the mes	sage.		
5	Industry	Group		Byte Fi Bit F	eld Size ield Size			Request Param Command Para		Optional Optional
	DD168	Industry Group			1 2 3 2 4 4 5	Global; Glo	nd Forestry; ocess ionary (Gen-Se SAE	ets)		
	DF52	Bit field	bit(n)	Range:			Resolution:	_	Used to	construct bit fields
	When Field	12 (PGN number) contains a non-	-proprietary	PGN nun	nber, this	field is not includ	led in the mes	sage.		
6	Unique II	D		Byte Fi Bit F	eld Size ield Size			Request Param Command Para		Optional Optional
	DD005	Generic numeric ID, short			Nι	mber of route, wa	aypoint, event,	mark, etc.		
	DF53	Integer, 8 bit unsigned	uint8	Range:			Resolution	1 bit	Unit-le	ss number
	This field lin	nks the write fields reply group ful	nction with	the write fi	ields gro	up function.				

NMEA - Write Fields - group function

7	Number	of Selection Pairs			eld Size: ield Size:	1		Request Param Command Para		Optional Optional	
	DD006	Generic counter, short			Num	eric count, event	counter, sequ	ience counter			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	
8	Number	of Parameter Pairs to be W	/ritten	•	eld Size: ield Size:	1		Request Param Command Para		Optional Optional	
	DD006	Generic counter, short			Num	eric count, event	counter, sequ	ience counter			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	
9	Field Nu	mber of First Selection Pai	r		eld Size: ield Size:	1		Request Param Command Para		Optional Optional	
	DD005	Generic numeric ID, short			Num	ber of route, way	point, event,	mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	
10	Field Val	lue of First Selection Pair			eld Size: ield Size:	? n		Request Param Command Para		Optional Optional	
	DD000	Undefined									
	DF00	Undefined	Undefined	Range:	undefine	ed	Resolution:	undefined	Applica at time	ation specific, defi of use.	ned
11	Variable	Number of fields, field 9 re	peated		eld Size: ield Size:	1		Request Param Command Para		Optional Optional	
	DD005	Generic numeric ID, short			Num	ber of route, way	point, event,	mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	
12	Variable	Number of Fields, field 10	repeated	•	eld Size: ield Size:	? n		Request Param Command Para		Optional Optional	
	DD000	Undefined									
	DF00	Undefined	Undefined	Range:	undefine	ed	Resolution:	undefined	Applica at time	ntion specific, defi of use.	ned
13	Field Nu Written	mber of First Parameter Pa	ir to be	Byte Fi	eld Size:	1		Request Param	neter	Optional	
				Bit F	ield Size:			Command Para	ameter:	Optional	
	DD005	Generic numeric ID, short			Num	ber of route, way	point, event,	mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	
14	Field Val Written	lue of First Parameter Pair	to be			?		Request Param		Optional	
	DDCCC	II 1.C 1		BIT F	ield Size:	П		Command Para	ameter:	Optional	
	DD000	Undefined	11.16	Donas:	1 ~	.1	Populution:	1 . C 1	A m = 11	tion on ocitic 1 C	1
	DF00	Undefined	Undefined	range:	undefine	ea	Resolution:	undefined	Applica at time	ation specific, defi of use.	пеа

NME	A - Write Fields - group function	ı	PGN: 126208 hex: 1ED00
15	Variable Number of Fields, field 13 repeated	Byte Field Size: 1 Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD005 Generic numeric ID, short	Number of route	, waypoint, event, mark, etc.
	DF53 Integer, 8 bit unsigned uint8	Range: 0 to 252	Resolution: 1 bit Unit-less number
16	Variable Number of Fields, field 14 repeated	Byte Field Size: ? Bit Field Size: n	Request Parameter Optional Command Parameter: Optional
	DD000 Undefined		
	DF00 Undefined Undefine	ed Range: undefined	Resolution: undefined Application specific, defined at time of use.

NMEA - Write Fields Reply - group function

ield#	Field Name		
1	Complex Request Group Function Cod	le Byte Field Size: Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD144 Group Function, Request/Com	mand/Acknowledge 0 = Request Message, 1 = Command Message, 2 = Acknowledge Message, 3 = Read Fields Message, 4 = Read Fields Reply Message, 5 = Write Fields Reply Message, 6 = Write Fields Reply Message	
	DF53 Integer, 8 bit unsigned This is the Write Fields Reply message, set =		ion: 1 bit Unit-less number
2	PGN Number	Byte Field Size: Bit Field Size: 24	Request Parameter Optional Command Parameter: Optional
	DD009 PGN	24-bit Parameter Group Numb first	er (PGN) expressed in binary, LSB is transmitted
	DF52 Bit field	bit(n) Range: Variable Resolut	ion: 1 Used to construct bit fields
3	Manufacturer's Code	Byte Field Size: Bit Field Size: 11	Request Parameter Command Parameter: Optional Optional
	DD172 NMEA Manufacturer Code	Assigned by NMEA Committee	e
		bit(n) Range: Variable Resolut roprietary PGN number, this field is not included in the r	
4	NMEA Reserved	Byte Field Size: Bit Field Size: resv 2	Request Parameter Command Parameter:
	DD001 Reserved field	Variable number of reserved by	ts, all set to logic "1"
		bit(n) Range: Variable Resolut	
	When Field 2 (PGN number) contains a non-p	roprietary PGN number, this field is not included in the r	nessage.
5	Industry Group	Byte Field Size: Bit Field Size: 3	Request Parameter Command Parameter: Optional
	DD168 Industry Group	0 = Global; 1 = On-Highway; 2 = Agricultural and Forestry 3 = Construction; 4 = Marine; 5 = Industrial - Process Control - Stationary (Ge) 6 = Reserved for SAE 7 = Reserved for SAE	
		bit(n) Range: Variable Resolut	
	When Field 2 (PGN number) contains a non-p	roprietary PGN number, this field is not included in the r	nessage.
6	Unique ID	Byte Field Size: 1 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD005 Generic numeric ID, short	Number of route, waypoint, ev	ent, mark, etc.
	DF53 Integer, 8 bit unsigned This field links the write fields group function w		ion: 1 bit Unit-less number

NMEA - Write Fields Reply - group function

7	Number	of Selection Pairs		•	eld Size: ield Size:	1		Request Param Command Para		Optional Optional	
	DD006	Generic counter, short			Num	neric count, event	counter, sequ				
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	
8	Number	of Parameter Pairs to be W	ritten		eld Size: ield Size:	1		Request Param Command Para		Optional Optional	
	DD006	Generic counter, short			Num	neric count, event	counter, sequ	ience counter			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	
9	Field Nu	mber of First Selection Pai	r		eld Size: ield Size:	1		Request Param Command Para		Optional Optional	
	DD005	Generic numeric ID, short			Nun	ber of route, way	point, event,	mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	
10	Field Val	lue of First Selection Pair		•	eld Size: ield Size:	? n		Request Param Command Para		Optional Optional	
	DD000	Undefined									
	DF00	Undefined	Undefined	Range:	undefine	ed	Resolution:	undefined	Applica at time	ntion specific, defi of use.	ned
11	Variable	Number of fields, field 9 re	peated	•	eld Size: ield Size:	1		Request Param Command Para		Optional Optional	
	DD005	Generic numeric ID, short			Nun	ber of route, way	point, event,	mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	
12	Variable	Number of Fields, field 10	repeated	•	eld Size: ield Size:	? n		Request Param Command Para		Optional Optional	
	DD000	Undefined									
	DF00	Undefined	Undefined	Range:	undefine	ed	Resolution:	undefined	Applica at time	ntion specific, defi of use.	ned
13	Field Nu Written	mber of First Parameter Pa	ir to be	Byte Fi	eld Size:	1		Request Param	neter	Optional	
				Bit F	ield Size:			Command Para	ameter:	Optional	
	DD005	Generic numeric ID, short			Nun	ber of route, way	point, event,	mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	
14	Field Val Written	lue of First Parameter Pair	to be			?		Request Param		Optional	
	DD444	TT 1 C 1		Bit F	ield Size:	n		Command Para	ameter:	Optional	
	DD000	Undefined		D	1 0		D	1.0			
	DF00	Undefined	Undefined	Range:	undefine	ed	Resolution:	undefined	Applica at time	ation specific, defi of use.	ned

NME	A - Write Fields Reply - group fu	ınction	PGN: 126208 hex: 1ED00
15	Variable Number of Fields, field 13 repeated	Byte Field Size: 1 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD005 Generic numeric ID, short	Number of route, way	ypoint, event, mark, etc.
	DF53 Integer, 8 bit unsigned uint8	Range: 0 to 252	Resolution: 1 bit Unit-less number
16	Variable Number of Fields, field 14 repeated	Byte Field Size: ? Bit Field Size: n	Request Parameter Optional Command Parameter: Optional
	DD000 Undefined		
	DF00 Undefined Undefine	ed Range: undefined	Resolution: undefined Application specific, defined at time of use.

PGN List - Transmit PGNs group function

PGN: 126464 hex: 1EE00

The PGN List group function type is defined by the first field.

Transmit PGNs group function: This message contains a list of the Transmitted PGNs that are supported by a node. If the Group Function Code (Field #1) is not specified in the "Command Request" or an ISO Request is made of this PGN, the response will be with both the Transmitted PGNs and Received PGNs group functions. (This PGN will be transmitted twice.)

All ISO Request (PGN 059904) requests for the PGN List parameter group shall be destination address specific (as opposed to global). Once a node issues an ISO Request for PGN List, the node shall not issue a subsequent ISO Request for PGN List until the full response has been received for the first request or the response has timed out in accordance with ISO 11783-3, "Controller response time and time out defaults".

All NMEA Request group function (PGN 126208) requests for the PGN List parameter group shall be destination address specific (as opposed to global).

Once a node issues an NMEA Request for PGN List, the node shall not issue a subsequent NMEA Request for PGN List until the full response has been received for the first request or the response has timed out in accordance with ISO 11783-3, "Controller response time and time out defaults".

This PGN will be requested as needed.

Single Frame: No Priority Default: 6 Default Update Rate: milliseconds Frequency: NA cycles per second Destination: Address Query Support: Required Command Support: Required ACK Rgmnts: Requested data or Acknowledgement Group Function containing error codes of reasons for non-compliance. Field # Field Name Byte Field Size: **Transmitted PGN Group Function Code** Request Parameter 1 Required Bit Field Size: Command Parameter: Required **DD145** Group Function, Transmit and Receive PGN List 0 = Transmit PGN List Message, 1 = Receive PGN List Message Integer, 8 bit unsigned Range: 0 to 252 Resolution: 1 bit Unit-less number DF53 uint8 This is the Transmitted Group List, set = 0x00 Byte Field Size: Request Parameter 2 First PGN supported Optional Bit Field Size: 24 Command Parameter: Optional DD009 PGN 24-bit Parameter Group Number (PGN) expressed in binary, LSB is transmitted **DF52** Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields 3 Variable Number of fields, Field number 2 Byte Field Size: Request Parameter Optional repeated Bit Field Size: 24 Command Parameter: Optional DD009 PGN 24-bit Parameter Group Number (PGN) expressed in binary, LSB is transmitted Range: Variable Resolution: 1 Used to construct bit fields DF52 Bit field bit(n)

PGN List - Received PGNs group function

PGN: 126464 hex: 1EE00

ield#	Field Na	ame						
1	Received PGN Group Function Code			•		•		Required Required
	DD145	Group Function, Transmit ar	d Receive	e PGN Lis	•	it PGN List Message, PGN List Message		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution: 1 bit	Unit-les	s number
	This is the I	Receive Group List, set = 0x01						
2	First PGN	l supported		Byte Fie	eld Size:	Reque	est Parameter	Optional
				Bit F	ield Size: 24	Command Para		Optional
	DD009	PGN			24-bit Parar first	meter Group Number (PGN) ex	expressed in binary,	LSB is transmitted
	DF52	Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to	construct bit field
3	Variable Number of fields, Field number 2 repeated			Byte Fie	eld Size:	Reque	est Parameter	Optional
				Bit F	ield Size: 24	Comm	nand Parameter:	Optional
	DD009	PGN			24-bit Parar first	meter Group Number (PGN) ex	expressed in binary,	LSB is transmitted
	DF52	Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to	construct bit field

Alert PGN: 126983 hex: 1F007

This PGN is used to report the status of an alert and is required for all Alert Service implementations.

The PGN is transmitted according to the update rate when the Alert is active or upon request.

The Command Group function PGN (126208) is used to request or command the Alert PGN.

Query Support for this PGN is required. ISO request is not allowed.

Note 1: When requested or commanded using PGN 126208, if any field 1 thru to 5 is included within the parameter list, it represents a qualifier identifying the target alert or alerts. Any or all of the fields not included as qualifiers are treated as wild cards and the request or command is applied to the remaining fields.

Note 2: Field 18, Test mode can only be commanded, if the existing trigger condition is disabled. Once in test mode it is only possible to command back to disabled. Note 3: Field 19 can only be commanded if the current trigger condition is test mode.

Single Fr	ame: No	Priority Default: 2	Defaul	t Update Ra	te: 1000	milliseconds	Frequency:	1.	cycles per seco
Destinatio	n: <mark>Global</mark>	Query Support: Requir	ed C	ommand Supp	ort: Optional	ACK Rqmnts	None		
ield#	Field Na	ame							
1	Alert Type	е		Byte Fiel			Request Para	meter	Note 1
				Bit Fie	eld Size: 4		Command Pa	rameter:	Note 1
	DD315	Alert Type			0 = Reserved 1 = Emergenc 2 = Alarm 3 = Reserved 4 = Reserved 5 = Warning 6 = Reserved 7 = Reserved 8 = Caution 13 = Reserved 14 = Data out 15 = Data not	l of range			
	DF52	Bit field	bit(n)	Range:	Variable	Resoluti	on: 1	Used to	construct bit fields
		ervice shall convey the Alert type	()	-			-		
2	Alert Cate			Byte Fiel			Request Para		Note 1
	DD316	Alert Category			0 = Navigatio 1 = Technical 13 = Reserved 14 = Data out 15 = Data not	i of range			
	DF52	Bit field	bit(n)	Range:	Variable	Resoluti	on: 1	Used to	construct bit fields
	The Alert Se Definition Ta	ervice shall convey the Alert Ca	()	a means of id	entification. Deper	ndent on NMEA A	lert Code		
3	Alert Sys	tem		Byte Fiel			Request Para		Note 1
				Bit Fie	eld Size:		Command Pa	rameter:	Note 1
	DD317	Alert System			Values define	d by the Alert Coo	les in Appendix B		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resoluti	on: 1 bit	Unit-le	ss number
		ervice shall convey the Alert Sy of the Alert has occurred. Deper					ain system where		

Alert PGN: 126983 hex: 1F007

Byte Field Size: 1 Request Parameter Alert Sub-System Note 1 Bit Field Size: Command Parameter: Note 1 **DD318** Alert Sub-System Values defined by the Alert Codes in Appendix B Range: 0 to 252 Resolution: 1 bit Unit-less number **DF53** Integer, 8 bit unsigned uint8 The Alert Service shall convey the Alert Sub-system as a means of identification, which will describe the sub system where the cause of the Alert has occurred. Dependent on NMEA Alert Code Definition Table. Byte Field Size: Request Parameter 5 Alert ID Bit Field Size: Command Parameter: Note 1 DD319 Alert ID Values defined by the Alert Codes in Appendix B uint16 Range: 0 to 65,532 Resolution: 1 bit Integer, 16 bit unsigned Unit-less number The Alert Service shall convey the Alert ID as a means of describing the actual cause of an Alert. Dependent on NMEA Alert Code Definition Table. Byte Field Size: **Data Source Network ID NAME** Request Parameter Optional 6 Bit Field Size: Command Parameter: Prohibited **DD320** Network ID NAME This field is defined by fields 1-10 of PGN 60928 Resolution: 1 bit Unit-less number Integer, 64 bit unsigned uint64 Range: 0 to (2E+64)-4 The Data Source 64 bit network NAME field found within PGN 060928. This is the NAME of the device providing the data that is monitored by this alert. Byte Field Size: 7 **Data Source Instance** Request Parameter Optional Bit Field Size: Command Parameter: Prohibited **DD128** Generic instance 0 = Instance 01 = Instance 12 = Instance 2n = Instance n, where n < 253253 = Reserved254 = Error255 = Not available Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: 1 bit Unit-less number The Data Source Instance identifies either the Device Instance or the Data Instance (as applicable) of the source of data monitored by this Alert. This parameter is used in conjunction with the Data Source Network ID and the Data Source Index to uniquely identify Alerts of the same type, from the same source but from using a different input or sensor to generate the Alert. If a Request Parameter or Command Parameter is supported on any other Data Field, you must also support the capability on this Data Field. Note: Refer to Alert Codes(Appendix B) & Alert Application Notes (Appendix D).

Alert	PGN: 126983
	hav: 1F007

8	Data Source Index / Source		Byte Field Size: 1	Request	Parameter Optional
			Bit Field Size:	Comman	d Parameter: Prohibited
	DD128 Generic instance		0 = Instance 1 = Instance 2 = Instance n = Instance 253 = Reser 254 = Error 255 = Not a	e 1 e 2 e n, where n < 253 eved	
	DF53 Integer, 8 bit unsi	gned uint8	Range: 0 to 252	Resolution: 1 bit	Unit-less number
	The Data Source Index is an inde If a Request Parameter or Comm capability on this Data Field. Note: Refer to Alert Codes(Appe	and Parameter is sup	ported on any other Data Fig		
9	Alert Occurrence Number		Byte Field Size: 1 Bit Field Size:		Parameter Optional d Parameter: Prohibited
	DD006 Generic counter, sh	ort	Numeric co	unt, event counter, sequence coun	ter
	DF53 Integer, 8 bit unsi	gned uint8	Range: 0 to 252	Resolution: 1 bit	Unit-less number
	This parameter is a number starti	ng at zero and increm	nented by one for each occur	rrence of the same Alert.	
10	Temporary Silence Status		Byte Field Size: Bit Field Size: 1		Parameter <mark>Optional</mark> d Parameter: <mark>Prohibited</mark>
	DD321 Temporary Silence	Status	0 = Not Ten 1 = Tempor	nporary Silence ary Silence	
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1	Used to construct bit fields
	This single bit status denotes who	ether a temporary sile	nce period is active for the c	urrent alert.	
11	Acknowledge Status		Byte Field Size: Bit Field Size: 1	•	Parameter <mark>Optional</mark> d Parameter: Prohibited
	DD322 Acknowledge Statu	ıs	0 = Not Ack 1 = Acknow		
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1	Used to construct bit fields
	This single bit status denotes who	ether the current alert	has been acknowledged.		
12	Escalation Status		Byte Field Size: Bit Field Size: 1	•	Parameter <mark>Optional</mark> d Parameter: Prohibited
	DD323 Escalation Status		0 = Not Esc 1 = Escalate		
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1	Used to construct bit fields
	This single bit status denotes who	ether the current alert	has been escalated.		
13	Temporary Silence Support		Byte Field Size: Bit Field Size: 1	•	Parameter <mark>Optional</mark> d Parameter: <mark>Optional</mark>
	DD324 Temporary Silence	Support	0 = Not Sup 1 = Support		
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1	Used to construct bit fields
	This single bit status denotes who	ether the current Alert	supports the temporary sile	nce feature.	

Alert PGN: 126983 hex: 1F007

14	Acknowl	edge Support		•	eld Size: ield Size: 1		Request Parameter Command Parameter:	Optional Optional
	DD325	Acknowledge Support			0 = Not Supported 1 = Supported			
	DF52 This single	Bit field bit status denotes whether the o	bit(n) current Alert		Variable he acknowledge feature.	Resolution:	1 Used to	o construct bit fields
15	Escalation	on Support		-	eld Size: ield Size: 1		Request Parameter Command Parameter:	Optional Optional
	DD326	Escalation Support			0 = Not Supported 1 = Supported			
	DF52 This single	Bit field bit status denotes whether the	bit(n) current Alert		Variable escalation.	Resolution:	1 Used to	o construct bit fields
16	NMEA R	eserved		•	eld Size: ield Size: resv 2		Request Parameter Command Parameter:	
	DD001	Reserved field			Variable number of	reserved bits, a	all set to logic "1"	
	DF52 Used to ali	Bit field gn subsequent data on byte bou	bit(n) ndary.	Range:	Variable	Resolution:	1 Used t	o construct bit fields
17	Acknowl	edge Source Network ID NA	ME	•	eld Size: 8		Request Parameter Command Parameter:	Optional Prohibited
	DD320	Network ID NAME			This field is defined	by fields 1- 10	of PGN 60928	
	DF56	Integer, 64 bit unsigned	uint64	Range:	0 to (2E+64)-4	Resolution:	1 bit Unit-le	ss number
		wledge Source 64 bit network N ged this alert.	AME field fo	ound within	PGN 060928. This is the	NAME of the o	levice that	
18	Trigger (Condition		•	eld Size: ield Size: <mark>4</mark>		Request Parameter Command Parameter:	Optional Note 2
	DD328	Trigger Condition			0 = Manual (triggered 1 = Auto (triggered 2 = Test (alert is in the street of the st	autonomously) test mode) is not operation		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	o construct bit fields
19	Thresho	ld Status		-	eld Size: ield Size: <mark>4</mark>		Request Parameter Command Parameter:	
	DD329	Threshold Status			3 = Low Threshold	old Exceeded, Exceeded, field hreshold Excee	field added to support 01 1 added to support 0183 ded, field added to suppo	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used t	o construct bit fields

Alert							Р	GN: 126983 hex: 1F007
20	Alert Pric	prity		•	eld Size: 1		Request Paramet	- p
	DD006	Generic counter, short			Numeric cou	unt, event counter, sequ	uence counter	
	DF53 The Alert p	Integer, 8 bit unsigned riority is a numeric value in the r	uint8 range of 0 to	-	0 to 252 e 0 is the highest	Resolution: priority.	1 bit U	Jnit-less number
21	Alert Sta	te		Byte Fie Bit Fi	eld Size: 1		Request Paramet	deter: Optional Prohibited
	DD330	Alert State			253 = Reser 254 = Data o	l eledged g Acknowledge ved		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	1 bit U	Jnit-less number

Alert Response PGN: 126984 hex: 1F008

This PGN is used to control an active Alert. The function of this PGN is to send an acknowledge command or a temporary silence command to the Alert Source. Since this is a broadcast PGN, a destination Alert Source name field is included.

The PGN also includes data source instance to enable the product providing an alert to distinguish from multiple sensors.

Note 1: It is not possible to request or command this PGN.

Single F	rame: No	Priority Default: 2	Default Update R	Rate: m		, ,	A cycles per second
Destination	on: <mark>Global</mark>	Query Support: Prohibite	d Command Sup	oport: Prohibited	ACK Rqmnts: N	one	
ield#	Field Nam	e					
1	Alert Type		•	ield Size:		Request Parameter	Note 1
			Bit F	ield Size: 4		Command Parameter	Prohibited
	DD315 A	lert Type		0 = Reserved 1 = Emergency 2 = Alarm 3 = Reserved 4 = Reserved 5 = Warning 6 = Reserved 7 = Reserved 8 = Caution 13 = Reserved 14 = Data out of 15 = Data not a	of range		
	DF52	Bit field	bit(n) Range:	Variable	Resolution:	1 Used t	to construct bit fields
	The Alert Serv	rice shall convey the Alert type					
2	Alert Categ	ory	Byte Fi	ield Size:		Request Parameter	Note 1
			Bit F	ield Size: 4		Command Parameter	Prohibited
	DD316 A	lert Category		0 = Navigation 1 = Technical 13 = Reserved 14 = Data out of 15 = Data not a	of range		
	DF52	Bit field	bit(n) Range:	Variable	Resolution:	1 Used t	to construct bit fields
	The Alert Serv Definition Tab	rice shall convey the Alert Cateque.	gory as a means of	identification. Depend	dent on NMEA Alert	Code	
3	Alert Syster	n	•	ield Size: 1]	Request Parameter Command Parameter	Note 1 Prohibited
	DD317 A	lert System		Values defined	by the Alert Codes	in Appendix B	
		Integer, 8 bit unsigned	uint8 Range:	0 to 252	Resolution:	1 bit Unit-l	ess number
	The Alert Serv	ice shall convey the Alert Systene Alert has occurred. Depende	em as a means of id	entification, which wil	I describe the main	system where	
4	Alert Sub-S	ystem	•	ield Size: 1		Request Parameter Command Parameter	Note 1 Prohibited
	DD318 A	lert Sub-System		Values defined	by the Alert Codes	in Appendix B	
	DF53	Integer, 8 bit unsigned	uint8 Range:	0 to 252	Resolution:	1 bit Unit-l	ess number
	The Alert Serv	rice shall convey the Alert Sub-se of the Alert has occurred. De	system as a means	of identification, which		ub system	

DCN: 126984

Aleri	t Response		PGN: 126984 hex: 1F008
5	Alert ID	Byte Field Size: 2 Bit Field Size:	Request Parameter Note 1 Command Parameter: Prohibited
	DD319 Alert ID	Values defined by the	e Alert Codes in Appendix B
	DF54 Integer, 16 bit unsigned The Alert Service shall convey the Alert ID as Alert Code Definition Table.	uint16 Range: 0 to 65,532 a means of describing the actual cause of an	Resolution: 1 bit Unit-less number Alert. Dependent on NMEA
6	Data Source Network ID NAME	Byte Field Size: Bit Field Size:	Request Parameter Command Parameter: Prohibited
	DD320 Network ID NAME	This field is defined by	by fields 1- 10 of PGN 60928
	DF56 Integer, 64 bit unsigned The Data Source 64 bit network NAME field fo that is monitored by this alert.	uint64 Range: 0 to (2E+64)-4 ound within PGN 060928. This is the NAME of	Resolution: 1 bit Unit-less number the device providing the data
7	Data Source Instance	Byte Field Size: 1 Bit Field Size:	Request Parameter Command Parameter: Prohibited
	DD128 Generic instance	0 = Instance 0 1 = Instance 1 2 = Instance 2 n = Instance n, when 253 = Reserved 254 = Error 255 = Not available	e n < 253
	DF53 Integer, 8 bit unsigned The Data Source Instance identifies either the monitored by this Alert. This parameter is used Index to uniquely identify Alerts of the same ty generate the Alert. Note: Refer to Alert Codes(Appendix B) & Aler	d in conjunction with the Data Source Network ype, from the same source but from using a diff	ID and the Data Source
8	Data Source Index / Source	Byte Field Size: 1	Request Parameter Note 1
0	Data Source muex / Source	Bit Field Size:	Command Parameter: Prohibited
	DD128 Generic instance	0 = Instance 0 1 = Instance 1 2 = Instance 2 n = Instance n, where 253 = Reserved 254 = Error 255 = Not available	re n < 253
	6) - 6	uint8 Range: 0 to 252	Resolution: 1 bit Unit-less number
	The Data Source Index is an index into a set of Note: Refer to Alert Codes(Appendix B) & Aler		Instance.

Byte Field Size: 1

Bit Field Size:

Range: 0 to 252

uint8 This parameter is a number starting at zero and incremented by one for each occurrence of the same Alert.

Request Parameter

Numeric count, event counter, sequence counter

Resolution: 1 bit

Command Parameter: Prohibited

Note 1

Unit-less number

Alert Occurrence Number

DF53

DD006 Generic counter, short

Integer, 8 bit unsigned

9

Alert Response PGN: 126984 hex: 1F008

Byte Field Size: 8 Acknowledge Source Network ID NAME Request Parameter 10 Note 1 Bit Field Size: Command Parameter: Prohibited This field is defined by fields 1- 10 of PGN 60928 **DD320** Network ID NAME uint64 Range: 0 to (2E+64)-4 Integer, 64 bit unsigned Resolution: 1 bit Unit-less number **DF56** The Acknowledge Source 64 bit network NAME field found within PGN 060928. This is the NAME of the device that acknowledged this alert. Byte Field Size: **Response Command** Request Parameter 11 Note 1 Bit Field Size: 2 Command Parameter: Prohibited **DD332** Response Command 0 = Acknowledge1 = Temporary Silence 2 = Test Command off 3 = Test Command onResolution: 1 Used to construct bit fields **DF52** Bit field bit(n) Range: Variable **NMEA Reserved** Byte Field Size: Request Parameter 12 Bit Field Size: resv 6 Command Parameter: **DD001** Reserved field Variable number of reserved bits, all set to logic "1" Resolution: 1 DF52 Bit field bit(n) Range: Variable Used to construct bit fields Used to align subsequent data on byte boundary.

Alert Text PGN: 126985 hex: 1F009

The Alert text PGN is used to convey identification and location text strings associated with source of an Alert. This PGN is not a mandatory requirement to implement the Alert Service.

This PGN would either be transmitted cyclically once an alert is active or upon request. If the PGN is transmitted cyclically then the frequency shall not be any more than once every 10 seconds.

This PGN shall be transmitted upon request regardless of alert status. The Command Group function PGN (126208) is used to request or command the Alert Text PGN.

Note 1: When requested or commanded using PGN 126208, if any field 1 thru to 5 is included within the parameter list, it represents a qualifier identifying the target alert or alerts.

Any or all of the fields not included as qualifiers are not considered or used in the selection process of applying the request or command to the remaining fields (These are considered as wild cards).

Note 2: Field 10 can be used to request text strings by a defined language.

Single Fra	ame: No	Priority Default: 2	Defaul	t Update Rate:	10000	milliseconds	Frequency:	.1	cycles per second
Destinatio	n: <mark>Global</mark>	Query Support: Req	<mark>uired</mark> C	ommand Support:	Optional	ACK Rqmnts	None		
Field #	Field Na	ame							
1	Alert Typ	е		Byte Field S Bit Field			Request Para Command Pa		Note 1 Note 1
	DD315	Alert Type			0 = Reserved 1 = Emergence 2 = Alarm 3 = Reserved 4 = Reserved 5 = Warning 6 = Reserved 7 = Reserved 8 = Caution 13 = Reserved 14 = Data out 15 = Data not	d c of range			
	DF52 The Alert S	Bit field ervice shall convey the Alert	bit(n) t type as a mea	Range: Va		Resoluti	on: 1	Used to	construct bit fields
2	Alert Cate			Byte Field : Bit Field	Size:		Request Para Command Pa		Note 1 Note 1
	DD316	Alert Category			0 = Navigation 1 = Technical 13 = Reserved 14 = Data out 15 = Data not	d t of range			
	DF52	Bit field	bit(n)	Range: Va	riable	Resoluti	on: 1	Used to	construct bit fields
	The Alert S Definition T	ervice shall convey the Alertable	t Category as a	a means of ident	tification. Depe	ndent on NMEA A	lert Code		
3	Alert Sys	tem		Byte Field : Bit Field			Request Para Command Pa		Note 1 Note 1
	DD317	Alert System			Values define	ed by the Alert Coo	des in Appendix B		
		Integer, 8 bit unsigned ervice shall convey the Alert fthe Alert has occurred. De			ication, which v		1 010	Unit-les	s number

Alert Text PGN: 126985 hex: 1F009

Byte Field Size: 1 Request Parameter Alert Sub-System Note 1 Bit Field Size: Command Parameter: Note 1 **DD318** Alert Sub-System Values defined by the Alert Codes in Appendix B Range: 0 to 252 Resolution: 1 bit Unit-less number **DF53** Integer, 8 bit unsigned uint8 The Alert Service shall convey the Alert Sub-system as a means of identification, which will describe the sub system where the cause of the Alert has occurred. Dependent on NMEA Alert Code Definition Table. Byte Field Size: Request Parameter 5 Alert ID Bit Field Size: Command Parameter: Note 1 DD319 Alert ID Values defined by the Alert Codes in Appendix B uint16 Range: 0 to 65,532 Resolution: 1 bit Integer, 16 bit unsigned Unit-less number The Alert Service shall convey the Alert ID as a means of describing the actual cause of an Alert. Dependent on NMEA Alert Code Definition Table. Byte Field Size: **Data Source Network ID NAME** Request Parameter Note 2 6 Bit Field Size: Command Parameter: Note 2 **DD320** Network ID NAME This field is defined by fields 1-10 of PGN 60928 Resolution: 1 bit Unit-less number Integer, 64 bit unsigned uint64 Range: 0 to (2E+64)-4 The Data Source 64 bit network NAME field found within PGN 060928. This is the NAME of the device providing the data that is monitored by this alert. Byte Field Size: 7 **Data Source Instance** Request Parameter Note 2 Command Parameter: Note 2 Bit Field Size: **DD128** Generic instance 0 = Instance 01 = Instance 12 = Instance 2n = Instance n, where n < 253253 = Reserved254 = Error255 = Not available Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: 1 bit Unit-less number The Data Source Instance identifies either the Device Instance or the Data Instance (as applicable) of the source of data monitored by this Alert. This parameter is used in conjunction with the Data Source Network ID and the Data Source Index to uniquely identify Alerts of the same type, from the same source but from using a different input or sensor to generate the Alert. If a Request Parameter or Command Parameter is supported on any other Data Field, you must also support the capability on this Data Field.

Note: Refer to Alert Codes(Appendix B) & Alert Application Notes (Appendix D).

Alert Text PGN: 126985 hex: 1F009

Data Source Index / Source	Byte Field Size: 1 Bit Field Size:		Request Parame Command Param		Note 2 Note 2
DD128 Generic instance	0 = Instance 0 1 = Instance 1 2 = Instance 2 n = Instance n, where 253 = Reserved 254 = Error 255 = Not available	e n < 253			
DF53 Integer, 8 bit unsigned uint8	Range: 0 to 252	Resolution:	1 bit	Unit-les	ss number
The Data Source Index is an index into a set of data a If a Request Parameter or Command Parameter is su capability on this Data Field.	upported on any other Data Field, you r		port the		
 Note: Refer to Alert Codes(Appendix B) & Alert Applic	ation Notes (Appendix D).				
Alert Occurrence Number	Byte Field Size: 1 Bit Field Size:		Request Parame Command Param		Optional Prohibited
DD006 Generic counter, short	Numeric count, event	t counter, sequ	ience counter		
DF53 Integer, 8 bit unsigned uint8 The parameter is a number starting at zero and incren	Range: 0 to 252 nented by one for each occurrence of t	Resolution: the same Aler	1 010	Unit-les	ss number
Language ID	Byte Field Size: 1		Request Parame	eter	Note 2
	Bit Field Size:		Command Paral	meter:	Optional
DD355 Language ID	0 = English (US) 1 = English (UK)				
	2 = Arabic 3 = Chinese (simplif 4 = Croatian 5 = Danish 6 = Dutch 7 = Finnish 8 = French 9 = German 10 = Greek 11 = Italian 12 = Japanese 13 = Korean 14 = Norwegian 15 = Polish 16 = Portuguese(Bra 17 = Russian 18 = Spanish				
DF53 Integer, 8 bit unsigned uint8	3 = Chinese (simplif 4 = Croatian 5 = Danish 6 = Dutch 7 = Finnish 8 = French 9 = German 10 = Greek 11 = Italian 12 = Japanese 13 = Korean 14 = Norwegian 15 = Polish 16 = Portuguese(Bra 17 = Russian		1 bit	Unit le	ss number

Alert Text PGN: 126985 hex: 1F009

Byte Field Size: 8 or 16 n **Alert Text Description** Request Parameter 11 Optional Bit Field Size: Command Parameter: Optional

DD004 Generic name string, short Name of place, route, waypoint, destination, vessel, vehicle, etc.

String, variable, short ch8or16(n)Range: 0 to 250 ASCII or Resolution: 1 ASCII or 0 to 125 Unicode 1 Unicode Characters Character

This is a text string describing the Alert.

DF50

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII

characters

A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

12 **Alert Location Text Description** Byte Field Size: 8 or 16 n Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD004 Generic name string, short

Name of place, route, waypoint, destination, vessel, vehicle, etc.

ch8or16(n)Range: **DF50** String, variable, short

This is a text string describing the location of the Alert.

0 to 250 ASCII or 0 to 125 Unicode

Characters

Resolution: 1 ASCII or 1 Unicode Character

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters

A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

Alert Configuration PGN: 126986 hex: 1F00A

This PGN shall be required for all Alert Service implementations. This PGN is used to report the configuration of an alert.

When reporting the configuration, the "User Defined Alert Assignment" Field 11 shall be set to a value of "2" meaning "Not Applicable" This PGN can also be used in conjunction with the Command Group Function PGN (126208) to change the configuration of an alert.

This PGN can also be used in conjunction with the Command Group Function PGN (126208) to create a new "User Defined" Alert that does not exist within the current network and is not already defined within the NMEA 2000 Alert Codes. (See NMEA 2000 Appendix B, Alert Codes). This PGN can also be used in conjunction with the Command Group Function PGN (126208) to remove a single "User Defined" Alert that was previously created within the current network.

This PGN shall be broadcast after the acknowledgement required by the Command Group Function (126208).

Note 1: When commanded using PGN 126208, if any field 1 thru 5 is included in the commanded parameter list, it represents a qualifier identifying the specific alert or alerts that the command will apply to. Any field 1 thru 5 that is not included is treated as a wild card and the command is applied to all alerts matching the remaining fields.

Note 2: Fields 6, 7 & 8, can also optionally be requested or commanded. Fields 7 & 8 are dependent on field 6.

For more information, see Alert Application Notes in Appendix D.

Note 3: The ability to command Field 10 shall be required. Note 4: Commanding the "User Defined Alert Assignment" Field 11 is optional. When commanded this field is used for two purposes: 1 - To create a new (user defined) Alert that does not exist within the current network and that is not already defined within the NMEA 2000 Alert Codes. (See NMEA 2000 Appendix B). When commanded using PGN 126208, this field is set to a value of "0 = Instantiate (new) User Defined Alert".

When commanded using PGN 126208, fields 2 thru 5 shall be included in the commanded parameter list, identifying the specific alert that the command will apply to. The fields shall be interpreted as follows: For Field 2 – "Alert Category" shall be used as a qualifier to determine which NMEA defined category (Navigational or Technical) the new "User Defined Alert" should be assigned to. For Field 3 – "Alert System", the values determine the action taken.

If the provided value is within the NMEA "User Defined Range for this field" and does not exist within the current network, a new "User Defined" Alert System entry is created; If the provided value is already defined by NMEA or previous "User Defined" actions, the value is treated as qualifier as to what Alert System the new "User Defined Alert" is assigned to.

For Field 4 – "Alert Subsystem", the values determine the action taken. If the provided value is within the NMEA "User Defined Range for this field" and does not exist within the current network, a new "User Defined" Alert Subsystem entry is created; If the provided value is already defined by NMEA or previous "User Defined" actions, the value is treated as qualifier as to what Alert Subsystem the new "User Defined Alert" is assigned to.

For Field 5 – "Alert ID": The provided value must be within the NMEA "User Defined" Range for this field and does not exist within the current network, then a new "User Defined" Alert ID entry is created; If the provided value is already defined by NMEA or previous "User Defined" actions, this is an invalid command and should be Acknowledged as such.

2 - To remove an existing "User Defined" Alert that exists within the current network. When commanded using PGN 126208, this field is set to a value of "1 = Remove (existing) User Defined Alert".

When commanded using PGN 126208, fields 2 thru 5 shall be included in the as necessary commanded parameter list, identifying the specific alert that the command will apply to. For instance if there is only a "User Defined" Alert System with no associated Alert Subsystem, the Alert Subsystem Field 4 does not need to be commanded.

The fields shall be interpreted as follows; For Field 2 – "Alert Category" shall be used as a qualifier to determine which NMEA defined category (Navigational or Technical) the existing "User Defined Alert" should be removed from.

For Field 3 – "Alert System", the values determine the action taken. If the provided value is within the NMEA "User Defined Range for this field", and exists within the current network, and there are no "User Defined" Alert Subsystems associated with the Alert System value, the "User Defined" Alert System is removed; If the provided value is already defined by NMEA, or defined by previous "User Defined" actions and is associated with one or more "User Defined" Alert Subsystems, the value is treated as qualifier as to what Alert System the "User Defined Alert" is to be removed from.

For Field 4 – "Alert Subsystem", the values determine the action taken. If the provided value is within the NMEA "User Defined Range for this field", exists within the current network, and there are no "User Defined" Alert IDs associated with the Alert Subsystem

Alert Configuration PGN: 126986 hex: 1F00A

value, the "User Defined" Alert Subsystem is removed; If the provided value is already defined by NMEA, or defined by previous "User Defined" actions and is associated with one or more "User Defined" Alert IDs, the value is treated as qualifier as to what Alert Subsystem the "User Defined Alert" is to be removed from.

For Field 5 – "Alert ID": The provided value must be within the NMEA "User Defined" Range for this field and exists within the current network, only then can the "User Defined" Alert ID is removed; If the provided value is already defined by NMEA or does not exist from previous "User Defined" actions, this is an invalid command and should be Acknowledged as such.

NMEA defined Alerts shall not be affected by the "User Defined Alert Assignment" Field 11.

•	rame: No	Priority Default: 2		Update Ra			Frequency:	N/	cycles per secor
Destination	on: <mark>Global</mark>	Query Support: R	equired Co	mmand Supp	ort: Required	ACK Rqmnts: N	lone		
ield#	Field Na	ame							
1	Alert Typ	e		Byte Fiel Bit Fie	ld Size: eld Size: 4		Request Pa		Required Optional
	DD315	Alert Type			0 = Reserved 1 = Emergene 2 = Alarm 3 = Reserved 4 = Reserved 5 = Warning 6 = Reserved 7 = Reserved 8 = Caution 13 = Reserve 14 = Data out 15 = Data not	ey Alarm d t of range			
	DF52 The Alert S	Bit field ervice shall convey the A	bit(n) lert type as a mea	Range:		Resolution	1	Used to	construct bit fields
2	Alert Cat	egory		Byte Fiel Bit Fie	ld Size: eld Size: 4		Request Pa		Required Note 1
	DD316	Alert Category			0 = Navigation 1 = Technical 13 = Reserve 14 = Data out 15 = Data not	l d t of range			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
	The Alert S Definition T	ervice shall convey the A able.	()	means of id	entification. Depe	ndent on NMEA Aler	t Code		
3	Alert Sys	tem		Byte Fiel Bit Fie	ld Size: 1		Request Pa Command F		Required Note 1
	DD317	Alert System			Values define	ed by the Alert Codes	in Appendix l	В	
	DF53	Integer, 8 bit unsign	ed uint8	Range:	0 to 252	Resolution	1 bit	Unit-le	ss number
		ervice shall convey the A of the Alert has occurred.					system where	e	

Alert Configuration PGN: 126986 hex: 1F00A

4		b-System	Byte Field Size: 1 Bit Field Size:	Request Parameter Command Parameter	Required Note 1
		Alert Sub-System	Range: 0 to 252	the Alert Codes in Appendix B Resolution: 1 bit Unit-l	ess number
		Integer, 8 bit unsigned uint8 Service shall convey the Alert Sub-system as cause of the Alert has occurred. Dependent	s a means of identification, which wil	Il describe the sub system	ess number
5	Alert ID		Byte Field Size: Bit Field Size:	Request Parameter Command Parameter	Required Note 1
	DD319	Alert ID	Values defined by t	the Alert Codes in Appendix B	
		Service shall convey the Alert ID as a means	Range: 0 to 65,532 of describing the actual cause of ar		ess number
	Alert Code	Definition Table.			
6	Data Soi	urce Network ID NAME	Byte Field Size: 8 Bit Field Size:	Request Parameter Command Parameter	Note 2 Note 2
	DD320	Network ID NAME	This field is defined	d by fields 1- 10 of PGN 60928	
		Integer, 64 bit unsigned uint64 Source 64 bit network NAME field found with itored by this alert.	Range: 0 to (2E+64)-4 in PGN 060928. This is the NAME of	1 010	ess number
7	Data So	urce Instance	Byte Field Size: 1 Bit Field Size:	Request Parameter Command Parameter	Note 2
	DD128	Generic instance	0 = Instance 0 1 = Instance 1 2 = Instance 2 n = Instance n, who 253 = Reserved 254 = Error 255 = Not available		
	DF53	Integer, 8 bit unsigned uint8	Range: 0 to 252	Resolution: 1 bit Unit-1	ess number
	monitored Index to ur generate the	Source Instance identifies either the Device I by this Alert. This parameter is used in conjudiquely identify Alerts of the same type, from the Alert. If a Request Parameter or Command capability on this Data Field.	unction with the Data Source Network the same source but from using a d	rk ID and the Data Source different input or sensor to	
	Note: Refe	r to Alert Codes(Appendix B) & Alert Applica	ation Notes (Appendix D).		

PGN: 126986

			hex: 1F00A
8	Data Source Index / Source	Byte Field Size: 1 Bit Field Size:	Request Parameter Note 2 Command Parameter: Note 2
	DD128 Generic instance	0 = Instance 0 1 = Instance 1 2 = Instance 2 n = Instance n, where 253 = Reserved 254 = Error 255 = Not available	e n < 253
	DF53 Integer, 8 bit unsigned uint8	Range: 0 to 252	Resolution: 1 bit Unit-less number
	The Data Source Index is an index into a set of data Parameter or Command Parameter is supported on a Data Field. Note: Refer to Alert Codes(Appendix B) & Alert Appli	any other Data Field, you must also supp	
9	Alert Occurrence Number	Byte Field Size: 1	Request Parameter Optional
9	Alert Occurrence Humber	Bit Field Size:	Command Parameter: Prohibited
	DD006 Generic counter, short	Numeric count, event	counter, sequence counter
	DF53 Integer, 8 bit unsigned uint8	_	Resolution: 1 bit Unit-less number
	The parameter is a number starting at zero and incre	•	2 2 2 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
40	<u> </u>	<u> </u>	
10	Alert Control	Byte Field Size: Bit Field Size: 2	Request Parameter Optional Command Parameter: Required
	DD333 Alert Control	0 = Disabled 1 = Enabled	
	DF52 Bit field bit(n) 0 = Alert Disabled 1 = Alert Enabled	Range: <mark>Variable</mark>	Resolution: 1 Used to construct bit fields
11	User Defined Alert Assignment	Byte Field Size: Bit Field Size: 2	Request Parameter Optional Command Parameter: Note 4
	DD411 User Defined Alert Assignment	0 = Instantiate (new) 1 = Remove (existin 2 = Null – not applie	g) User Defined Alert
	DF52 Bit field bit(n)	Range: Variable	Resolution: 1 Used to construct bit fields
12	NMEA Reserved	Byte Field Size: Bit Field Size: resv 4	Request Parameter Command Parameter:
	DD001 Reserved field	Variable number of re	eserved bits, all set to logic "1"
	DF52 Bit field bit(n)	Range: Variable	Resolution: 1 Used to construct bit fields
	Used to align subsequent data on byte boundary.		
13	Reactivation Period	Byte Field Size: 4 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD334 Reactivation Period	Range: 0 to ~4.295x1	0E+9 s
	DF67 Time interval, large uint3 2	Range: 0 to ~4.295x10E+9 s	Resolution: 1 sec
	This field contains the reactivation period associated		

state of an Alert from acknowledged back to Active. This value is in seconds

Alert Configuration

Alert Configuration	PGN: 126986
	hex: 1F00A

 14
 Temporary Silence Period
 Byte Field Size:
 4
 Request Parameter
 Optional

 Bit Field Size:
 Command Parameter:
 Optional

DD335 Temporary Silence Period Range: 0 to ~4.295x10E+9 s

DF67 Time interval, large uint32 Range: 0 to ~4.295x10E+9 s Resolution: 1 sec

This field contains the temporary silence period associated with the target Alert. The temporary Silence period is used to determine how long an audible device remains muted after a temporary silence command has been issued. This value is in seconds.

15 Escalation Period Byte Field Size: 4 Request Parameter Optional
Bit Field Size: Command Parameter: Optional

DD336 Escalation Period Range: 0 to ~4.295x10E+9 s

DF67 Time interval, large uint32 Range: 0 to ~4.295x10E+9 s Resolution: 1 sec

This field contains the escalation period associated with the target Alert. The Escalation period is used as an elapsed time before the status of an Alert is escalated. The value is defined in seconds.

Alert Threshold PGN: 126987
hex: 1F00B

The Alert Threshold PGN is used to convey or program the trigger method and threshold level associated with an Alert. This PGN is not a mandatory requirement to implement the Alert Service.

The Command Group function PGN (126208) is used to request or command the Alert Threshold PGN.

Note 1: When requested or commanded fields 1 thru to 5 represent a qualifier indentifying the target alert or alerts. Any or all of the fields 1 thru to 5 not included as qualifiers are treated as wild cards and the request or command is applied to the remaining fields.

Note 2: Fields 6, 7 and 8 can also be used to qualify a specific request or command of this PGN. Fields 7 and 8 are dependent on field 6.

Note 3: Fields 10 thru 15 shall be specified when this PGN is commanded. When programming threshold parameters, fields 11 thru 14 for each parameter must be specified each time this Alert is commanded. Each issuance of commanding the Alert Threshold PGN replaces all previously assigned parameters.

ACK Rqmnts: None Request Parameter Note 1 Command Parameter: Note 1
ed ency Alarm ed out of range not available
Resolution: 1 Used to construct bit fields
Request Parameter Note 1 Command Parameter: Note 1
tional cal ved out of range not available
Resolution: 1 Used to construct bit fields
pendent on NMEA Alert Code
Request Parameter Note 1 Command Parameter: Note 1
ined by the Alert Codes in Appendix B
Resolution: 1 bit Unit-less number
h will describe the main system where able.

Alert Threshold PGN: 126987 hex: 1F00B

DF53 The Alert S where the or Alert ID DD319 DF54 The Alert S Alert Code Data Sou	Alert Sub-System Integer, 8 bit unsigned ervice shall convey the Alert Sub- cause of the Alert has occurred. D Alert ID Integer, 16 bit unsigned ervice shall convey the Alert ID as Definition Table. Ince Network ID NAME Network ID NAME Integer, 64 bit unsigned	Dependent of	Byte Fine State of describes a means on NMEA. Byte Fine State of describes a means on NMEA. Byte Fine State of describes a means on NMEA.	0 to 252 of identification, wh Alert Code Definition eld Size: Values define 0 to 65,532	ed by the Alert Codes Resolution	Request Parame Command Parame s in Appendix B 1 bit dent on NMEA	Unit-less number
The Alert S where the country and the Alert ID DD319 DF54 The Alert S Alert Code Data Sou	Alert ID Integer, 16 bit unsigned ervice shall convey the Alert ID a Definition Table. Integer Network ID NAME	e-system as Dependent of uint16	Byte Fine State of describes a means on NMEA. Byte Fine State of describes a means on NMEA. Byte Fine State of describes a means on NMEA.	of identification, wh Alert Code Definition eld Size: 2 iteld Size: Values define 0 to 65,532 ing the actual cause eld Size: 8	ich will describe the on Table. and the control of	Request Parame. Command Parames in Appendix B I bit Udent on NMEA Request Parame	neter: Note 1 Note 1 Unit-less number
DD319 DF54 The Alert S Alert Code Data Sou	Integer, 16 bit unsigned ervice shall convey the Alert ID as Definition Table. Irce Network ID NAME Network ID NAME		Bit F Range: of describ	Values define 0 to 65,532 ing the actual caus eld Size: 8	Resolution	Command Parames in Appendix B 1 bit Understood NMEA Command Parame Request Parame	Unit-less number
DF54 The Alert S Alert Code Data Sou	Integer, 16 bit unsigned ervice shall convey the Alert ID as Definition Table. Irce Network ID NAME Network ID NAME		of describ	0 to 65,532 ing the actual causeld Size: 8	Resolution	: I bit Lident on NMEA Request Parame	ter Note 2
The Alert S Alert Code Data Sou DD320	ervice shall convey the Alert ID as Definition Table. Irce Network ID NAME Network ID NAME		of describ	ing the actual caus		dent on NMEA Request Parame	ter Note 2
DD320	Network ID NAME						
						Command Param	neter: Note 2
DF56	Integer 61 hit unsigned			This field is o	lefined by fields 1-1	0 of PGN 60928	
	Source 64 bit network NAME field itored by this alert.			0 to (2E+64)-4 0928. This is the N	Resolution AME of the device processes the second	1 010	Jnit-less number
Data Sou	irce Instance		•	eld Size: 1		Request Parame Command Param	
DD128	Generic instance			2 = Instance 2 n = Instance 1 253 = Reserv 254 = Error	1 2 n, where n < 253 ed		
DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	: 1 bit U	Jnit-less number
monitored Index to un generate the	source Instance identifies either the by this Alert. This parameter is us- iquely identify Alerts of the same the Alert. It Parameter or Command Parame	ed in conju type, from	inction with the same	n the Data Source N source but from usi	Network ID and the Ding a different input o	oata Source or sensor to	
	monitored I Index to un generate th If a Reques	The Data Source Instance identifies either the monitored by this Alert. This parameter is us lindex to uniquely identify Alerts of the same generate the Alert.	The Data Source Instance identifies either the Device Inmonitored by this Alert. This parameter is used in conjuil Index to uniquely identify Alerts of the same type, from generate the Alert. If a Request Parameter or Command Parameter is supported by this Data Field.	The Data Source Instance identifies either the Device Instance or monitored by this Alert. This parameter is used in conjunction witl Index to uniquely identify Alerts of the same type, from the same generate the Alert. If a Request Parameter or Command Parameter is supported on a capability on this Data Field.	2 = Instance of n = Instance o	DF53 Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution The Data Source Instance identifies either the Device Instance or the Data Instance (as applicable) of the monitored by this Alert. This parameter is used in conjunction with the Data Source Network ID and the Data Index to uniquely identify Alerts of the same type, from the same source but from using a different input of generate the Alert. If a Request Parameter or Command Parameter is supported on any other Data Field, you must also supported on this Data Field.	2 = Instance 2 n = Instance n, where n < 253 253 = Reserved 254 = Error 255 = Not available DF53 Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: 1 bit The Data Source Instance identifies either the Device Instance or the Data Instance (as applicable) of the source of data monitored by this Alert. This parameter is used in conjunction with the Data Source Network ID and the Data Source Index to uniquely identify Alerts of the same type, from the same source but from using a different input or sensor to generate the Alert. If a Request Parameter or Command Parameter is supported on any other Data Field, you must also support the

Alert Threshold PGN: 126987 hex: 1F00B

8	Data Source Index / Source			eld Size: 1		Request Parameter	Note 2
	DD128 Generic instance		Bit F	0 = Instance 1 = Instance 2 = Instance n = Instance 253 = Reserv 254 = Error 255 = Not av	1 2 n, where n < 253	Command Paramete	r: Note 2
	DF53 Integer, 8 bit unsigned The Data Source Index is an index into Parameter or Command Parameter is Data Field. Note: Refer to Alert Codes(Appendix B	a set of data as supported on an	sociated w y other Dat	ta Field, you must		Request	less number
9	Alert Occurrence Number	, 	Byte Fi	eld Size: 1		Request Parameter Command Paramete	Optional r: Prohibited
	DD006 Generic counter, short			Numeric cou	int, event counter, seq	uence counter	
	DF53 Integer, 8 bit unsigned The parameter is a number starting at			0 to 252 ne for each occurr	Resolution.		less number
10	Total Number of Threshold Para	meters		eld Size: 1		Request Parameter Command Paramete	Optional r: Note 3
	DD006 Generic counter, short			Numeric cou	nt, event counter, seq	uence counter	
	DF53 Integer, 8 bit unsigned This field contains a parameter that de		_	0 to 252 reshold parameter	Resolution. s used to trigger the a		less number
11	Parameter Number		•	eld Size: 1		Request Parameter Command Paramete	Optional r: Note 3
	DD005 Generic numeric ID, sho	ort		Number of re	oute, waypoint, event,	mark, etc.	
	DF53 Integer, 8 bit unsigned This field defines numerically which pa		_	0 to 252 maximum of the to	Resolution.	1 010	less number
12	Trigger Method		•	eld Size: ield Size: 8		Request Parameter Command Paramete	Optional r: Note 3
	DD337 Trigger Method				d Reached Ascending d Reached Descending yed out of range		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution.	1 Used	to construct bit fields
13	Threshold Data Format			eld Size: 1		Request Parameter Command Paramete	Optional r: Note 3
	DD338 Threshold Data Format			1	ole to reference an uns d be decimal 96. Rang	igned high voltage (DF9 e 0 to 252.	6), the Threshold Data
	DF53 Integer, 8 bit unsigned This field contains the NMEA Network			0 to 252	Resolution.	1 010	less number

Alert Threshold PGN: 126987
hex: 1F00B

Byte Field Size: ? **Threshold Level** Request Parameter Optional 14 Bit Field Size: Command Parameter: Note 3 This parameter is defined by the Threshold Data Format and is a preset value used **DD339** Threshold Level to trigger an Alert. Application specific, defined DF00 Undefined Undefined Range: undefined Resolution: undefined at time of use. This field contains the threshold level that is used as a comparison against the data value to trigger the associated Alert. This field can contain a variable sized parameter defined by the Threshold Data Format code defined above. Byte Field Size: Request Parameter Fields 11 to 14 Repeat as necessary Optional 15 Bit Field Size: Command Parameter: Note 3 **DD000** Undefined DF00 Undefined Undefined Range: undefined Resolution: undefined Application specific, defined at time of use. Application Specific defined at time of use

Alert Value PGN: 126988 hex: 1F00C

The Alert Value PGN is used to convey the instantaneous value parameter directly linked with an associated Alert. This PGN is not a mandatory requirement to implement the Alert Service.

The Request Group function PGN (126208) is used to request the Alert Value PGN.

The Command Group Function PGN (126208) shall not be used with this PGN.

Note 1: When requested or commanded fields 1 thru to 5 represent a qualifier identifying the target alert or alerts. Any or all of the fields 1 thru to 5 not included as qualifiers are treated as wild cards and the request or command is applied to the remaining fields.

Note 2: Fields 6, 7 and 8 can also be used to qualify a specific request of this PGN. Fields 7 and 8 are dependent on field 6.

Single Fra	ame: No	Priority Default: 2	Defaul	t Update Rate	: 10000 mi	Iliseconds	Frequency:	.1 cycles per second
Destination	n: <mark>Global</mark>	Query Support: Requir	ed C	ommand Support	Prohibited Prohibited	ACK Rqmnts: N	lone	
Field #	Field Na	me						
1	Alert Type			Byte Field Bit Field	Size: Size: <mark>4</mark>		Request Parameter Command Paramete	Note 1 r: Prohibited
	DD315 A	Alert Type			0 = Reserved 1 = Emergency A 2 = Alarm 3 = Reserved 4 = Reserved 5 = Warning 6 = Reserved 7 = Reserved 8 = Caution 13 = Reserved 14 = Data out of 15 = Data not av	f range		
	DF52	Bit field rvice shall convey the Alert type	bit(n)	Range: Va		Resolution	Used Used	to construct bit fields
2	Alert Category		Byte Field			Request Parameter Command Paramete	Note 1	
	DD316 A	Alert Category			0 = Navigationa 1 = Technical 13 = Reserved 14 = Data out of 15 = Data not av	f range		
	DF52 The Alert Se Definition Ta	Bit field rvice shall convey the Alert Ca	bit(n) ategory as a	Range: Va a means of iden		Resolution ent on NMEA Aler	•	to construct bit fields
				Duta Field	Ci-ci 4	1	Desired Desired	N 4
3	Alert Syste	em		Byte Field Bit Field			Request Parameter Command Paramete	Note 1 r: Prohibited
	DD317	Alert System			Values defined b	by the Alert Codes	in Appendix B	
	DF53	Integer, 8 bit unsigned	uint8	Range: 0 1	to 252	Resolution	: 1 bit Unit-	less number
		rvice shall convey the Alert Sy the Alert has occurred. Deper				describe the main	system where	

Alert Value PGN: 126988 hex: 1F00C

4	Alert Sul	b-System	Byte Field Size: 1 Bit Field Size:	Request Parame Command Paran	neter: Note 1 Prohibited				
	DD318	Alert Sub-System	Values defined by the	he Alert Codes in Appendix B					
		Integer, 8 bit unsigned uint8 Service shall convey the Alert Sub-system a cause of the Alert has occurred. Dependent		I describe the sub system	Unit-less number				
5	Alert ID		Byte Field Size: 2 Bit Field Size:	Request Parame Command Paran	neter: Note 1 Prohibited				
	DD319	Alert ID	Values defined by tl	he Alert Codes in Appendix B					
		Integer, 16 bit unsigned uint16 Service shall convey the Alert ID as a means Definition Table.	Range: 0 to 65,532 s of describing the actual cause of an	1 010	Unit-less number				
6	Data Sou	urce Network ID NAME	Byte Field Size: 8 Bit Field Size:	Request Parame Command Paran	neter: Note 2 Prohibited				
	DD320	Network ID NAME	This field is defined	l by fields 1- 10 of PGN 60928					
		Integer, 64 bit unsigned uint64 Source 64 bit network NAME field found with itored by this alert.	Range: 0 to (2E+64)-4 nin PGN 060928. This is the NAME o	1 010	Unit-less number				
7	Data Sou	urce Instance	Byte Field Size: 1 Bit Field Size:	Request Parame Command Paran	neter: Note 2 Prohibited				
	DD128	Generic instance	0 = Instance 0 1 = Instance 1 2 = Instance 2 n = Instance n, whe 253 = Reserved 254 = Error 255 = Not available						
	DF53	Integer, 8 bit unsigned uint8	Range: 0 to 252	Resolution: 1 bit	Unit-less number				
	monitored Index to ur generate th	Source Instance identifies either the Device by this Alert. This parameter is used in conjuiquely identify Alerts of the same type, from the Alert. If a Request Parameter or Commate capability on this Data Field.	unction with the Data Source Network the same source but from using a di	k ID and the Data Source ifferent input or sensor to					
Note: Refer to Alert Codes(Appendix B) & Alert Application Notes (Appendix D).									

Alert Value PGN: 126988 hex: 1F00C

8	Data Source Index / Source			ield Size: 1		Request Para Command Pa		Note 2 Prohibited	
	DD128 Generic instance			0 = Instanc 1 = Instanc 2 = Instanc n = Instanc 253 = Rese 254 = Erro 255 = Not	e 1 e 2 e n, where n < 253 cryed				
	DF53 Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resoluti	ion: <mark>1 bit</mark>	Unit-le	ess number	
	The Data Source Index is an index into a Parameter or Command Parameter is sup Data Field. Note: Refer to Alert Codes(Appendix B) &	ported on an	y other Da	ta Field, you mus		•			
9	Alert Occurrence Number		Byte Fi	ield Size: 1		Request Para	ameter	Optional	
				ield Size:		Command Pa	arameter:	Prohibited	
	DD006 Generic counter, short			Numeric co	ount, event counter,	sequence counter			
	DF53 Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resoluti	ion: 1 bit	Unit-le	ess number	
	The parameter is a number starting at zer	o and increm	ented by c	ne for each occu	rrence of the same A	Alert.			
10	Total Number of Value Parameters			ield Size: 1		Request Para Command Pa		Optional Prohibited	
	DD006 Generic counter, short			Numeric co	ount, event counter,	sequence counter			
	DF53 Integer, 8 bit unsigned This field contains a parameter that define	uint8 es the total nu	_	0 to 252 alue parameters i		ion: <mark>1 bit</mark> ert.	Unit-le	ess number	
11	Value Parameter Number		-	ield Size: 1		Request Para Command Pa		Optional Prohibited	
	DD005 Generic numeric ID, short			Number of	route, waypoint, eve	ent, mark, etc.			
	DF53 Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resoluti	ion: 1 bit	Unit-le	ess number	
	This field defines numerically which parar	neter is to foll	low up to a	maximum of the	total value paramet	ers.			
12	Value Data Format		•	ield Size: 1 ield Size:		Request Para Command Pa		Optional Prohibited	
	DD340 Value Data Format				nple to reference an uld be decimal 96. R	0 0	age (DF96	(i), the Threshold D) ata
	DF53 Integer, 8 bit unsigned This field contains the NMEA Network Me			0 to 252 e used to define the		ion: <mark>1 bit</mark>	Unit-le	ess number	
13	Value Data		•	ield Size: ?		Request Para Command Pa		Optional Prohibited	
	DD341 Value Data				lata range is defined arameter used to trig	•	format. Th	ne Value data is th	.e
	DF00 Undefined	Undefine	Range:	undefined	Resoluti	ion: undefined	1.1	eation specific, def	fined
	This field contains the value data that con contain a variable sized parameter define					lert. This field can	at time	e of use.	

Alert	: Value			PGN: 126988 hex: 1F00C			
14	Fields 11 to 13 Repeat as necessar	•	eld Size: ?		equest Parame ommand Paran		Optional Prohibited
	DD000 Undefined						
	DF00 Undefined	Undefined Range:	undefined	Resolution: u		Applicat time of	tion specific, defined of use.

System Time PGN: 126992

hex: 1F010

The purpose of this parameter group is to provide a regular transmission of UTC time and date, with minimal latency. Optionally, the transmission of this parameter group may use the SID to provide synchronism for measurement data in other parameter groups from the same source address. The default update rate for this PGN is only applicable when sending the current UTC time and date independently, otherwise the update rate will be determined by the update rate of the PGN(s) related by the SID.

Single Fr	ame: Yes	Priority Default: 3	Default	Update Ra	ate: 1000	milliseconds	Frequency:	1.	cycles per second
Destinatio	n: Global	Query Support: Optional	Co.	mmand Supp	oort: Prohibited	ACK Rqmnts	None		
Field #	Field N	ame							
1	Sequence ID			Byte Fie Bit Fie	eld Size: 1 eld Size:		Request Para Command Pa		Note 1 Prohibited
	DD056	Sequence ID			PGNs from a different PGN related data so	single source addi transmissions ide et. For example, i		values with transmissi s bind the	in two or more
					0 - 252 = binodata set	ling available (wh	en SID value reacl	hes 252, res	ume with 0 on next
					253 - 254 = rc	eserved for future	use		
					255 = No bind whenever practices		MEA recommends	using bind	ing SID values
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resoluti	on: 1 bit	Unit-les	s number
2	Source			Byte Fie Bit Fie	eld Size: eld Size: 4		Request Para Command Pa		Note 1 Prohibited
	DD066	Time Source			0x3 = Local C	or equivalent Rad Cesium clock, Rubidium clock, Crystal clock,	io Station Time Sy	nc,	
	DF52	Bit field	bit(n)	Range:	Variable	Resoluti	on: 1	Used to	construct bit fields
3	NMEA R	eserved		Byte Fie Bit Fie	eld Size:	4	Request Para Command Pa		
	DD001	Reserved field			Variable num	ber of reserved bi	ts, all set to logic "	1"	
	DF52 Used to ali	Bit field gn subsequent data on a byte bour	bit(n) ndary.	Range:	Variable	Resoluti	on: 1	Used to	construct bit fields
4	Date			Byte Fie Bit Fie	eld Size: 2		Request Para Command Pa		Note 1 Optional
	DD039	Generic date			Days since Ja	nuary 1, 1970, D	ate is relative to U	TC Time.	
	DF41	Date, day count	uint16	Range:	0 to 65,532 days	Resoluti	on: 1 day	0 = Jan ~179 ye	nary 1, 1970, max =

Syst	em Time		PG				
5	Time	•	Field Size: 4	Request Para Command Pa	meter Note 1 rameter: Optional		
	DD158 Generic time of day		24 hour clock, 0	= midnight, time is in UTC			
	DF06 Time of day	uint32 Rang	e: 0 to 86,401 s	Resolution: 1x10E-4 s	~24 hours, 0 = midnight, range allows for up to two leap seconds per day		

Heartbeat PGN: 126993 hex: 1F011

This PGN shall be transmitted by all NMEA devices.

Reception of this PGN confirms that a device is still present on the network.

Reception of this PGN may also be used to maintain an address to NAME association table within the receiving device.

The transmission interval may be used by the receiving unit to determine the time-out value for the connection supervision.

The value contained in Field 1 of this PGN reflects the PGN's current Transmission Interval. Changes to this PGN's Transmission Interval shall be reflected in Field 1.

The transmission interval can only be changed by using the Request Group Function PGN 126208 with no pairs of request parameters provided. Field 3 of the Request Group Function PGN 126208 may contain values between 1,000ms and 60,000ms.

This PGN cannot be requested by the ISO Request PGN 059904 or Request Group Function PGN 126208. In Request Group Function PGN 126208, setting Field 3 to a value of 0xFFFF FFFF and Field 4 to a value of 0xFFFF: "Transmit now without changing timing variables." is prohibited.

The Command Group Function PGN 126208 shall not be used with this PGN.

Fields 3 and 4 of this PGN provide information which can be used to distinguish short duration disturbances from permanent failures. See ISO 11898 -1 Sections 6.12, 6.13, 6.14, 13.1.1, 13.1.4, 13.1.4.3 and Figure 16 (node status transition diagram) for additional context.

Revisions:

20190624 - Devices that report NMEA Network Message Database Version 2.100 (and newer) in their Product Information PGN (126996) should be using a 1-millisecond resolution, per Data Dictionary #383 and Data Format #116, for Field 1 "Update Rate".

Devices that report NMEA Network Message Database Versions prior to 2.100 in their Product Information PGN (126996) should be using a10-millisecond resolution, per Data Dictionary #036 and Data Format #66, for Field 1 "Update Rate".

Single Fra	ame: Y	Priority Default: 7	Default	Update Ra	te: 60,000	milliseconds	Frequency:	NA	cycles per second
Destinatio	n: <mark>Global</mark>	Query Support: Prohibite	ed Cor	mmand Supp	ort: Prohibited	ACK Rqmnts: N	one		
ield#	Field Na	nme							
1	Update R	ate		Byte Fiel	d Size: 2		Request Param	eter	Prohibited
				Bit Fie	ld Size:		Command Parameter: Prohibited		Prohibited
	DD383 Data Interval			Reporting interval in seconds. 0xFFFD=Reserved 0xFFFE=Error 0xFFFF=Data not available					
	DF116	Time Interval, .001 sec.	uint16	Range: () - 65.532s	Resolution.	1x10E-3 sec.		
	Valid data ra	ange is between 1.000 sec and 6	60.000 sec.						
2	Heartbeat Sequence Counter			Byte Field Size: 1 Bit Field Size:			Request Parameter Command Parameter: Prohibited Prohibited		
	DD006	Generic counter, short		Numeric count, event counter, seq			equence counter		
	DF53	Integer, 8 bit unsigned	uint8	Range: () to 252	Resolution.	1 bit	Unit-les	s number

Heartbeat PGN: 126993 hex: 1F011

3	Class 1 CAN Controller State		•	eld Size: ield Size: <mark>2</mark>	Request Pa Command		Prohibited Prohibited	
	DD384 CAN State			00= error active 01= error passive 10= bus off 11= not available				
				Represents the wo	orst state detected since the las	st transmissio	n of this informat	ion.
	DF52 Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to	construct bit field	ds
	Reflects the node state , as defined in ISO 1 Instance 0 CAN controller.	1898-1 sed	ction 13.1.4	4, of the Class 1 CAN co	ontroller or the Class 2 Syster	n		
4	Class 2 Second CAN Controller State		•	eld Size: ield Size: 2	Request Pa Command		Prohibited Prohibited	
	DD384 CAN State			00= error active 01= error passive 10= bus off 11= not available				
				Represents the wo	orst state detected since the las	st transmissio	n of this informat	ion.
	DF52 Bit field	bit(n)	•	Variable	Resolution: 1	Used to	construct bit field	ds
	Reflects the node state, as defined in ISO 11	1898-1 sec		•				
5	Equipment Status		•	eld Size: ield Size: <mark>2</mark>	Request Pa Command		Prohibited Prohibited	
	DD385 Device Status			00= operational 01= fault 10= reserved 11= not available				
				Operational = dev Fault = active error	rice has no active error condition conditions exist	ions		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to	construct bit field	ds
6	NMEA Reserved		•	eld Size: ield Size: resv 34	Request Pa Command	arameter Parameter:		
	DD001 Reserved field			Variable number	of reserved bits, all set to logic	e "1"		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to	construct bit field	ds
	Used to align subsequent data on a byte bou	ındary.						

Product Information PGN: 126996 hex: 1F014

Provides product information onto the network that could be important for determining quality of data coming from this product. Each field must be provided if the data is typically available from such a product. At minimum the NMEA Network Database Version, NMEA Manufacturer's Product Code, and NMEA Certification Level must be provided.

All ISO Request (PGN 059904) requests for the Product Information parameter group shall be destination address specific (as opposed to global).

Once a node issues an ISO Request for Product Information, the node shall not issue a subsequent ISO Request for Product Information until the full response has been received for the first request or the response has timed out in accordance with ISO 11783-3, "Controller response time and time out defaults".

All NMEA Request group function (PGN 126208) requests for the Product Information parameter group without specifying request parameters shall be destination address specific (as opposed to global). Once a node issues an NMEA Request for Product Information, the node shall not issue a subsequent NMEA Request for Product Information until the full response has been received for the first request or the response has timed out in accordance with ISO 11783-3, "Controller response time and time out defaults".

Note 1: NMEA encourages manufacturers to provide the capability to support multiple NMEA Network Message database versions within their product. This provides a means for manufacturers products to retain backwards compatibility with previous versions of the database and existing legacy products.

This parameter group contains static information and therefore should not be requested periodically, but may be requested as needed.

Query Support: Require Name Network Message Database of Generic numeric ID, mediu Integer, 16 bit unsigned by NMEA:	Version	Byte Fie Bit Fie	ort: Optional Id Size: 2 Eld Size: Number of	ACK Rqmnts:	Request Parai Command Pai	meter Optional rameter: Note 1			
7 Generic numeric ID, mediu 54 Integer, 16 bit unsigned by NMEA:	m	Bit Fie	eld Size:	route, waypoint, even	Command Par	- 1			
7 Generic numeric ID, mediu54 Integer, 16 bit unsigned by NMEA:	m	Bit Fie	eld Size:	route, waypoint, even	Command Par	- 1			
54 Integer, 16 bit unsigned by NMEA:				route, waypoint, even		rameter: Note 1			
54 Integer, 16 bit unsigned by NMEA:		Range:	Number of	route, waypoint, even	t mark ata				
by NMEA:	uint16	Range:			t, mark, etc.				
•			0 to 65,532	Resolutio	n: 1 bit	Unit-less number			
Decimal Number of the format AA.BBB where AA is the position is assumed. i.e. The first release of this standard is value 1000, whi NMEA Manufacturer's Product Code			efered to as Ve		·				
7 Generic numeric ID, mediu	m		Number of	route, waypoint, even	waypoint, event, mark, etc.				
54 Integer, 16 bit unsigned by NMEA: I Number assigned numerically to a	uint16 a manufactu		,	Resolutio	n: <mark>1 bit</mark>	Unit-less number			
5	Manufacturer's Product Code Generic numeric ID, mediu Integer, 16 bit unsigned by NMEA: Number assigned numerically to a	Manufacturer's Product Code Generic numeric ID, medium Integer, 16 bit unsigned uint16 by NMEA: Number assigned numerically to a manufacturer is not specified in the "Command Request"	Manufacturer's Product Code Manufacturer's Product Code Byte Fie Bit Fie 7 Generic numeric ID, medium 44 Integer, 16 bit unsigned uint16 Range: d by NMEA: Number assigned numerically to a manufacturer's product Id is not specified in the "Command Request" or an ISO Re	Manufacturer's Product Code Byte Field Size: Bit Field Size: Bit Field Size: The Generic numeric ID, medium Number of the Integer, 16 bit unsigned wint 16 Range: O to 65,532 did by NMEA: Number assigned numerically to a manufacturer's product. Id is not specified in the "Command Request" or an ISO Request is made	Manufacturer's Product Code Byte Field Size: Bit Field Size: Bit Field Size: O to 65,532 Resolution do by NMEA: Number assigned numerically to a manufacturer's product. Byte Field Size: O to 65,532 Resolution do by NMEA: Number assigned numerically to a manufacturer's product.	Manufacturer's Product Code Byte Field Size: Bit Field Size: Number of route, waypoint, event, mark, etc. Integer, 16 bit unsigned wint16 Range: 0 to 65,532 Resolution: 1 bit			

Product Information PGN: 126996 hex: 1F014

3 Manufacturer's Model ID

Byte Field Size: char

Request Parameter
Optional
Bit Field Size: Command Parameter: Prohibited

DD192 Generic String, ASCII, Fixed length Length specified by PGN field definition.

DF63 String, fixed char8(n) Range: 0 to 1,785 characters Resolution: 1 char

This is a n=32 character string, Format defined and documented by manufacturer. The beginning of the field should clearly define Manufacturer's Product.

0 to 1,785 bytes. Character count not included, length is specified by application in Data Dictionary. Unused characters shall be treated as not available, and filled with [0xFF] = Data not available.

Manufacturer's Software Version Code

Byte Field Size:

Char

Request Parameter

Optional

Optional

char8(n) Range: 0 to 1,785 characters

DD192 Generic String, ASCII, Fixed length Length specified by PGN field definition.

Digital String, ASCH, Fixed length

This is a n=32 character string, Format defined and documented by manufacturer.

0 to 1,785 bytes. Character count not included, length is specified by application in Data Dictionary. Unused characters shall be treated as not available, and filled with [0xFF] = Data not available.

5 Manufacturer's Model Version Byte Field Size: char Request Parameter Optional

Bit Field Size: Command Parameter: Prohibited

DD192 Generic String, ASCII, Fixed length

Length specified by PGN field definition.

Resolution: 1 char

DF63 String, fixed

String, fixed

DF63

char8(n) Range: 0 to 1,785 characters Resolution: 1 char

This is a n=32 character string, Format defined and documented by manufacturer.

0 to 1,785 bytes. Character count not included, length is specified by application in Data Dictionary. Unused characters shall be treated as not available, and filled with [0xFF] = Data not available.

6 Manufacturer's Model Serial Code

Byte Field Size: Char Request Parameter

Optional

Bit Field Size: Command Parameter: Prohibited

DD192 Generic String, ASCII, Fixed length Length specified by PGN field definition.

DF63 String, fixed char8(n) Range: 0 to 1,785 characters Resolution: 1 char

This is a n=32 character string, Format defined and documented by manufacturer.

0 to 1,785 bytes. Character count not included, length is specified by application in Data Dictionary. Unused characters shall be treated as not available, and filled with [0xFF] = Data not available.

Product Information	PGN: 126996
	hex: 1F014

7	NMEA 2000 Certification Level			•	eld Size: 1	Request Parameter Command Parameter: Prohibite			•
	DD226 NMEA Certification Level				0 = Level A 1 = Level B 2 = Not Applicable				
		Integer, 8 bit unsigned ary 2015 and Version 2.000 of the ot Applicable".	uint8 e NMEA 2	Range: 000 Main [0 to 252 Document, Certification Lev	Resolution: vel Field (7) s	1 010	Unit-les	ss number
8	Load Equivalency			•	eld Size: 1	Request Parameter Optional Command Parameter: Prohibited			
	DD257 Load Equivalency Number The "Load Equivalency Number" (LEN) is an NMEA 2000 conc Virtual Devices shall report the value as defined in the NMEA 2000 Main Document in section 2.4.7 Interface Power. OneNet PGN V shall report a LEN of zero.							A 2000 Standard's	
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit	Unit-les	ss number

Configuration Information

PGN: 126998 hex: 1F016

Free-form alphanumeric fields describing the installation (e.g., starboard engine room location) of the device and installation notes (e.g., calibration data).

All ISO Request (PGN 059904) requests for the Configuration Information parameter group shall be destination address specific (as opposed to global). Once a node issues an ISO Request for Configuration Information, the node shall not issue a subsequent ISO Request for Configuration Information until the full response has been received for the first request or the response has timed out in accordance with ISO 11783-3, "Controller response time and time out defaults".

All NMEA Request group function (PGN 126208) requests for the Configuration Information parameter group without specifying request parameters shall be destination address specific (as opposed to global). Once a node issues an NMEA Request for Configuration Information, the node shall not issue a subsequent NMEA Request for Configuration Information until the full response has been received for the first request or the response has timed out in accordance with ISO 11783-3, "Controller response time and time out defaults".

This parameter group contains static information and therefore should not be requested periodically, but may be requested as needed.

Note 1: Using this field as a request parameter is prohibited.

Single Fra	ame: No	Priority Default: 6	Default Update Ra	ate:	milliseconds	Frequency:	NA	cycles per second		
Destinatio	n: Global	Query Support: Optiona	Command Sup	port: Optional	ACK Rqmnt	s: None				
Field #	Field N	ame								
1	Installati	on Description, Field 1	Byte Fie	eld Size: 8 or	16 n	Request Par	rameter	Note 1		
			Bit Fi	eld Size:		Command P	'arameter:	Required		
	DD004	Generic name string, short		Name of place, route, waypoint, destination, vessel, vehicle, etc.						
	DF50	<i>C,</i>		0 to 250 ASCII 0 to 125 Unico Characters		tion: 1 ASCII or 1 Unicode Character	string (ubyte ind of bytes including Control in string The Control the string characte Unicode Control characte Control characte A string (total less	byte = 1 => ASCII		

Configuration Information

PGN: 126998 hex: 1F016

2 Installation Description, Field 2 Byte Field Size: 8 or 16 n Bit Field Size:

Request Parameter Command Parameter: Required

Note 1

DD004 Generic name string, short

Name of place, route, waypoint, destination, vessel, vehicle, etc.

String, variable, short **DF50**

70 ASCII or 35 Unicode characters maximum

ch8or16(n)Range:

0 to 250 ASCII or 0 to 125 Unicode Characters

Resolution: 1 ASCII or 1 Unicode Character

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

3

Byte Field Size: 8 or 16 n Bit Field Size:

Request Parameter Command Parameter: Optional

Note 1

DD004 Generic name string, short

Manufacturer Information, Field 3

Name of place, route, waypoint, destination, vessel, vehicle, etc.

DF50 String, variable, short ch8or16(n)Range:

0 to 250 ASCII or 0 to 125 Unicode

Characters

Resolution: 1 ASCII or 1 Unicode Character

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters A string with no characters

(total length of 2 bytes, i.e. Count = 2) is a null string.

70 ASCII or 35 Unicode characters maximum

Man Overboard Notification(MOB)

PGN: 127233 hex: 1F101

The MOB PGN is intended to provide notification from a MOB monitoring system. The included position information may be that of the vessel or the MOB device itself as identified in field "X", position source. Additional information may include the current state of the MOB device, time of activation, and MOB device battery status.

This PGN may be used to set a MOB waypoint, or to initiate an alert process.

This PGN may be used to command or register a MOB device emitter Ids or other applicable fields in the message with an MOB System or other equipment. If the fields in this PGN are configured over the network, the Command Group Function (PGN 126208) shall be used.

Queries for this PGN shall be requested using either the ISO Request (PGN 059904) or the NMEA Request Group Function (PGN 126208).

A device receiving an ISO (PGN 059904) for this PGN (127233), shall respond by providing as many of these PGNs (127233) as necessary for every MOB Emitter ID that has associated data fields.

If a Request Group Function (PGN 126208) requesting this PGN (127233) is received, the receiving device shall respond in the following manner:

- If no requested fields have been included with the Request Group Function then the response is to return one or more PGNs, just like responding to the ISO Request (PGN 055904) described above.
- If the Request Group Function (PGN 126208) includes the MOB Emitter ID field or MOB Status field, then the response shall be filtered by these fields contained within this request resulting in one or more PGN (127233) responses.

If the MOB Emitter ID requested is not considered a valid MOB Emitter ID by the receiving device, then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) of "0x3 = Access denied." And the requested MOB Emitter ID field parameter error code (Field 6) of "0x3 = Requested or command parameter out-of-range;".

The Default update rate of this PGN is autonomous, as it is dependent upon notification rates of MOB devices.

Single Frame: N Priority Default: 3 Default Update Rate: milliseconds Frequency: NA cycles per second

Destination: Global Query Support: Required Command Support: Optional ACK Rqmnts: None

Field # Field Name

range allows for up to two

leap seconds per day

Man Overboard Notification(MOB) **PGN: 127233** hex: 1F101 Byte Field Size: 1 Request Parameter Sequence ID 1 Optional Bit Field Size: Command Parameter: Optional

An upward counting number that binds information transmitted in two or more **DD056** Sequence ID PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG values in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single data set. 0 - 252 = binding available (when SID value reaches 252, resume with 0 on next data set) 253 - 254 = reserved for future use 255 = No binding provided. NMEA recommends using binding SID values whenever practical. Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: 1 bit Unit-less number 2 **MOB Emitter ID** Byte Field Size: Request Parameter Required Bit Field Size: Command Parameter: Optional **DD010** Generic numeric ID, large Number of route, waypoint, event, mark, etc. uint32 Range: 0 to 4,294,967,292 Resolution: 1 bit Unit-less number Integer, 32 bit unsigned This provides a unique Identifier for each MOB emitter (MOB emitter is unique to the vessel) Man Overboard (MOB) Status Byte Field Size: Request Parameter 3 Required Bit Field Size: 3 Command Parameter: Optional **DD369** Man Over Board (MOB) Status 0=MOB Emitter Activated 1=Manual on-board MOB Button Activation 2=Test Mode 3=MOB Not in Use 4 - 5=Reserved 6=Error 7=Unknown/ Unavailable Bit field Range: Variable **DF52** bit(n) Resolution: 1 Used to construct bit fields 4 **NMEA Reserved** Byte Field Size: Request Parameter Bit Field Size: resv Command Parameter: **DD001** Reserved field Variable number of reserved bits, all set to logic "1" Bit field Range: Variable Resolution: 1 Used to construct bit fields Used to align subsequent data on a byte boundary. Byte Field Size: Request Parameter **UTC Time of MOB Activation** 5 Optional Bit Field Size: Command Parameter: Optional **DD158** Generic time of day 24 hour clock, 0 = midnight, time is in UTC Resolution: 1x10E-4 s \sim 24 hours, 0 = midnight, Time of day uint32 Range: 0 to 86,401 s

UTC of MOB activation provides the time of the initial MOB device activation.

DF06

Man Overboard Notification(MOB)

PGN: 127233 hex: 1F101

6	Position Source			Byte Field Size:			Request Parameter Optional			
	DD370	Position Source		Bit Field Size: Command Parameter: Optional Identifies the source of the position information 0=MOB Position estimated by the Vessel 1=MOB position reported by MOB emitter 2-5= Reserved 6=Error 7=Unknown						
	DF52	Bit field	bit(n)	Range:	/ Unavailable Variable	Resolution	1	Used to construct bit fields		
7	NMEA Reserved			Byte Field Size: Bit Field Size: resv 5			Request Parame Command Paran			
	DD001 Reserved field				Variable number of	of reserved bits, a	all set to logic "1"			
	DF52 Used to alig	Bit field gn subsequent data on a byte	bit(n) boundary.	Range:	Variable	Resolution:	1	Used to construct bit fields		
8	UTC Date of Position			•	eld Size: 2		Request Parame Command Param	eter Optional meter: Optional		
	DD039	Generic date			Days since Januar	y 1, 1970, Date	is relative to UTC	Time.		
	DF41	Date, day count	uint16	Range:	0 to 65,532 days	Resolution:		0 = January 1, 1970, max = ~179 years		
9	9 UTC Time of Position			•	eld Size: 4		Request Parame Command Param	eter <mark>Optional</mark> meter: <mark>Optional</mark>		
	DD158			24 hour clock, 0 =	midnight, time	e is in UTC				
	DF06 Time of day The UTC of position provides the time of the		uint32 the position in				Resolution: 1x10E-4 s ~24 hours, 0 = midnight, range allows for up to two leap seconds per day			
10	Latitude				eld Size: 4		Request Parame	eter Optional meter: Optional		
	DD022 Latitude, WGS-84			Latitude referenced to WGS-84.						
	DF23	Latitude	int32	Range:	+/- 90 deg	Resolution:		"-" = South, resolution ~1.1 cm		
11	Longitude				eld Size: 4		Request Parame	eter Optional meter: Optional		
	DD023			Longitude referen	ced to WGS-84.					
	DF25	Longitude	int32	Range:	+/- 180 deg	Resolution		"-" = West, resolution ~1.1		

Man Overboard Notification(MOB) **PGN: 127233** hex: 1F101 Request Parameter Byte Field Size: 12 Course over ground Reference Optional Bit Field Size: 2 Command Parameter: Optional **DD117** Direction reference 0 = True,1 = Magnetic, 2 = Error3 = Null**DF52** Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields **NMEA Reserved** Byte Field Size: Request Parameter 13 Optional Bit Field Size: resv 6 Command Parameter: Optional **DD001** Reserved field Variable number of reserved bits, all set to logic "1" Resolution: 1 Bit field Range: Variable Used to construct bit fields DF52 bit(n) Byte Field Size: 2 Course over ground Request Parameter Optional 14 Command Parameter: Optional Bit Field Size: The direction of the path over ground actually followed by a vessel. **DD165** Course-Over-Ground (COG) Resolution: 1x10E-4 rad uint16 Range: 0 to 2Pi rad Resolution ~0.0057deg, 1 DF02 Angle deg = .01745 radByte Field Size: 2 Speed over ground Request Parameter Optional 15 Bit Field Size: Command Parameter: Optional DD044 Generic Speed Range: 0 to 655.32 m/s 1 Knot = 0.5144 m/sDF35 Speed Resolution: 1x10E-2 m/s MMSI of vessel of Origin Byte Field Size: 4 Request Parameter 16 Optional Bit Field Size: Command Parameter: Optional Number of route, waypoint, event, mark, etc. **DD010** Generic numeric ID, large uint32 Range: 0 to 4,294,967,292 Resolution: 1 bit Unit-less number Integer, 32 bit unsigned The MMSI number of the ship of origin may be set to 2,147,483,647 if unknown. **MOB Emitter Battery Status** Byte Field Size: Request Parameter 17 Optional Bit Field Size: 3 Command Parameter: Optional 0=Good **DD371** Battery Status 1=Low 2-5=Reserved 6=Error 7=Data not available Resolution: 1 Used to construct bit fields **DF52** Bit field Range: Variable bit(n) **NMEA Reserved** Byte Field Size: Request Parameter 18 Bit Field Size: resv 5 Command Parameter:

Range: Variable

bit(n)

Variable number of reserved bits, all set to logic "1"

Resolution: 1

Used to construct bit fields

DD001 Reserved field

Bit field

Used to align subsequent data on a byte boundary.

DF52

Heading/Track Control

PGN: 127237 hex: 1F105

Sends Commands to, and receives data from, heading control systems. Allows for navigational (remote) control of a heading control system and direct rudder control. When used as a command, the Commanded Rudder Direction field and the Commanded Rudder Angle should never contain order values at the same time.

Single Fr	ame: No	Priority Default: 2	Default	Update Ra	ate: 250	milliseconds	Frequency: 4	. cycles per secor	
Destinatio	n: <mark>Global</mark>	Query Support: Optiona	al Co	mmand Supp	oort: Optional	ACK Rqmnts: N	one		
=ield #	Field N	ame							
1	Rudder Limit Exceeded			Byte Field Size: Bit Field Size: 2			Request Parameter Option Command Parameter: Prohit		
DD002 Generic status pair				01 = [Yes, Or 10 = Error,	f, Disabled, Reset, "0' 1, Enabled, Set, "1"], able, Unknown]	'],			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1 Used	to construct bit fields	
2	Off-Head	ling Limit Exceeded		Byte Fie Bit Fie	eld Size:		Request Parameter Command Parameter	Optional Prohibited	
	DD002	Generic status pair			01 = [Yes, Or 10 = Error,	f, Disabled, Reset, "0' n, Enabled, Set, "1"], able, Unknown]	'],		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1 Used	to construct bit fields	
	Off-Headin Control.	g Limit field can be generated if	the Steering	g Mode is H	eading Control Sta	indalone, Heading Co	ontrol, or Track		
3	Off-Traci	k Limit Exceeded		Byte Fie Bit Fie	eld Size:		Request Parameter Command Parameter	Optional Prohibited	
	DD002	Generic status pair			01 = [Yes, Or 10 = Error,	f, Disabled, Reset, "0' n, Enabled, Set, "1"], able, Unknown]	·],		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1 Used	to construct bit fields	
	Off-Track L	imit field can be generated if the	e Steering M	lode is Trac	k Control.				
4	Override			Byte Fie Bit Fie	eld Size:		Request Parameter Command Parameter	Optional Prohibited	
	DD163	Autopilot Override			mode. As lor ignored by the	ng as this field is Yes,	porary interruption of th Steering Mode and Turn oller and its computing p	n Mode shall be	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1 Used	to construct bit fields	

Heading/Track Control PGN: 127237 hex: 1F105 Request Parameter **Steering Mode** Byte Field Size: 5 Optional Bit Field Size: 3 Command Parameter: Prohibited MSB/LSB: **DD153** Steering Mode 000 = Main Steering, 001 = Non-Follow-up Device, 010 = Follow-up Device, 011 = Heading Control Standalone, 100 = Heading Control, 101 = Track Control. Definitions: Main Steering/Outside System - The main steering system is in use. Non-Follow-up Device - The system provides non-follow-up control. Rudder is moved in the commanded direction but a specific angle is not maintained. Follow-up - The system provides follow-up control. Rudder is moved to the commanded angle and maintained at that angle. Heading Control Standalone - The system works as a standalone heading controller. Heading Control - The system works as a remotely controlled heading controller with the commanded course input from an external device. Track Control – The system works as a track controller by correcting a commanded course. Corrections are based on additionally received track errors. **DF52** Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields **Turn Mode** Byte Field Size: Request Parameter Optional 6 Bit Field Size: 3 Command Parameter: Prohibited MSB/LSB: DD152 Turn Method 000 = Rudder Limit controlled, 001 = turn rate controlled,010 = radius controlled. Definitions: Rudder - An operator set rudder limit determines the maximum turning capability available, in which case the system outputs rudder orders up to and limited by the rudder limit. Turn Rate - An operator set turn rate limit determines the maximum turning capability available, in which case the system controls the rate of turn using whatever value of rudder order is necessary to control the rate. Radius - An operator set turn radius determines the maximum turning capability available which in this case is described as the minimum turn radius, in which case the system controls the rate of turn corresponding to the set turn radius. Range: Variable Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) 7 **Heading Reference** Byte Field Size: Request Parameter Optional Bit Field Size: 2 Command Parameter: Prohibited 0 = True**DD117** Direction reference 1 = Magnetic,

2 = Error, 3 = Null

Bit Field Size: resv 5

Resolution: 1

Resolution: 1

Variable number of reserved bits, all set to logic "1"

Request Parameter

Command Parameter:

Used to construct bit fields

Used to construct bit fields

Range: Variable

Byte Field Size:

Range: Variable

bit(n)

bit(n)

DF52

DF52

NMEA Reserved

DD001 Reserved field

8

Bit field

Bit field

Used to align subsequent data on a byte boundary.

lead	ding/Track Control					Р	GN: 127237 hex: 1F105
9	Commanded Rudder Direction		•	eld Size: ield Size: <mark>3</mark>		Request Paramete	
	DD147 Directional Command			MSB/LSB: 000 = No Or 001 = Move 010 = Move	to starboard,		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	1 Us	sed to construct bit fields
10	Commanded Rudder Angle			eld Size: 2 ield Size:		Request Paramete Command Parame	O 1.101.101.
	DD146 Rudder Angle Signed			Rudder angl	e where positive value	es are starboard and n	egative values are port
	DF04 Angle, signed	int16	Range:	+/-Pi rad	Resolution	1x10E-4 rad Re	esolution ~0.0057deg
11	Heading-To-Steer (Course)			eld Size: 2 ield Size:		Request Paramete	
	DD113 Course			expressed as		north, clockwise thro	intended to be steered, ough 359 degrees. Not to org.
	DF02 Angle	uint16	Range:	0 to 2Pi rad	Resolution.		esolution ~0.0057deg, 1 eg = .01745 rad
12	Track		-	eld Size: 2 ield Size:		Request Paramete	-
	DD166 Track			The track ex allowances r order to achi between two	pressed in degrees of the nade in the course for eve the desired track.	the compass may diff such factors as sea as This field represents	ith respect to the earth. For from the course due to and weather conditions in the course line (leg) in a track-controlled turn
	DF02 Angle	uint16	Range:	0 to 2Pi rad	Resolution		esolution \sim 0.0057deg, 1 $_{\text{eg}} = .01745 \text{ rad}$
13	Rudder Limit		•	eld Size: 2		Request Paramete	- 1
	DD148 Angular Limit						
	DF02 Angle	uint16	Range:	0 to 2Pi rad	Resolution		esolution ~0.0057deg, 1 eg = .01745 rad
14	Off-Heading Limit			eld Size: 2		Request Paramete	
	DD148 Angular Limit						
	DF02 Angle Off-Heading Limit field can be generated Control.	uint16 if the Steering		<mark>0 to 2Pi rad</mark> leading Control St		da	esolution ~0.0057deg, 1 g = .01745 rad
15	Radius of Turn Order			eld Size: 2		Request Paramete	
	DD149 Distance ordered			A command	ed distance like radius	order, off-track limi	t, etc.

int16 Range: +/-32,764 m

Resolution: 1 m

DF74 Distance, rough

Heading/Track Control

Resolution ~0.0057deg, 1

deg = .01745 rad

Resolution: 1x10E-4 rad

Head	ling/Track Control		PGN: 127237 hex: 1F105	
16	Rate of Turn Order	Byte Field Size: 2	Request Parameter Ontional	

16	Rate of Turn Order	Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional			
	DD150 Rate of Turn	+ = Bow turning to st	arboard, 1 deg/min = .00029 rad/sec			
	DF73 Angular rate, signed int16	Range: +/-1.0 rad/s	Resolution: 1/32 x 10E-3 Resolution 0.1 deg/min rad/s			
17	Off-Track Limit	Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Prohibited			
	DD149 Distance ordered	A commanded distance	ce like radius order, off-track limit, etc.			
	DF74 Distance, rough int16 Off-Track field can be generated if the Steering Mode	- ,	Resolution: 1 m			
18	Vessel Heading	Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Prohibited			
	DD167 Heading					

uint16 Range: 0 to 2Pi rad

DF02 Angle

Rudder PGN: 127245 hex: 1F10D

Rudder order command in direction or angle with current rudder angle reading. The Direction Order field is for non-follow-up rudder orders and the Angle Order field is for follow-up rudder orders. When used as a command, the Direction Order field and the Angle Order field shall never contain order values at the same time. The Position should be set to 'Data Not Available' unless the unit which sources the command also sources the current angle. When used as a feedback from the rudder, the commanded rudder may be returned together with the current rudder angle reading. It is recommended to send both the commands and the current rudder angle messages at fixed intervals. The unit which controls the rudder should monitor the reception of rudder angle messages.

Single Fr	rame: Yes	Priority Default: 2	Defaul	t Update Rai	te: 100 n	nilliseconds	Frequency:	10.	cycles per secor
Destination	n: Global	Query Support: Require	ed Co	ommand Suppo	ort: Required	ACK Rqmnts:	None		
ield#	Field N	ame							
1	Rudder I	nstance		-	d Size: 1		Request Para Command Pa		Required Required
	DD128	Generic instance			0 = Instance 0 1 = Instance 1 2 = Instance 2 n = Instance n, 253 = Reserver 254 = Error 255 = Not avai				
	with all def	Integer, 8 bit unsigned is not specified in the "Request ined Rudder Instances. (This Poparameter is supported on any of	GN will be t	ransmitted fo	O Request is mad reach instance.)	f a Request Para	e response will be meter or	Unit-le	ss number
2	Direction	n Order		Byte Fiel Bit Fie	d Size:		Request Para Command Pa		Optional Optional
	DD147	Directional Command			MSB/LSB: 000 = No Orde 001 = Move to 010 = Move to	starboard,			
	DF52 Value shou	Bit field uld be "Not Available" when Angl	bit(n) e Order is	Range: Torovided.	Variable	Resolutio	on: 1	Used to	construct bit fields
3	NMEA R	eserved		Byte Fiel Bit Fie	d Size: Id Size: <mark>resv 5</mark>	j _	Request Para Command Pa		
	DD001	Reserved field			Variable numb	er of reserved bits	s, all set to logic "1	"	
	DF52 Used to ali	Bit field gn subsequent data on a byte bo	bit(n) oundary.	Range: \	Variable	Resolutio	on: 1	Used to	construct bit fields
4	Angle O	rder		Byte Field Bit Field	d Size: 2		Request Para Command Pa		Optional Optional
	DD146	Rudder Angle Signed			Rudder angle v	where positive val	ues are starboard a	nd negati	ve values are port
	DF04 Value shou	Angle, signed uld be "Not Available" when Direction	int16 ction Order	Range: -	⊦/-Pi rad	Resolutio	on: 1x10E-4 rad	Resolut	cion ~0.0057deg
5	Position			Byte Field Bit Fie	d Size: 2		Request Para Command Pa		Optional Prohibited
	DD146	Rudder Angle Signed			Rudder angle v	where positive val	ues are starboard a	nd negati	ve values are port
	DF04	Angle, signed	int16	Range: -	⊦/-Pi rad	Resolutio	on: 1x10E-4 rad	Resolut	ion ~0.0057deg

Rudder **PGN: 127245**

hex: 1F10D

Used to construct bit fields

6 **NMEA Reserved**

DF52

Byte Field Size: Bit Field Size: resv 16

Range: Variable

Request Parameter Command Parameter:

DD001 Reserved field

Bit field

Variable number of reserved bits, all set to logic "1"

Resolution: 1

bit(n) Used to align subsequent data on a byte boundary.

Vessel Heading PGN: 127250 hex: 1F112

Heading sensor value with a flag for True or Magnetic.

If the sensor value is Magnetic, the deviation field can be used to produce a Magnetic heading, and the variation field can be used to correct the Magnetic heading to produce a True heading.

To obtain Magnetic Heading from the Heading Sensor Reading: Add Deviation to Heading Sensor Reading. To obtain True Heading: Add Variation to Magnetic Heading. The Heading Sensor Reading may or may not be corrected for Deviation and the Deviation field set to 'Data Not Available'. (A fluxgate compass may be compensated for Deviation without being able to produce the Deviation corresponding to every Heading)

If the Heading sensor does not provide Variation by itself, it shall set the value to 'Data Not Available'. A source which provides Magnetic Variation only, should use PGN 127258 Magnetic Variation.

Variation provided in this PGN is the one currently in use by this device. If this device is also a source of variation, it should also transmit Magnetic Variation PGN 127258. A steering compass must send rapidly, a second backup compass may send at a slower rate, a Variation only source may send this at a slow rate. A deviation table may be programmed into the compass using the Command Group Function (PGN 126208) message and sending Heading Sensor Reading and Deviation for each entry of the table.

ame: Yes	Priority Default: 2	Default	Update R	late:	100 millised	onds	Frequency:	10.	cycles per	second
n: Global	Query Support: Optional	Co	mmand Sup	port: Option	al AC	CK Rqmnts: N	one			
Field N	ame									
Sequenc	e ID		•				•		Optional Optional	
DD056	Sequence ID			PGNs fi differen related o in PGN data set 0 - 252 data set 253 - 25 255 = N	om a single so t PGN transm data set. For e 129026 to the binding ava 4 = reserved	ource address issions identi example, ider e Latitude and ilable (when for future use	s. Identical SID va ifies those PGN tr atical SID values d Longitude value SID value reache	alues with ansmissi pind the (es in PGN s 252, res	nin two or more ons as a single COG and SOC 129029 as a sume with 0 or	re e G values single n next
DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution.	1 bit	Unit-les	ss number	
Heading	Sensor Reading		•				,		Optional Optional	
DD118	Heading Sensor Reading			Primary	output of hea	ding as indic	ated by the headi	ng senso	r.	
DF02	Angle	uint16	Range:	0 to 2Pi rac	l	Resolution.	1x10E-4 rad			eg, 1
Deviation	1		•				•		Optional Optional	
DD151	Magnetic Heading Correction	1		Positive	values are Ea	sterly and ne	gative values are	Westerly		
DF04	Angle, signed	int16	Range:	+/-Pi rad		Resolution.	1x10E-4 rad	Resolut	ion ~0.0057de	eg
	DD056 DF53 Heading DD118 DF02 Deviation	Pield Name Sequence ID DD056 Sequence ID DF53 Integer, 8 bit unsigned Heading Sensor Reading DD118 Heading Sensor Reading DF02 Angle Deviation DD151 Magnetic Heading Correction	Pield Name Sequence ID DD056 Sequence ID DF53 Integer, 8 bit unsigned uint8 Heading Sensor Reading DD118 Heading Sensor Reading DF02 Angle uint16 Deviation DD151 Magnetic Heading Correction	Field Name Sequence ID Byte Find Bit F DD056 Sequence ID DF53 Integer, 8 bit unsigned uint8 Range: Heading Sensor Reading Byte Find Bit F DD118 Heading Sensor Reading DF02 Angle uint16 Range: Deviation Byte Find Bit F Bit F Bit F DD151 Magnetic Heading Correction	Field Name Sequence ID Byte Field Size: Bit Field Size: DD056 Sequence ID An upw PGNs fr differen related of in PGN data set. 253 - 25 255 = N whenever DF53 Integer, 8 bit unsigned uint8 Range: 0 to 252 Heading Sensor Reading Byte Field Size: Bit Field Size: Bit Field Size: DD118 Heading Sensor Reading DF02 Angle Deviation Byte Field Size: Bit Field Size: DD151 Magnetic Heading Correction Positive	Field Name Sequence ID Byte Field Size: Bit Field Size: DD056 Sequence ID An upward counting a PGNs from a single so different PGN transm related data set. For a in PGN 129026 to the data set. 0 - 252 = binding avaidata set. 253 - 254 = reserved 255 = No binding prowhenever practical. DF53 Integer, 8 bit unsigned Heading Sensor Reading DF02 Angle Byte Field Size: Bit Field Size: Byte Field Size: Bit Field Size: DD118 Heading Sensor Reading DF02 Angle Byte Field Size: Byte Field Size: Bit Field Size: Bit Field Size: DD151 Magnetic Heading Correction Byte Field Size: DD151 Magnetic Heading Correction Positive values are Ea	### Sequence ID Sequence ID Byte Field Size: 1	Sequence ID Byte Field Size: Request Param Bit Field Size: Command Paramon Command Support: Optional ACK Ramnis: None	Sequence ID Byte Field Size: An upward counting number that binds information transmit PGNs from a single source address. Identical SID values with different PGN transmissions identifies those PGN transmissions related data set. For example, identical SID values bind the tin PGN 129026 to the Latitude and Longitude values in PGN data set. 0 - 252 = binding available (when SID value reaches 252, readata set) 253 - 254 = reserved for future use 255 = No binding provided. NMEA recommends using bind whenever practical. DF53 Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: 1 bit Unit-lest Bit Field Size: DD118 Heading Sensor Reading Byte Field Size: DP702 Angle uint16 Range: 0 to 2Pi rad Resolution: Byte Field Size: Command Parameter: DD151 Magnetic Heading Correction Positive values are Easterly and negative values are Westerly	Sequence ID Byte Field Size: Request Parameter Optional

	hex: 1F1'	12
A Marietian Protection Protection Company Comp	Paramatar Outing	

4	Variation	1		•	eld Size: 2		Request Param Command Para		Optional Optional
	DD151	Magnetic Heading Correction			Positive values are	Easterly and ne	gative values are	Westerly	7.
	DF04	Angle, signed	int16	Range:	+/-Pi rad	Resolution	1x10E-4 rad	Resolut	tion ~0.0057deg
5	Heading	Sensor Reference		•	eld Size: ield Size: <mark>2</mark>		Request Param Command Para		Optional Optional
	DD117	Direction reference			0 = True, 1 = Magnetic, 2 = Error, 3 = Null				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
6	NMEA R	eserved		•	eld Size: ield Size: resv 6		Request Param Command Para		
	DD001	Reserved field			Variable number of	of reserved bits, a	all set to logic "1"		
	DF52 Used to alig	Bit field gn subsequent data on a byte bou	bit(n) ndary.	Range:	Variable	Resolution	1	Used to	construct bit fields

Rate of Turn PGN: 127251 hex: 1F113

Rate of Turn is the rate of change of the Heading. Heading is defined as the direction of the vertical projection of the fore-and-aft line of the ship onto the horizontal plane.

Single Fr	rame: Yes	Priority Default: 2	Default	Update Ra	te: 100	<mark>)</mark> milliseco	nds /	Frequency:	10.	cycles per second
Destination	n: Global	Query Support: Optional	Co	mmand Supp	ort: Optional	ACK	(Rqmnts: <mark>N</mark> a	one		
Field #	Field N	ame								
1	Sequenc	e ID		Byte Fiel Bit Fie	d Size: 1			Request Para Command Pa		Optional Optional
	DD056	Sequence ID			PGNs from different PG related data in PGN 129 data set. 0 - 252 = bin data set) 253 - 254 =	a single sou in transmiss set. For ex- 026 to the I anding availar reserved fo nding provi	arce address. sions identification identification identification and able (when some future use	Identical SID values those PGN tical SID values Longitude values ID value reach	values with transmissi s bind the ones in PGN ess 252, res	ted in two or more nin two or more ons as a single COG and SOG values I 129029 as a single sume with 0 on next
	DF53	Integer, 8 bit unsigned	uint8	Range:) to 252	F	Resolution:	1 bit	Unit-les	ss number
2	Rate of T	⁻ urn		-	d Size: 4			Request Para Command Pa		Optional Optional
	DD224	Rate of Turn			+ = Bow tur	ning to star	board, 1 deg	g/min = .00029	rad/sec	
	DF85	Angular rate, signed - Pre	int32		+/-67.0 rad/s (a 230703 deg/mi	1 1		1/32 x 10E-6 rad/s		
3	NMEA R	eserved		Byte Fiel Bit Fie	d Size: Id Size: resv	24		Request Para Command Pa		
	DD001	Reserved field			Variable nur	mber of rese	erved bits, a	ll set to logic "1	"	
	DF52	Bit field	bit(n)	Range:	Variable	F	Resolution:	1	Used to	construct bit fields
	Used to alig	gn subsequent data on a byte boo	ındary.							

Heave PGN: 127252 hex: 1F114

The Heave PGN reports the vertical distance perpendicular to (smooth, wave-free water on) the earth's surface.

The vertical distance is the height that a vessel is lifted by the crest of a wave (-), or the depth that a vessel drops in the trough of a wave (+).

This convention conforms to the North-East-Down(NED) coordinate system, which is also referred to as positive down. Heave measurements can be used by a sounder to remove the effects of waves (heave) from the data presented on its display.

Field 3 may be configured over the network.

The Command Group Function (PGN126208) shall be used for any configuration of this PGN.

Note 1: Field 3 command support is optional. If it is supported, the sensor may accept a command to change the source of the delay value: 1) Change the delay to one of the manufacturer's preset values, or 2) Change the delay to a user defined value

Single Fra	ame: Y	Priority Default: 3	Default Update F	Rate: 100	milliseconds	Frequency:	10.	cycles per second
Destination	n: Global	Query Support: Optional	Command Su	pport: Optional	ACK Rqmnts	: None		
Field#	Field N	ame						
1	Sequenc	e ID	•	ield Size: 1 Field Size:		Request Paral Command Pal		Optional Optional
	DD056	Sequence ID		PGNs from a different PGN related data sein PGN 12902 data set. 0 - 252 = bind data set) 253 - 254 = re	single source add transmissions idet. For example, i 26 to the Latitude ling available (where eserved for future ding provided. N	and Longitude valu	ralues with transmission bind the C es in PGN es 252, res	in two or more ons as a single COG and SOG values 129029 as a single ume with 0 on next
	DF53	Integer, 8 bit unsigned	uint8 Range:	0 to 252	Resoluti	ion: <mark>1 bit</mark>	Unit-les	s number
2	Heave		•	iield Size: 2 Field Size:		Request Paral Command Pal		Optional Optional
	DD372	Heave		surface. The that a vessel d	height that a vesse rops in the trough	cular to (smooth, wa el is lifted by the cre n of a wave (+). This inate system, which	est of a war	ve (-), or the depth on conforms to the
	DF14	Distance, short, signed	int16 Range:	+/-327.64 m	Resoluti	ion: <mark>1x10E-2 m</mark>		

Heave PGN: 127252 hex: 1F114

Byte Field Size: 2 Delay Request Parameter 3 Optional Bit Field Size: Command Parameter: Note 1 DD373 Delay Delay added by calculations. When commanded: 0x0000 - 0xfff9 = Value within valid uint16 range0xfffa = Set minimum value0xfffb = Set maximum value 0xfffc = Restore Factory Defaults Resolution: 1x10E-2sec **DF66** Time interval, .01sec uint16 Range: 0 to 655.32s The delay parameter is optional. If not supported, it must be transmitted as Data Not Available. Commanding this field may allow the sensor to fine tune its calculations given more or less time than its default setting. **Delay Source** Byte Field Size: Request Parameter Optional Bit Field Size: 4 Command Parameter: Optional 0 = User Defined **DD374** Measurement Delay Source 1 = Minimum Supported Value 2 = Factory Default Value 3 = Maximum Supported Value 4 thru 13 = Reserved 14 = Data out of range15 = Data not available DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields This field is used to report the source of the time delay value in field 3 in this PGN. **NMEA Reserved** Byte Field Size: Request Parameter 5 Bit Field Size: resv 20 Command Parameter: Variable number of reserved bits, all set to logic "1" **DD001** Reserved field Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) Range: Variable Used to align subsequent data on a byte boundary.

Attitude PGN: 127257 hex: 1F119

This PGN provides a single transmission that describes the position of a vessel relative to both horizontal and vertical planes. This would typically be used for vessel stabilization, vessel control and onboard platform stabilization. Products that directly interface to pitch, roll and yaw transducers would transmit this PGN

Single Fr	rame: Yes	Priority Default: 3	Default	Update Ra	ate: 1000	milliseconds	Frequency:	1.	cycles per second
Destination	n: Global	Query Support: Optional	Co	ommand Supp	oort: Optional	ACK Rqmnts.	None		
ield#	Field Na	ame							
1	Sequenc	e ID		Byte Fie Bit Fie	ld Size: 1 eld Size:		Request Paran Command Para		Optional Optional
	DD056	Sequence ID			PGNs from a different PGN related data s	single source addr I transmissions ide et. For example, id		nlues with ansmissi oind the	nin two or more
					0 - 252 = bino data set)	ding available (wh	en SID value reaches	s 252, res	sume with 0 on next
					253 - 254 = r	eserved for future	ise		
					255 = No bin whenever pra		MEA recommends us	sing bind	ling SID values
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	on: 1 bit	Unit-les	ss number
2	Yaw			Byte Fie Bit Fie	ld Size: 2		Request Param Command Para		Optional Optional
	DD063	Yaw			Oscillation of	ship about it's ver	tical axis. Bow mov	ving to st	arboard is positive.
	DF04	Angle, signed	int16	Range:	+/-Pi rad	Resolution	on: 1x10E-4 rad	Resolut	ion ~0.0057deg
3	Pitch			Byte Fie Bit Fie	ld Size: 2 eld Size:		Request Param Command Para		Optional Optional
	DD062	Pitch			Oscillation of	ship about it's lati	tudinal axis. Bow n	noving u	p is positive.
	DF04	Angle, signed	int16	Range:	+/-Pi rad	Resolution	on: 1x10E-4 rad	Resolut	ion ~0.0057deg
4	Roll			Byte Fie Bit Fie	ld Size: 2 eld Size:		Request Param Command Para		Optional Optional
	DD061	Roll			Oscillation of	ship about it's lon	gitudinal axis. Roll	to the sta	arboard is positive.
	DF04 Roll to start	Angle, signed board is positive +/- 180 degrees	int16	Range:	+/-Pi rad	Resolution	on: 1x10E-4 rad	Resolut	ion ~0.0057deg
5	NMEA R	eserved		Byte Fie Bit Fie		8	Request Param Command Para		
	DD001	Reserved field			Variable num	ber of reserved bit	s, all set to logic "1"		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	on: 1	Used to	construct bit fields
	Used to alig	gn subsequent data on a byte bou	ndary.						

Magnetic Variation PGN: 127258 hex: 1F11A

Message for transmitting variation. The message contains a sequence number to allow synchronization of other messages such as Heading or Course over Ground. The quality of service and age of service are provided to enable recipients to determine an appropriate level of service if multiple transmissions exist.

Single Fr	rame: Yes	Priority Default: 6	Default Update	Rate: 1000	milliseconds	Frequency:	1.	cycles per second	
Destination	n: <mark>Global</mark>	Query Support: Optional	Command Sเ	pport: Optional	ACK Rqmnts:	None			
Field #	Field Nam	e							
1	Sequence I	D		ield Size: 1 Field Size:		Request Parar Command Par		Optional Optional	
	DD056 So	equence ID		PGNs from a different PGN related data so		ss. Identical SID v tifies those PGN t entical SID values	alues with ransmissi bind the	nin two or more	
				0 - 252 = bino data set)	ling available (wher	SID value reache	es 252, res	sume with 0 on next	
				253 - 254 = re	eserved for future us	e			
				255 = No bind whenever practices	inding provided. NMEA recommends using binding SID valuractical.				
	DF53	Integer, 8 bit unsigned	uint8 Range:	0 to 252	Resolution	1: 1 bit	Unit-les	s number	
2	Variation S	ource	•	iield Size: Field Size: <mark>4</mark>		Request Parar Command Par		Optional Optional	
	DD232 V	ariation Source		0x01 = Auton system" 0x02 = Auton system" 0x03 = Auton 0x04 = WMN 0x05 = WMN 0x06 = WMN 0x07 = WMN	ved,	tion is derived from has been composed variation has been s calc via World March via World Mar	om cartogram cartogram derived valued Magnetic M	rahy present in n tabular based via calculation" Model for 2000" Model for 2010" Model for 2010" Model for 2015"	
	DF52	Bit field	bit(n) Range:	Variable	Resolution	r: 1	Used to	construct bit fields	
3	NMEA Rese	erved	-	iield Size: Field Size: resv	4	Request Parar Command Par			
	DD001 R	eserved field		Variable num	ber of reserved bits,	all set to logic "1"	"		
		Bit field subsequent data on a byte bour		Variable	Resolution	n: <mark>1</mark>	Used to	construct bit fields	

Magnetic Variation PGN: 127258 hex: 1F11A

4	Age of Service (Date)	•	Byte Field Size: Bit Field Size:			oeter Optional ometer: Optional	
	DD039 Generi	c date		Days since January	1, 1970, Date	is relative to UTC	C Time.	
	DF41 Date	day count uin	t16 Range:	0 to 65,532 days	Resolution:	1 day	0 = January 1, 1970, max = ~179 years	
5	Variation		-	ield Size: 2		Request Parameter Optional Command Parameter: Optional		
	DD151 Magne	tic Heading Correction		Positive values are I	Easterly and negative values are Westerly.			
	DF04 Angl	e, signed int	16 Range:	+/-Pi rad	Resolution:	1x10E-4 rad	Resolution ~0.0057deg	
6	NMEA Reserved		•	ield Size: Field Size: resv 16		Request Param Command Para		
	DD001 Reserv	ed field		Variable number of	reserved bits, a	ll set to logic "1"		
	DF52 Bit fi	eld bit	(n) Range:	Variable	Resolution:	1	Used to construct bit fields	
		quent data on a byte boundar						

Engine Parameters, Rapid Update

PGN: 127488 hex: 1F200

Provides data with a high update rate for a specific engine in a single frame message. The first field provides information as to which engine. This PGN if used with PGN 127489 will provide most Engine data.

Single F	rame: Yes	Priority Default: 2	Default	Update Ra	ate: 100	milliseconds	Frequency:	10.	cycles per se	cond
Destination	on: Global	Query Support: Require	d Co	mmand Supp	oort: Optional	ACK Rqmnts: N	lone			
Field #	Field Name									
1	Engine Insta	nce		Byte Fie	eld Size:		Request Paran Command Para		Required	
	DD410 Eng	gine / Transmission Instan	ace	Zit i i	This data instance num Class 50 and 1, 2, 3,n) p	tance field should be ther 0 and incrementing Function Code 140 sorior to moving to a d s and Function Code	enumerated begin ng towards Starbo hould be the first ifferent Class and	nning on oard. De- enumera Function	the Port side with vices in Propulsic tion sequence (i.e n Code. Devices of	on e. 0, of
	DF52 B	it field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fiel	lds
	all defined Engir	t specified in the "Command ne Instances. (This PGN wil pported on any other Data F	l be transr	nitted for ea	ch instance.) If a	Request Parameter				
2	Engine Spee	d			eld Size: 2 eld Size:		Request Paran Command Para		Optional Optional	
	DD129 Rat	e of rotation								
	DF72 R	otational rate, unsigned	uint16	Range:	0-16,383 RPM	Resolution	1/4 RPM			
3	Engine Boos	t Pressure			eld Size: 2		Request Paran Command Para		Optional Optional	
	DD049 Ger	neric Pressure								
	DF47 Pr	ressure, medium	uint16	Range:	0 to 6,553,200 I	Resolution	1x10E+2 Pa			
4	Engine tilt/tri	m		Byte Fie Bit Fie	eld Size: 1		Request Paran Command Para		Optional Optional	
	DD138 Ger	neric percent of range								
		ercent, Relative measure o, where 0% =Full Down (trir	int8 m) and 10	•	+/- 124% Jp (tilt) Positions	Resolution	1%			
5	NMEA Reser	ved		Byte Fie Bit Fie		<mark>16</mark>	Request Paran Command Para			
	DD001 Res	served field			Variable num	ber of reserved bits,	all set to logic "1"			
	DF52 B	it field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fiel	lds
	Used to align su	ibsequent data on a byte boo	undary.							

Engine Parameters, Dynamic

PGN: 127489 hex: 1F201

Used to provide real-time operational data and status relevant to a specific engine, indicated by the engine instance field. This message would normally be broadcasted periodically to provide information for instrumentation or control functions.

The Engine Discrete Status 1 and Engine Discrete Status 2 fields (11 and 12) are required and may not be transmitted as unavailable.

Reserved bits in these two fields shall be set to 0.

For example, if a sensor is not provided to detect water in the fuel, a 0 shall be placed in the corresponding bit position; If a sensor is provided to detect water in the fuel and water in the fuel is not indicated a 0 shall be placed in the bit position; The only time that a 1 is placed in the bit position is when both a sensor is provided to detect water in the fuel, and water in the fuel is indicated.

Single Fi	ame: No	Priority Default: 2	Default	Update Rate:	500 r	nilliseconds	Frequency:	2.	cycles per second
Destination	n: <mark>Global</mark>	Query Support: Require	ed Co	mmand Support:	Optional	ACK Rqmnts: N	lone		
Field #	Field Nar	me							
1	Engine ins	tance		Byte Field S Bit Field			Request Param Command Para		Required Optional
	DD410 E	Engine / Transmission Insta	nce		instance numb Class 50 and F 1, 2, 3,n) pr	ior to moving to a d	ng towards Starboa hould be the first e ifferent Class and I	ard. Dev numera Function	vices in Propulsion tion sequence (i.e. 0,
	DF52	Bit field	bit(n)	Range: Va	riable	Resolution	1	Used to	construct bit fields
	all defined Er	not specified in the "Command ngine Instances. (This PGN w supported on any other Data I	ill be transn	nitted for each in	nstance.) If a R	equest Parameter o			
2	Engine oil	pressure		Byte Field S	Size: 2		Request Param	eter	Optional
				Bit Field	Size:		Command Para	meter:	Prohibited
	DD049	Generic Pressure							
	DF47	Pressure, medium	uint16	Range: 0 to	o 6,553,200 Pa	Resolution	1x10E+2 Pa		
3	Engine oil	temp.		Byte Field S Bit Field			Request Param Command Para		Optional Prohibited
	DD130 T	Temperature, high							
	DF38	Temperature, high	uint16	Range: 0 to	o 6,553.2 deg	K Resolution	1x10E-1 deg K	0.01° K	elvin
4	Engine ten	np.		Byte Field S Bit Field			Request Param Command Para		Optional Prohibited
	DD043	Generic Temperature							
	DF39	Temperature, low	uint16	Range: 0 to	o 655.32 deg I	Resolution	1x10E-2 deg K		
5	Alternator	potential		Byte Field S Bit Field			Request Param Command Para		Optional Prohibited
	DD136 \	Voltage, DC							
	DF42	Voltage, high	int16	Range: +/-	327.64 V	Resolution	1x10E-2 V		

PGN: 127489

							nex: 1F201
6	Fuel rate DD131 Flow rate, low			ield Size: 2 Field Size:		Request Parameter Command Paramete	Optional Prohibited
	DF18 Flow rate, low	int16	Range:	+/-3.2764 cu-m/hr	Resolution	1x10E-4 cu- m/hr	
7	Total engine hours			ield Size: 4		Request Parameter Command Paramete	Optional er: Optional
	DD132 Run time, Engine						
	DF67 Time interval, large	uint32	Range:	0 to ~4.295x10E+9	Resolution	1 sec	
8	Engine coolant pressure			ield Size: 2		Request Parameter Command Paramete	Optional er: Prohibited
	DD049 Generic Pressure						
	DF47 Pressure, medium	uint16	Range:	0 to 6,553,200 Pa	Resolution	1x10E+2 Pa	
9	Fuel Pressure			ield Size: 2		Request Parameter Command Paramete	Optional Prohibited
	DD225 Generic Pressure High						
	DF29 Pressure	uint16	Range:	0 to 65,532,000 Pa	Resolution	1x10E+3 Pa	
10	Not Available			ield Size: Field Size: resv 8]	Request Parameter Command Paramete	er:
	DD001 Reserved field			Variable number	of reserved bits,	all set to logic "1"	
	DF52 Bit field	bit(n)		Variable	Resolution	-	to construct bit fields
	Previously assigned Engine tilt/trim, moved +127 (Not Available) until future reuse.	to PGN 12	27488 field	4 for faster update rate	e. This value to b	e always set to	
11	Engine Discrete Status 1		•	ield Size: Field Size: 16		Request Parameter Command Parameter	Optional Prohibited
	DD206 Engine Discrete Warning Sta		xxxx xxxx xxx1 xxxx xxxx xx1x xxxx xxxx x1xx xxxx xxxx 1xxx xxxx xxx1 xxxx xxxx xx1x xxxx xxxx xxxx xxxx xxxx 1xxx xxxx xxx1 xxxx xxx1 xxxx xxxx xx1x xxxx xx1x xxxx xx1x xxxx	xx1x = Over Ten x1xx = Low Oil 1 1xxx = Low Oil 1 xxxx = Low Syst xxxx = Low Coo xxxx = Water Flo xxxx = Water in xxxx = Charge Ir xxxx = Preheat Ir xxxx = High Boo xxxx = Rev Limi xxxx = EGR Sysi xxxx = Throttle Ir xxxx = Engine Ere x = don't care	er Temperature, w Oil Pressure, w Oil Level, w Fuel Pressure, w System Voltage, w Coolant Level, tter Flow, tter in Fuel, arage Indicator, theat Indicator, the Boost Pressure, w Limit Exceeded, R System, rottle Position Sensor, gine Emergency Stop Mode		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	Used	to construct bit fields

Engine Parameters, Dynamic

Engine Parameters, Dynamic

PGN: 127489 hex: 1F201

12	Engine [Discrete Status 2		Bvte Fi	eld Size:		Request Parameter Optional			
_	g			•	ield Size: 16		Command Paramete			
	DD223	Engine Discrete Warning Sta	ntus		XXXX XXXX XXX XXXX XXXX XXX XXXX XXXX	x xxxx = reserved, x xxxx = reserved, here x = don't care	evel 2, duction, ace Needed, omm Error, condary Throttle, art Protect, utting Down,			
	DF52	Bit field	bit(n)	Range:	Variable Variable	Resolution:	1 Used	to construct bit fields		
13	Percent	Engine Load		•	eld Size: 1		Request Parameter Command Paramete	Optional er: Prohibited		
	DD138	Generic percent of range								
	DF30 Range 0 -	Percent, Relative measure 124%	int8	Range:	+/- 124%	Resolution:	1%			
14	Percent	Engine Torque			eld Size: 1		Request Parameter Command Paramete	Optional er: Prohibited		
		G :								
	DD138	Generic percent of range								

Electric Drive Status (Dynamic)

PGN: 127490 hex: 1F202

This PGN is used to provide Electric Drive Status data.

The Identifier field (Field1) specifies which motor the PGN message relates to and all following data fields refer only to that motor.

When a field is not supported, an output value of 'Data not available' shall be used

Application examples are located in NMEA 2000 Appendix D.

Single Fr	ame: No	Priority Default: 1	Default	Update R	ate: 1500	<mark>)</mark> milliseconds	Frequency:	.7	7 cycles per se	econd
Destinatio	n: Global	Query Support: Optional	Co	mmand Sup	pport: Optional	ACK Rq	mnts: Yes			
Field #	Field N	ame								
1	Inverter/	Motor Identifier		•	eld Size: 1 ield Size:		Request Par Command P		Required Required	
	DD128	Generic instance			0 = Instance 1 = Instance 2 = Instance n = Instance 253 = Reser 254 = Error 255 = Not a	e 1 e 2 e n, where n < 2 eved	253			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Res	olution: 1 bit	Unit-les	ss number	
2	Operatin	g Mode		-	eld Size: ield Size: 4		Request Par Command P		Optional Optional	
	DD500	Electric Drive Mode				g'	ined			
	DF52	Bit field	bit(n)	Range:	Variable	Res	olution: 1	Used to	construct bit fie	elds
3	NMEA R	eserved			eld Size: ield Size: resv	4	Request Par Command P		Optional Optional	
	DD001	Reserved field			Variable nur	mber of reserve	ed bits, all set to logic	"1"		
	DF52	Bit field	bit(n)	Range:	Variable	Res	olution: <mark>1</mark>	Used to	construct bit fie	elds
4	Motor Te	emperature			eld Size: 2 ield Size:		Request Par Command P		Optional Optional	
	DD043	Generic Temperature								
	DF39	Temperature, low	uint16	Range:	0 to 655.32 deg	g K Res	olution: <mark>1x10E-2 deg</mark> K	5		
5	Inverter	Temperature			eld Size: 2 ield Size:		Request Par Command P		Optional Optional	
	DD043	Generic Temperature								
	DF39	Temperature, low	uint16	Range:	0 to 655.32 deg	g K Res	olution: <mark>1x10E-2 deg</mark> K	g		
	Inverter is a	also known as a Motor Controller.								

PGN: 127490

								ŀ	nex: 1F202	
6	Coolant	Temperature		•	eld Size: 2		Request Parame Command Paran		Optional Optional	
	DD043	Generic Temperature								
	DF39	Temperature, low	uint16	Range:	0 to 655.32 deg K	Resolution:	1x10E-2 deg K			
7	Gear Ter	Gear Temperature			eld Size: 2	Request Parameter Command Parameter:		Optional Optional		
	DD043	Generic Temperature								
	DF39	Temperature, low	uint16	Range:	0 to 655.32 deg K	Resolution:	1x10E-2 deg K			
8	Shaft To	rque		•	eld Size: 1		Request Parame Command Paran		Optional Optional	
	DD263	Generic Absolute Percenta	age 0-252%							
	DF93	Percent, Absolute	uint8	Range:	0 - 252%	Resolution:	1%			
		erating range designated by m ded performance.	anufacturer is	0-100% v	alues >100% can be used	by the manufa	cturer to			

Electric Drive Status (Dynamic)

Electric Energy Storage Status (Dynamic)

PGN: 127491 hex: 1F203

This PGN is used to provide Electric Energy Storage status of sources such as batteries. This message can provide dynamic data rates for information of an electric energy storage system.

The Instance Identifier field (Field 1) specifies which battery the PGN message relates to and all following data fields refer only to that source.

When a field is not supported, an output value of 'Data not available' shall be used

Application examples are located in NMEA 2000 Appendix D.

Single Fr	ame: No	Priority Default: 7	Default	Update Ra	ite: 1	<mark>500</mark> millis	econds	Frequency:		7 cycles per s	econd
Destinatio	n: Global	Query Support: Optional	Con	mmand Supp	ort: Option:	al	ACK Rqmnts: Ye	es			
Field #	Field Na	ame									
1	Energy S	torage Identifier		-	ld Size: 1			Request Para Command Pa		Required Required	
	DD128	Generic instance			253 = R6 $254 = Er$	ince 1 ince 2 ince n, wheserved	ere n < 253				
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-le	ss number	
2	State of 0	Charge		Byte Fie Bit Fie	ld Size: 1			Request Para Command Pa		Optional Optional	
	DD485	Range, Restricted Percentage			0-100% 254 = Er 255 = Data	тог ata Not Av	ailable				
		Percent, Restricted Range te of Charge (not physical State of	uint8 Charge).	Range:	0 - 100%		Resolution:	5x10E-1	0 = 0% 100%	, 100 = 50%, 20)0 =
3	Time Rer	maining		Byte Fie	ld Size: 2			Request Para Command Pa		Optional Optional	
	DD533	Time Remaining									
	DF71 Negative =	Time interval, medium time to full / Positive = time to emp	int16 oty	Range:	+/-32,764 m	ninutes	Resolution:	1.0 minute			
4	Highest (Cell Temperature		-	ld Size: 2			Request Para Command Pa		Optional Optional	
	DD043	Generic Temperature									
	DF39	Temperature, low	uint16	Range:	0 to 655.32	deg K		1x10E-2 deg K			
	Temperatur	re of the hottest cell									

Electric Energy Storage Status (Dynamic)

hex: 1F203

PGN: 127491

5	Lowest Cell Temperature	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD043 Generic Temperature		
	DF39 Temperature, low uint16	Range: 0 to 655.32 deg K Resolution	1x10E-2 deg K
	Temperature of the coldest cell		
6	Average Cell Temperature	Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD043 Generic Temperature		
	DF39 Temperature, low uint16	Range: 0 to 655.32 deg K Resolution	1x10E-2 deg K
	Average temperature of all cells in battery		
7	Max. Discharge Current	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD269 Current, Electric, Unsigned		
	DF95 Current, electric, high uint16 Changes with e.g. battery temperature	Range: 0 - 6553.2 A Resolution	1x10E-1 A
8	Max. Charge Current	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD269 Current, Electric, Unsigned		
	DF95 Current, electric, high uint16 Changes with e.g. battery temperature	Range: 0 - 6553.2 A Resolution	1x10E-1 A
9	Cooling System Status	Byte Field Size: Bit Field Size: 4	Request Parameter Command Parameter: Optional Optional
	DD520 Battery Temperature System Warning	Status 0x0 = lnactive, 0x1 = Active, 0x2 = Reserved, 0x3 = Reserved, 0x4 = Reserved, 0x5 to 0xD = Reserved 0xE = Error, 0xF = Data not available	
	DF52 Bit field bit(n)	Range: Variable Resolution	Used to construct bit fields
	Indicates the status of the of the cooling system		
10	Heating System Status	Byte Field Size: Bit Field Size: 4	Request Parameter Command Parameter: Optional Optional
	DD520 Battery Temperature System Warning	Status $0x0 = lnactive, \\ 0x1 = Active, \\ 0x2 = Reserved, \\ 0x3 = Reserved, \\ 0x4 = Reserved, \\ 0x5 to 0xD = Reserved 0xE = Error, \\ 0xF = Data not available$	
	DF52 Bit field bit(n) Indicates the status of the heating system	Range: Variable Resolution	Used to construct bit fields

Transmission Parameters, Dynamic

PGN: 127493 hex: 1F205

Used to provide the operational state and internal operating parameters of a specific transmission, indicated by the transmission instance field. This message would normally be broadcasted periodically to provide information for instrumentation or control functions.

Single Fr	ame: Yes	Priority Default: 2	Default	Update R	ate: 100	milliseconds	Frequency:	10.	cycles per second
Destination	n: Global	Query Support: Requ	i <mark>red</mark> Co	mmand Sup	port: Required	ACK Rqmnts:	None		
Field #	Field N	ame							
1	Transmi	ssion instance		,	eld Size: ield Size: 8		Request Parar Command Par		Required Required
	DD410	Engine / Transmission Ins	tance		instance num Class 50 and 1, 2, 3,n) p	rior to moving to a	ing towards Starbo should be the first different Class and	oard. De enumera Function	vices in Propulsion tion sequence (i.e. 0,
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	n: <mark>1</mark>	Used to	construct bit fields
	with all def	is not specified in the "Reques ined Transmission Instances. Parameter is supported on an	(This PGN w	ill be trans	mitted for each inst	ance.) If a Request	Parameter or		
2	Transmi	ssion Gear		Byte Fi	eld Size:		Request Parar	neter	Optional
				Bit F	ield Size: 2		Command Par	ameter:	Optional
	DD222	Transmission Gear			0 = Forward. 1 = Neutral, 2 = Reverse, 3 = [Unavaila	ble, Unknown]			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	n: <u>1</u>	Used to	construct bit fields
3	NMEA R	eserved		•	eld Size: ield Size: resv	6	Request Parar Command Par		
	DD001	Reserved field			Variable num	ber of reserved bits,	all set to logic "1"	'	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	n: 1	Used to	construct bit fields
	Used to ali	gn subsequent data on a byte	boundary.						
4	Transmi	ssion oil pressure		•	eld Size: 2 ield Size:		Request Parar Command Par		Optional Prohibited
	DD049	Generic Pressure							
	DF47	Pressure, medium	uint16	Range:	0 to 6,553,200 P	a Resolution	n: 1x10E+2 Pa		
5	Transmi	ssion oil temperature		•	eld Size: 2 ield Size:		Request Parar Command Par		Optional Prohibited
	DD130	Temperature, high							
	DF38	Temperature, high	uint16	Range:	0 to 6,553.2 deg	K Resolution	n: 1x10E-1 deg	0.01° K	elvin

Transmission Parameters, Dynamic

PGN: 127493 hex: 1F205

6	Transmis	sion Discrete Status		•	eld Size: ield Size: <mark>8</mark>		Request Parame Command Param	ter Optional neter: Prohibited	
	DD221	DF52 Bit field bit(n)			xxxx xx1x = xxxx x1xx = xxxx 1xxx = xxx1 xxxx = xx1x xxxx = x1x xxxx = 1xxx xxxx =	reserved,			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1 U	Jsed to construct bit fields	
7	NMEA Re	eserved		•	eld Size: ield Size: <mark>resv</mark>	8	Request Parame Command Param		
	DD001	Reserved field			Variable nun	nber of reserved bits,	all set to logic "1"		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1 U	Jsed to construct bit fields	
	Used to alig	gn subsequent data on a byte	boundary.						

Electric Drive Information

PGN: 127494 hex: 1F206

This PGN is used to provide information about electric drive specifications and ratings. This PGN is available by request only.

The Identifier field (Field 1) specifies which motor the PGN message relates to and all following data fields refer only to that motor.

Application examples are located in NMEA 2000 Appendix D.

Single Fr	ame: No	Priority Default: 4	Default	Update Ra	ate:	milliseconds	Frequency:	N/	A cycles per se	cond
Destinatio	n: Global	Query Support: Required	Co	mmand Supp	oort: Optional	ACK Rqm	nnts: <mark>Yes</mark>			
ield#	Field N	ame								
1	Inverter/	Motor Identifier		Byte Fie Bit Fie	ld Size: 1 eld Size:		Request Par Command F		Required Required	
	DD128	Generic instance			0 = Instance 1 = Instance 2 = Instance n = Instance 253 = Reser 254 = Error 255 = Not a	1 2 n, where n < 2:	53			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Reso	lution: 1 bit	Unit-le	ss number	
2	Motor Ty	уре		Byte Fie Bit Fie	ld Size: eld Size: <mark>2</mark>		Request Par Command F		Optional Prohibited	
	DD497	Voltage Type			0=DC 1=AC 2= Reserved 3=Data Not					
	DF52	Bit field	bit(n)	Range:	Variable	Reso	lution: 1	Used to	construct bit fie	lds
3	NMEA R	eserved		Byte Fie Bit Fie	ld Size: eld Size: <mark>resv</mark>	6	Request Par Command F		Optional Prohibited	
	DD001	Reserved field			Variable nui	mber of reserved	bits, all set to logic	"1"		
	DF52	Bit field	bit(n)	Range:	Variable	Reso	lution: 1	Used to	construct bit fie	lds
4	Motor Vo	oltage Rating		Byte Fie Bit Fie	ld Size: 2		Request Par Command F		Optional Prohibited	
	DD347	Voltage, AC or DC, High Ran	ige		6553.3 = Re 6553.4 = Ou 6553.5 = No		o Not Change			
	DF106	6 Voltage - High Range	uint16	Range:	0 - 6553.2 V	Reso	lution: <mark>0.1V</mark>			
5	Maximur	m Continuous Motor Power		Byte Fie Bit Fie	ld Size: 2 eld Size:		Request Par Command F		Optional Prohibited	
	DD528	Power, High (kWatts)								
	DF131	Power - High Range	uint16	Range:	0-655kW	Reso	lution: 10W			
6	Maximur	n Boost Motor Power		Byte Fie Bit Fie	ld Size: 2 eld Size:		Request Par Command F		Optional Prohibited	
	DD528	Power, High (kWatts)								
	DF13 1	Power - High Range	uint16	Range:	0-655kW	Reso	lution: <mark>10W</mark>			
	· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·	·		·		·	

Electric Drive Information PGN: 127494 hex: 1F206

Byte Field Size: 2 Request Parameter 7 **Maximum Motor Temperature Rating** Optional Bit Field Size: Command Parameter: Prohibited **DD043** Generic Temperature uint16 Range: 0 to 655.32 deg K Resolution: 1x10E-2 deg **DF39** Temperature, low Byte Field Size: Request Parameter **Rated Motor Speed** Optional 8 Bit Field Size: Command Parameter: Prohibited **DD129** Rate of rotation Resolution: 1/4 RPM **DF72** Rotational rate, unsigned uint16 Range: 0-16,383 RPM **Maximum Controller Temperature Rating** Byte Field Size: Request Parameter 9 Optional Bit Field Size: Command Parameter: Prohibited **DD043** Generic Temperature Range: 0 to 655.32 deg K Resolution: 1x10E-2 deg DF39 Temperature, low uint16 **Motor Shaft Torque Rating** Byte Field Size: 2 Request Parameter Optional 10 Bit Field Size: Command Parameter: **Prohibited** DD521 Torque DF129 Torque uint16 Range: 0 -6553.2 Resolution: 1x10E-1 Nm 11 **Motor DC-Voltage Derating Threshold** Byte Field Size: Request Parameter Optional Bit Field Size: Command Parameter: **Prohibited** 6553.3 = ReservedDD347 Voltage, AC or DC, High Range 6553.4 = Out of Range6553.5 = Not Available or Do Not Change Resolution: 0.1V DF106 Voltage - High Range uint16 Range: 0 - 6553.2 V Voltage threshold below which performance will be reduced Byte Field Size: Request Parameter 12 Motor DC-Voltage Cut Off Threshold Optional Bit Field Size: Command Parameter: Prohibited **DD347** Voltage, AC or DC, High Range 6553.3 = Reserved6553.4 = Out of Range6553.5 = Not Available or Do Not Change Range: 0 - 6553.2 V DF106 Voltage - High Range uint16 Resolution: 0.1V Voltage threshold below which device will be shut down **Drive/Motor Hours** Byte Field Size: Request Parameter 13 Optional Bit Field Size: Command Parameter: Prohibited **DD132** Run time, Engine Range: $0 \text{ to } \sim 4.295 \times 10E + 9 \text{ s}$ **DF67** Time interval, large Resolution: 1 sec uint32

PGN: 127495 hex: 1F207

This PGN is used to provide the information for power storage sources such as batteries.

The Instance Identifier field (Field 1) specifies which motor the PGN message relates to and all following data fields refer only to that source.

When a field is not supported, an output value of 'Data not available' shall be used"

Application examples are located in NMEA 2000 Appendix D.

	DF52	Bit field	bit(n)	Range:	Variable	Resolut	ion: 1	Used to construct bit fields			
	DD001	Reserved field			Variable nu	mber of reserved bi	its, all set to logic "	1"			
3	NMEA Re	eserved		•	eld Size: feld Size: resv	2	Request Para Command Pa				
	DF52	Bit field	bit(n)	Range:	Variable	Resolut	ion: 1	Used to construct bit fields			
	DD532	Energy Storage Mode			00 = Norma 01 = Storag 10 = Reserv 11 = Failure	e Mode ved					
2	Energy S	torage Mode		-	eld Size: ield Size: 2]	Request Parameter: Optional Command Parameter: Required				
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolut	ion: 1 bit	Unit-less number			
	DD128	Generic instance			0 = Instance 1 = Instance 2 = Instance n = Instance 253 = Reser 254 = Error 255 = Not a	e 1 e 2 e 2, where n < 253 rved					
1	Energy S	torage Identifier		•	eld Size: 1 feld Size:		Request Para Command Pa	· ·			
Field#	Field Na	ame									
•	n: Global	Query Support: Requi		•	port: Optional	ACK Rqmnts		TVV system per deserte			
Single Fr	ame: No	Priority Default: 6	Default	Update R	ate:	milliseconds	Frequency:	NA cycles per second			

PGN: 127495 hex: 1F207

Storage Chemistry/Conversion 4

Byte Field Size:

Bit Field Size: 12

Request Parameter Command Parameter: Optional

Optional

DD538 Battery Chemistry/Conversion

0x000 Lead - No specified secondary 0x001 Lead - Lead Acid, Flooded

0x002 Lead - Lead Acid, AGM 0x003 Lead - Lead Acid, Gel

0x004 Lead - Lead Acid, Advanced Carbon or Carbon Foam

0x005 Lead - Silicon Dioxide (SiO2)

0x006...0x03F - Reserved

0x040 Lithium - No specified secondary

0x041 Lithium - Lithium Iron Phospate (LiFePO4)

0x042 Lithium - Lithium Nickel Cobalt Aluminum Oxide (LiNiCoAlO2)

0x043 Lithium - Lithium Manganese Oxide (LiMn2O4 or LiMnO3)

0x044 Lithium - Lithium Nickel Manganese Cobalt Oxide (LiNiMnCoO2)

0x045 Lithium - Lithium Titanate

0x046 Lithium - Lithium Thyonol Chloride

0x047 Lithium - LiFe / LiS / Lithium CuO / Lithium Silver-Vanadium

0x048...0x07F - Reserved

0x080 Nickel - No specified secondary

0x081 Nickel - Nickel Cadmium (NiCd)

0x082 Nickel - Nickel Iron (NiFe)

0x083 Nickel - Nickel Zinc (NiZn)

0x084 Nickel - Nickel Metal Hydride (NiMh)

0x085...0x0BF - Reserved

0x0C0 Zinc - No specified secondary

0x0C1 Zinc - Zinc Air (ZnO2)

0x0C2 Zinc - Zinc Carbon

0x0C3...0x0FF - Reserved

0x100 Alkaline - No specified secondary

0x101 Alkaline - Manganese Dioxide

0x102...0x13F - Reserved

0x140 Magnesium - No specified secondary

0x141 Magnesium - Magnesium Aluminum

0x142...0x17F - Reserved

0x180 Silver - No specified secondary

0x181 Silver - Silver Oxide

0x182...0x1BF - Reserved

0x1C0 Solid Electrolyte Batteries - No specified secondary

0x1C1 Solid Electrolyte Batteries - Lithium Ion Solid Oxide (Li-Sox)

0x1C2...0x1FF - Reserved

0xE00 Transient Storage System/Array - Not specified

0xE01 Transient Storage System/Array - Super/Ultra-Capacitor

0xE02...0xE3F - Reserved

0xE40 Reserve Storage - Not specified

0xE41 Reserve Storage - Aqueous/Salt Water Activated

0xE42...0xE7F - Reserved

0xE80 Fuel Cell - No specified conversion system

0xE81 Fuel Cell - Hydrogen Conversion

0xE82 Fuel Cell - Compressed Gas Conversion

0xE83 Fuel Cell - Membrane/Ionomer Conversion

0xE84 Fuel Cell - Aqueous Alkaline Solution Conversion

PGN: 127495 hex: 1F207

0xE85...0xEBF - Reserved

0xEC0 General - No specified secondary 0xEC1 General - Primary Cells or Batteries

0xEC2...0xEFF - Reserved

						FE - Error FF - Data Not Av	vailable			
	DF52	Bit field	bit(n)	Range:	Variable	;	Resolution:	1	Used to	construct bit fields
5	Maximum	Temperature Derating			eld Size: ield Size:	2		Request Parame Command Para		Optional Optional
	DD043	Generic Temperature								
	DF39	Temperature, low	uint16	Range:	0 to 655	.32 deg K	Resolution:	1x10E-2 deg K		
	Temperature	e threshold above which perform	nance will b	e reduced	•					
6	Maximum	Temperature Shut Off			eld Size: ield Size:	2		Request Parame Command Para		Optional Optional
	DD043	Generic Temperature								
	DF39	Temperature, low	uint16	Range:	0 to 655	.32 deg K	Resolution:	1x10E-2 deg K		
	Temperature	e threshold above which perform	nance will b	e disabled						
•	Minimum	Temperature Derating			eld Size: ield Size:	2		Request Parame Command Param		Optional Optional
	DD043	Generic Temperature								
	DF39	Temperature, low	uint16	Range:	0 to 655	.32 deg K	Resolution:	1x10E-2 deg K		
	Temperature	e threshold below which perform	nance will b	e reduced						
}	Minimum	Temperature Shut Off			eld Size: ield Size:	2		Request Param Command Para		Optional Optional
	DD043	Generic Temperature								
	DF39	Temperature, low	uint16	Range:	0 to 655	.32 deg K	Resolution:	1x10E-2 deg K		
	Temperature	e threshold below which the batt	ery output	is disabled						
)	Usable Ba	attery Energy			eld Size: ield Size:	2		Request Parame		Optional Optional
	DD537	Battery Capacity (kWh)								
		Battery Capacity, Extend gy at full charge. Value may dec	uint16 crease over	_	0-6553.2 e time.	2 kWh	Resolution:	0.1		

PGN: 127495 hex: 1F207

10	State of Health		Byte Field Size: 1 Bit Field Size:		est Parameter mand Parameter:	Optional Optional
	DD485 Range, Restricted Percentage	•	0-100% 254 = Error 255 = Data Not Av	vailable		
	DF120 Percent, Restricted Range Indicates remaining service life of battery.	uint8)% indicate	Range: 0 - 100% es battery replacement recommende	Resolution: 5x10	E-1 0 = 0%, 100%	100 = 50%, 200 =
11	Battery Cycle Counter		Byte Field Size: 2 Bit Field Size:	•	est Parameter mand Parameter:	Optional Optional
	DD008 Generic counter, medium		Numeric count, ev	ent counter, sequence of	counter	
	DF54 Integer, 16 bit unsigned The number of discharge cycles	uint16	Range: 0 to 65,532	Resolution: 1 bit	Unit-les	s number
12	Battery Full Status		Byte Field Size: Bit Field Size: 2	•	est Parameter mand Parameter:	Optional Optional
	DD002 Generic status pair		MSB/LSB: 00 = [No, Off, Dis 01 = [Yes, On, Ens 10 = Error, 11 = [Unavailable,	abled, Set, "1"],		
	DF52 Bit field 01 = State set when BMS prevents further c	bit(n) harging. W	Range: Variable /ill vary with Max SOC.	Resolution: 1	Used to	construct bit fields
13	Battery Empty Status		Byte Field Size: Bit Field Size: 2		est Parameter mand Parameter:	Optional Optional
	DD002 Generic status pair		MSB/LSB: 00 = [No, Off, Dis 01 = [Yes, On, End 10 = Error,	abled, Set, "1"],		
			11= [Unavailable,	Unknown]		
	DF52 Bit field	bit(n)	Range: Variable	Unknown] Resolution: 1	Used to	construct bit fields
	DF52 Bit field 01 = State set when BMS prevents further D	()	Range: Variable		Used to	construct bit fields
14		()	Range: Variable	Resolution: 1		Optional
14	01 = State set when BMS prevents further D	()	Range: Variable Will vary with Min Charge SOC. Byte Field Size: Bit Field Size: resv 4	Resolution: 1	est Parameter mand Parameter:	Optional
14	01 = State set when BMS prevents further D NMEA Reserved	()	Range: Variable Will vary with Min Charge SOC. Byte Field Size: Bit Field Size: resv 4 Variable number o	Resolution: 1 Requ Comr	est Parameter mand Parameter: o logic "1"	Optional Optional
14	01 = State set when BMS prevents further D NMEA Reserved DD001 Reserved field	Discharge. V	Range: Variable Will vary with Min Charge SOC. Byte Field Size: Bit Field Size: resv 4 Variable number o	Resolution: 1 Requ Commof reserved bits, all set t Resolution: 1 Requ	est Parameter mand Parameter: o logic "1" Used to	Optional Optional construct bit fields Optional
	01 = State set when BMS prevents further D NMEA Reserved DD001 Reserved field DF52 Bit field	bit(n)	Range: Variable Will vary with Min Charge SOC. Byte Field Size: resv 4 Variable number of Range: Variable Byte Field Size: 1	Resolution: 1 Requ Comm of reserved bits, all set t Resolution: 1 Requ Comm	est Parameter mand Parameter: o logic "1" Used to	Optional Optional construct bit fields Optional

PGN: 127495 hex: 1F207

16 Minimum Discharge (SOC) Byte Field Size: 1 Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD485 Range, Restricted Percentage

0-100% 254 = Error

255 = Data Not Available

DF120 Percent, Restricted Range uint8

Range: 0 - 100%

Resolution: 5x10E-1

0 = 0%, 100 = 50%, 200 =

SOC below which the BMS will prevent further discharge normally 0% but can be increased to extend battery life.

Trip Fuel Consumption, Vessel

PGN: 127496 hex: 1F208

Trip fuel parameters relative to Vessel

Single Frame: No Priority Default:		Priority Default: 5	Default	Update Rate	1000	<mark>)</mark> millise	econds	Frequency:	1.	cycles per	second
Destination: <mark>Global Query Support: </mark> Optional		Co.	mmand Suppor	t: Optional		ACK Rqmnts: <mark>N</mark>	one				
ield#	Field Na	ame									
1	Time to E	Empty		Byte Field	Size: 4			Request Parame	eter	Optional	
				Bit Field	d Size:			Command Para	meter:	Optional	
	DD134	Run time, Trip									
	DF65	Time interval, standard	uint32	Range: 0	to ~4.295x10	E+6 s	Resolution:	1x10E-3 s			
2	Distance	to Empty /Fuel Range		Byte Field	Size: 4			Request Parame	eter	Optional	
				Bit Field	d Size:			Command Para	meter:	Optional	
	DD199	Distance, Unsigned									
	DF09	Distance	uint32	Range: 0	to ~4.295x10	E+7 m	Resolution:	1x10E-2 m			
3	Estimate	d Fuel Remaining		Byte Field	Size: 2			Request Parame	eter	Optional	
				Bit Field	d Size:			Command Para	meter:	Optional	
	DD135	Volume									
	DF44	Volume	uint16	Range: 0	to 65.532 cu	m	Resolution	1x10E-3 cu m			
4	Trip Run	Time		Byte Field	Size: 4			Request Parame	eter	Optional	
				Bit Field	d Size:			Command Para	meter:	Optional	
	DD134	Run time, Trip									
	DF65	Time interval, standard	uint32	Range: 0	to ~4.295x10	E+6 s	Resolution	1x10E-3 s			

Trip Fuel Consumption, Engine

PGN: 127497 hex: 1F209

Engine related trip / fuel information. This PGN will be requested as needed.

Single Frame: No Priority Default: 5		Default	Update R	ate: 1000	milliseconds	Frequency:	1.	cycles per se	cond	
Destination: Global Query Support: Requir			<mark>quired</mark> Cor	mmand Sup	port: Required	ACK Rqmnts: N	one			
Field #	Field Na	ame								
1	Engine in	nstance		•	eld Size: ield Size: 8		Request Parame Command Param		Required Required	
	DD410	Engine / Transmission	Instance		instance num Class 50 and 1, 2, 3,n) p	ance field should be ber 0 and incrementing Function Code 140 strior to moving to a distant stand Function Code	ng towards Starboa hould be the first en ifferent Class and F	rd. Dev numera unction	vices in Propulsion tion sequence (i.e. a Code. Devices of	on e. 0, of
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fie	lds
	with all defi	s not specified in the "Req ned Engine Instances. (TI Parameter is supported on	his PGN will be tr	ansmitted	for each instance.)	If a Request Parame	eter or			
2	Trip fuel	used		•	eld Size: 2 ield Size:		Request Parame Command Param		Optional Optional	
	DD135	Volume							Optional	
	DF44	Volume	uint16	Range:	0 to 65.532 cu n	n Resolution	1x10E-3 cu m			
3	Fuel Rate	e, Average			eld Size: 2 ield Size:		Request Parame Command Param		Optional Optional	
	DD131	Flow rate, low								
	DF18	Flow rate, low	int16	Range:	+/-3.2764 cu-m/	<mark>hr R</mark> esolution	1x10E-4 cu- m/hr			
4	Fuel Rate	e, Economy		•	eld Size: 2 ield Size:		Request Parame Command Param		Optional Optional	
	DD131	Flow rate, low								
	DF18	Flow rate, low	int16	Range:	+/-3.2764 cu-m/	hr Resolution	1x10E-4 cu- m/hr			
5	Instantar	neous Fuel Economy		•	eld Size: 2		Request Parame Command Parar		Optional Optional	
	DD131	Flow rate, low								
	DF18	Flow rate, low	int16	Range:	+/-3.2764 cu-m/	hr Resolution	1x10E-4 cu- m/hr			

Engine Parameters, Static

PGN: 127498 hex: 1F20A

Provides identification information and rated engine speed for the engine indicated by the engine instance field. Used primarily by display devices.

This PGN will be requested as needed.

		e requesteu a								
Single Frame: No Priority Default: 5			date Rate	e:	milliseco	onds	Frequency:	N.	cycles per se	cond
Destination: Global Query Support: Require			and Suppo	rt: Required	AC	K Rqmnts: N	one			
Field Na	ame									
	·	В	Byte Field	Size:			Request Par	ameter	Required	
3			•			,			•	
DD410	Engine / Transmission Insta	nce		instance nun Class 50 and 1, 2, 3,n) j the othe Class	nber 0 and I Function prior to m ss and Fur	l incrementir Code 140 sl oving to a di	ng towards Sta nould be the fi fferent Class a	rboard. De rst enumera nd Functio	vices in Propulsion ation sequence (i.e. on Code. Devices of	on e. 0, of
DF52	Bit field	bit(n) Ra	ange: 🔻	ariable		Resolution:	1	Used to	construct bit fie	lds
with all defi Command	ned Engine Instances. (This P Parameter is supported on any	GN will be trans other Data Field	mitted for I, you mus	each instance.) If a Req	uest Parame	eter or ata Field.			
Rated en	gine speed	В	•				•		•	
DD129	Rate of rotation									
DF72	Rotational rate, unsigned	uint16 Ra	ange: 0	-16,383 RPM		Resolution:	1/4 RPM			
VIN		В	•	d Size:			Command P	arameter:		
DD004	Generic name string, short			Name of pla	ce, route,	waypoint, de	stination, vess	el, vehicle,	etc.	
DF50	String, variable, short	ch8or16(n) <i>R</i> 6	0	to 125 Unico		Resolution:	1 ASCII or 1 Unicode Character	string (byte in	uint8) is the Coundicating the numb	nt
200 charac	ters maximum							includi Contro in strin The Co the stri charact Unicoc Contro charact Contro charact A strin (total le	ng the Count and I bytes. Second by g is the Control by the indicating consists of AS ers (Char8) or le characters (Char I byte = 0 => Uniters I byte = 1 => ASC ers g with no character ength of 2 bytes, i	byte byte. tes if SCII ar16). icode CII ters i.e.
	DF52 If this field i with all defi Command Rated en DD129 DF72 VIN DD004 DF50	Pried Name Engine instance DD410 Engine / Transmission Instance DF52 Bit field If this field is not specified in the "Request with all defined Engine Instances. (This P Command Parameter is supported on any Rated engine speed DD129 Rate of rotation DF72 Rotational rate, unsigned VIN DD004 Generic name string, short	Prield Name Engine instance Engine instance DP410 Engine / Transmission Instance DF52 Bit field bit(n) Results field is not specified in the "Request Group Function" with all defined Engine Instances. (This PGN will be trans Command Parameter is supported on any other Data Field Rated engine speed DD129 Rate of rotation DF72 Rotational rate, unsigned uint16 Results for the price of the	Field Name Engine instance Byte Field Bit Field DD410 Engine / Transmission Instance DF52 Bit field bit(n) Range: V If this field is not specified in the "Request Group Function" or an ISC with all defined Engine Instances. (This PGN will be transmitted for Command Parameter is supported on any other Data Field, you must Rated engine speed Byte Field Bit Field DD129 Rate of rotation DF72 Rotational rate, unsigned uint16 Range: 0 VIN Byte Field Bit Field Bit Field DD004 Generic name string, short DF50 String, variable, short ch8or16(n) Range: 0 C	Field Name Engine instance Engine instance Byte Field Size: Bit field bit(n) Range: Variable If this field is not specified in the "Request Group Function" or an ISO Request is mover with all defined Engine Instances. (This PGN will be transmitted for each instance. Command Parameter is supported on any other Data Field, you must also support it Rated engine speed Byte Field Size: DD129 Rate of rotation DF72 Rotational rate, unsigned uint16 Range: DD1004 Generic name string, short DF50 String, variable, short ch8or16(n) Range: 0 to 250 ASCII 0 to 125 Unico Characters	Field Name Engine instance Byte Field Size: Bit Field Size: DD129 Rate of rotation DF72 Rotational rate, unsigned uint16 Range: DD004 Generic name string, short DF50 String, variable, short ch8or16(n) Range: Command Support: Required AC Command Support: Required AC Command Size: Bit Field Size: Bit	## Field Name Engine instance Engine instance Byte Field Size: Bit Field Size: DF52 Bit field Bit Field Size: Bit Fiel	Field Name Engine instance Engine instance Byte Field Size: Bit Field Size: Command Piell Field Size: Command Piell Field Size: Bit Field Size: Bit Field Size: Bit Field Size: Command Piell Field Size: Command Piell Field Size: Bit Field Size: Command Piell Field Size: Bit Field Size: Command Piell Field Size: Command Pi	Field Name Engine instance Engine instance Byte Field Size: Bit Field Size:	Field Name Engine instance Byte Field Size: Bit Field Size:

Engine Parameters, Static

200 characters maximum

PGN: 127498

hex: 1F20A

Software ID 4

Byte Field Size: 8 or 16 n Bit Field Size:

ch8or16(n) Range:

Request Parameter Command Parameter: Optional

Optional

DD004 Generic name string, short

Name of place, route, waypoint, destination, vessel, vehicle, etc.

DF50 String, variable, short

0 to 250 ASCII or 0 to 125 Unicode Characters

Resolution: 1 ASCII or 1 Unicode Character

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = 0 => Unicode characters Control byte = 1 => ASCII characters

A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

Load Controller Connection State / Control

PGN: 127500 hex: 1F20C

Broadcast the state and status of a Load Controller output/connection & control of the output/connection with PGN 126208 Command Group Function.

This PGN has two purposes. First, it provides a mechanism to broadcast the current state and status of a Load Controller output electrical connection/pin/channel. The values provided include the connection state, status, pulse width modulation (PWM) duty cycle, and timing parameters to control one-shot pulses. Depending on the state, the PWM and timing status parameters may not be defined and are set to 0xFF.

Second, the PGN provides the mechanism to command the state and status of a Load Controller output electrical connection/pin/channel. Commands are transmitted to a specific addressed Load Controller using the NMEA Command Group Function (PGN 126208, Function 0x01). When used in this manner, values must be provided for all fields defined in this parameter group to ensure unambiguous understanding.

Global ISO requests (PGN 059904) and Global NMEA Requests (PGN 126208) for this Parameter Group shall be ignored.

Response to an addressed ISO request for this Parameter Group shall be the transmission of this PGN once for each defined connection/pin/channel.

Response to an addressed NMEA Request for this Parameter Group without specifying a value for PGN 127500, Field #2 (Connection ID) shall be the transmission of this PGN once for each defined connection/pin/channel.

Response to an addressed NMEA Request for this Parameter Group with a specified value for PGN 127500, Field #2 (Connection ID) shall be the transmission of this PGN for the specified connection/pin/channel.

The recommended/default frequency is every 15,000ms.

The Sequence ID field (SID) is used to link this PGN to other related PGN's from the same source address.

When no linkage exists, the value of the SID shall be set to 255.

Application specific examples can be found in Appendix D. This PGN is part of the Distributed Power System / Architecture.

Revision: 20180831 amendment to be added in version 2.20.

Single Frame: Y Destination: Global		P	Priority Default: 3	Default	Update R	ate:	<mark>1500</mark> milli	seconds	Frequency:		7 cycles per	second
			Query Support: Require	d Co	mmand Sup	port: Optio	nal	ACK Rqmnts:	None			
ield#	Field Na	ame										
1	Sequence	e ID			•	eld Size: 1 ield Size:			Request Pa Command		Optional Optional	
	DD056 Seq		ce ID			PGNs differer related in PGN data se 0 - 252 data se 253 - 2	from a sing nt PGN trar data set. F I 129026 to t. = binding t) 54 = reserv	le source addressissions ide for example, ide the Latitude a available (who red for future uprovided. NA	Command Parameter: Optional er that binds information transmitted in two or a address. Identical SID values within two or mot as identifies those PGN transmissions as a single ble, identical SID values bind the COG and SOC ande and Longitude values in PGN 129029 as a (when SID value reaches 252, resume with 0 or ture use		re e G values single n next	
	DF53	Intege	er, 8 bit unsigned	uint8	Range:	0 to 252		Resolutio	on: 1 bit	Unit-le	ss number	
			eld (SID) is used to link to alue of the SID shall be			ted PGN's fro	om the sam	e source addr	ress. When no			

Load Controller Connection State / Control

PGN: 127500 hex: 1F20C

2	Connect	ion ID		•	ield Size: 1		Request Paramet		
	DD005	Generic numeric ID, short			Number of r	oute, waypoint, event	, mark, etc.		
		Integer, 8 bit unsigned dentifies the connection/pin/chan e message is globally unique.	uint8 nel. The co		0 to 252 of the Connection	Resolution ID and Source Addres		Jnit-less number	
3	State			•	ield Size: ield Size: 8		Request Paramet	- p	
	DD351	Connection State			PGN 126200 0 = OFF	Connection is OFF - H Connected to Ground Connected to Supply D Max. Device capa Connection is Pulse W OFF Connection is F ON Connection is F ON Connection is F ON Connection is F orved Codes that can only be T Internal Failure - C teserved Only- Codes that may be d as states T Reset TRIPPED to	ii Impedance abilities Exceeded - Cridth Modulated - Dir OFF for TimeOFF, th HIGH for TimeOFF, th HIGH for TimeON, th COFF for TimeOFF, th HIGH for TimeON, th e reported as states Connection is OFF be commanded using	mmer nen HIGH nen OFF nen CYCLE_ON	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	: 1 U	Jsed to construct bit fields	,
	The physic	cal State of the Connection.							

Load Controller Connection State / Control

4	Status		•	ield Size: ield Size: 13		Request Parame		Optional	
	DD352 Connection Status		DILF	x xxxx xxxx xxx1 = x xxxx xxxx xxxx xxx	= SENSED_LO = SHORT- Curl = NO_LOAD- \(\) = FUSE_FAIL- = FUSE_DEST = GFCI_FAUL' = OVER_CURL = UNDER_CURL = UNDER_CURL = GFCI_EOL- (= ARC_FAULT = Reserved = Reserved It be transmitted	GH-HIGH voltage I W- voltage level de rent draw Exceeds o When HIGH, No Lc Blown or removed RUCT - Fuse was O G- Ground fault leal FAGE- Voltage Gre RENT- Current Gre TAGE- Voltage Le RRENT- Current L Ground fault end of Arc fault detected	evel de etected device o oad dete Comma kage de eater the eater the ess than ess than	capability cated - Amps=0 Inded to destroy tected In Over Voltage V In Over Current V Inder Voltage V In Under Voltage V In Under Current V Inder Current V Inder Current V Inder Current V Inched; replace brea	alue alue alue alue
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit field	is
5	The Status of the Connection. Operational Status & Control		-	ield Size:		Request Parame		Optional Optional	
	DD362 Operational Status & Control			xx1 = Locked- Dis. x1x = Security-Dis 0xx = Reserved where x = don't car Inactive states shal Reserved and unsu	sable/Enable abi re Il be transmitted	lity to Lock/Unlock as 0.	K	mitted as 0.	
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit field	ls
6	PWM Duty Cycle DD263 Generic Absolute Percentage	0-252%		ield Size: 1		Request Parame Command Param		Optional Optional	
	DF93 Percent, Absolute The Duty Cycle Percentage value of Pulse W	uint8	_	<mark>0 - 252%</mark> ly valid from 0% to 100%	Resolution	1%			
7	TimeON		•	ield Size: 1		Request Parame Command Param		Optional Optional	
	DD361 Event Time- Short DF111 Time Interval Medium- S Time remaining before the connection is char	uint8 nged to th	_	Interval of time ren 0.00 - 2.52 seconds CYCLE_OFF State		event change 0.01 seconds			
8	TimeOFF		•	ield Size: 1		Request Parame Command Parar		Optional Optional	
	DD361 Event Time- Short			Interval of time ren	maining before				
	DF111 Time Interval Medium- S Time remaining before the connection is char	uint8 nged to th	•	0.00 - 2.52 seconds CYCLE_ON State	Resolution	0.01 seconds			

Universal status report for multiple banks of two-state indicators.

Use of PGN 127502 is optional for support of devices that may only accept PGN 127502 for commanding switches.

For new switching devices, use of PGN 126208 (Write Fields Group Function) referencing 127501 is recommended to command Field 1 (Binary Device Bank Instance.

Note 1: For Legacy Devices the field command parameter will remain prohibited.

For New Devices, the field command parameter is optional.

For new switching devices, use of PGN 126208 (Write Group Function) referencing 127501 is recommended to command the required switch. Recommended timing intervals is 15000ms or on change.

Single Fr	ame: Yes	Priority Default: 3	Default	Update R	ate:	milliseconds	Frequency:	IA cycles per second
Destination	n: Global	Query Support: Optional	Coi	mmand Sup	port: Optional	ACK Rqmnts:	None	
Field #	Field N	ame						
1	Binary D	evice Bank Instance			eld Size: 1 ield Size:		Request Parameter Command Parameter	Required Note 1
	DD005	Generic numeric ID, short			Number of 1	route, waypoint, even	t, mark, etc.	
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolutio	n: 1 bit Unit-	less number
	all defined		his PGN v	vill be trans	smitted for each ir	nstance.)		
2	Status 1			Bvte Fie	eld Size:		Request Parameter	Optional
_				Bit Fi	ield Size: 2		Command Parameter	
	DD002	Generic status pair			01 = [Yes, 0 10 = Error,	off, Disabled, Reset, "On, Enabled, Set, "1"		
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: 1 Used	to construct bit fields
3	Status 2			-	eld Size: ield Size: 2		Request Parameter Command Parameter	Optional Note 1
	DD002	Generic status pair			01 = [Yes, 0 10 = Error,	off, Disabled, Reset, " On, Enabled, Set, "1" ilable, Unknown]		
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: 1 Used	to construct bit fields
4	Status 3				eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter	Optional Note 1
	DD002	Generic status pair			01 = [Yes, 0 10 = Error,	off, Disabled, Reset, " On, Enabled, Set, "1" ilable, Unknown]		
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: 1 Used	to construct bit fields

5	Status 4			Byte Fie	eld Size:		Request Parameter	Optional
				Bit Fi	ield Size: 2		Command Parameter:	
	DD002	Generic status pair			MSB/LSB: 00 = [No, Off, Di 01 = [Yes, On, Ellower of the color of th	_	·],	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
6	Status 5				eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Note 1
	DD002	Generic status pair			MSB/LSB: 00 = [No, Off, Di 01 = [Yes, On, E 10 = Error, 11 = [Unavailable	•],	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
7	Status 6			•	eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Note 1
	DD002	Generic status pair			MSB/LSB: 00 = [No, Off, Di 01 = [Yes, On, E 10 = Error, 11 = [Unavailable	•	'],	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
8	Status 7			•	eld Size: ield Size: 2		Request Parameter Command Parameter:	Optional Note 1
	DD002	Generic status pair			MSB/LSB: 00 = [No, Off, Di 01 = [Yes, On, Ei 10 = Error, 11 = [Unavailable],	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
9	Status 8				eld Size: ield Size: 2		Request Parameter Command Parameter:	Optional Note 1
	DD002	Generic status pair			MSB/LSB: 00 = [No, Off, Di 01 = [Yes, On, E: 10 = Error, 11 = [Unavailable	•],	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
10	Status 9			•	eld Size: ield Size: 2		Request Parameter Command Parameter:	Optional Note 1
	DD002	Generic status pair			MSB/LSB: 00 = [No, Off, Di 01 = [Yes, On, E: 10 = Error, 11 = [Unavailable	•	·],	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields

Byte Field Size: Request Parameter 11 Status 10 Optional Bit Field Size: 2 Command Parameter: Note 1 MSB/LSB: **DD002** Generic status pair 00 = [No, Off, Disabled, Reset, "0"], 01 = [Yes, On, Enabled, Set, "1"], 10 = Error, 11= [Unavailable, Unknown] Resolution: 1 DF52 Bit field bit(n) Range: Variable Used to construct bit fields Byte Field Size: Status 11 Request Parameter 12 Optional Command Parameter: Note 1 Bit Field Size: 2 **DD002** Generic status pair 00 = [No, Off, Disabled, Reset, "0"], 01 = [Yes, On, Enabled, Set, "1"], 10 = Error, 11= [Unavailable, Unknown] Bit field Range: Variable Resolution: 1 Used to construct bit fields DF52 bit(n) 13 Status 12 Byte Field Size: Request Parameter Optional Bit Field Size: 2 Command Parameter: Note 1 MSB/LSB: **DD002** Generic status pair 00 = [No, Off, Disabled, Reset, "0"], 01 = [Yes, On, Enabled, Set, "1"], 10 = Error, 11= [Unavailable, Unknown] Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) Range: Variable 14 Status 13 Byte Field Size: Request Parameter Optional Bit Field Size: 2 Command Parameter: Note 1 **DD002** Generic status pair MSB/LSB: 00 = [No, Off, Disabled, Reset, "0"], 01 = [Yes, On, Enabled, Set, "1"], 10 = Error. 11= [Unavailable, Unknown] Resolution: 1 DF52 Bit field bit(n) Range: Variable Used to construct bit fields Byte Field Size: Request Parameter Optional 15 Status 14 Bit Field Size: 2 Command Parameter: Note 1 **DD002** Generic status pair 00 = [No, Off, Disabled, Reset, "0"], 01 = [Yes, On, Enabled, Set, "1"], 10 = Error, 11= [Unavailable, Unknown] Range: Variable Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) 16 Status 15 Byte Field Size: Request Parameter Optional Command Parameter: Note 1 Bit Field Size: 2 MSB/LSB: **DD002** Generic status pair 00 = [No, Off, Disabled, Reset, "0"], 01 = [Yes, On, Enabled, Set, "1"], 10 = Error11= [Unavailable, Unknown] **DF52** Bit field Range: Variable Resolution: 1 Used to construct bit fields bit(n)

17	Status 16		Byte Field Size:	Request Pa	- p
			Bit Field Size: 2	Command F	Parameter: Note 1
	DD002 Generic status pair		MSB/LSB: $00 = [No, Off, Di]$	sabled, Reset, "0"],	
			01 = [Yes, On, En 10 = Error,	nabled, Set, "1"],	
			11= [Unavailable	, Unknown]	
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1	Used to construct bit fields
18	Status 17		Byte Field Size:	Request Pa	rameter Optional
			Bit Field Size: 2	Command F	Parameter: Note 1
	DD002 Generic status pair		MSB/LSB:	1.1-4 D4 !!O!!]	
			00 = [Yes, On, En]	sabled, Reset, "0"], nabled, Set, "1"],	
			10 = Error, 11= [Unavailable	Unknown]	
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1	Used to construct bit fields
19	Status 18		Byte Field Size:	Request Pa	rameter <mark>Optional</mark>
			Bit Field Size: 2	•	Parameter: Note 1
	DD002 Generic status pair		MSB/LSB:		
			00 = [No, Off, Di] 01 = [Yes, On, En]	sabled, Reset, "0"], nabled, Set, "1"].	
			10 = Error,		
	DE52 D'4 C 11	1.44	11= [Unavailable		I I - 4 4 4 1 : 4 6 - 1 4 -
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1	Used to construct bit fields
20	Status 19		Byte Field Size:	Request Pa	
	DD000 Commission testing units		Bit Field Size: 2	Command F	Parameter: Note 1
	DD002 Generic status pair			sabled, Reset, "0"],	
			01 = [Yes, On, En 10 = Error,	nabled, Set, "1"],	
			11= [Unavailable	, Unknown]	
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1	Used to construct bit fields
21	Status 20		Byte Field Size:	Request Pa	rameter Optional
			Bit Field Size: 2	Command F	Parameter: Note 1
	DD002 Generic status pair		MSB/LSB:	sabled, Reset, "0"],	
			01 = [Yes, On, En]		
			10 = Error, 11= [Unavailable	. Unknown]	
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1	Used to construct bit fields
22	Status 21		Byte Field Size:	Request Pa	rameter <mark>Optional</mark>
			Bit Field Size: 2	·	Parameter: Note 1
	DD002 Generic status pair		MSB/LSB:		
			00 = [No, Off, Di] 01 = [Yes, On, En]	sabled, Reset, "0"], nabled, Set, "1"].	
			10 = Error,		
		bit(n)	11= [Unavailable Range: Variable	, Unknown] Resolution: 1	Used to construct bit fields
	DF52 Bit field				

23	Status 22 DD002 Generic status pair		Byte Field Size: Bit Field Size: MSB/LSB:	Request Parameter Optional Command Parameter: Note 1
			00 = [No, Off, Disabled, Reset, 01 = [Yes, On, Enabled, Set, "I 10 = Error, 11 = [Unavailable, Unknown]	-
	DF52 Bit field	bit(n)	Range: Variable Resoluti	on: 1 Used to construct bit fields
24	Status 23		Byte Field Size: Bit Field Size: 2	Request Parameter Optional Command Parameter: Note 1
	DD002 Generic status pair		MSB/LSB: 00 = [No, Off, Disabled, Reset, 01 = [Yes, On, Enabled, Set, "I 10 = Error, 11= [Unavailable, Unknown]	
	DF52 Bit field	bit(n)	Range: Variable Resoluti	on: 1 Used to construct bit fields
25	Status 24		Byte Field Size: Bit Field Size: 2	Request Parameter Command Parameter: Note 1
	DD002 Generic status pair		MSB/LSB: 00 = [No, Off, Disabled, Reset, 01 = [Yes, On, Enabled, Set, "I 10 = Error, 11= [Unavailable, Unknown]	
	DF52 Bit field	bit(n)	Range: Variable Resoluti	on: 1 Used to construct bit fields
26	Status 25		Byte Field Size: Bit Field Size: 2	Request Parameter Optional Command Parameter: Note 1
	DD002 Generic status pair		MSB/LSB: 00 = [No, Off, Disabled, Reset, 01 = [Yes, On, Enabled, Set, "1 10 = Error, 11= [Unavailable, Unknown]	
	DF52 Bit field	bit(n)	Range: Variable Resoluti	on: 1 Used to construct bit fields
27	Status 26		Byte Field Size: Bit Field Size: 2	Request Parameter Optional Command Parameter: Note 1
	DD002 Generic status pair		MSB/LSB: 00 = [No, Off, Disabled, Reset, 01 = [Yes, On, Enabled, Set, "I 10 = Error, 11= [Unavailable, Unknown]	3,
	DF52 Bit field	bit(n)	Range: Variable Resoluti	on: 1 Used to construct bit fields
28	Status 27		Byte Field Size: Bit Field Size: 2	Request Parameter Optional Command Parameter: Note 1
	DD002 Generic status pair		MSB/LSB: 00 = [No, Off, Disabled, Reset,	"0"1
			01 = [Yes, On, Enabled, Set, "1 10 = Error, 11= [Unavailable, Unknown]	4.

Switch Bank Status PGN: 127501

hex: 1F20D

29 Status 28 Byte Field Size: Request Parameter Optional
Bit Field Size: 2 Command Parameter: Note 1

DD002 Generic status pair MSB/LSB:

00 = [No, Off, Disabled, Reset, "0"], 01 = [Yes, On, Enabled, Set, "1"],

10 = Error,

11= [Unavailable, Unknown]

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

PGN: 127502 hex: 1F20E

Universal commands to multiple banks of two-state devices.

For new switching devices, use of PGN 126208 (Write Fields Group Function) referencing 127501 is recommended to command the required switch.

Use of PGN 127502 is permitted for legacy support of devices that may only accept PGN 127502 for commanding switches.

-	rame: Yes	Priority Default: 3		Update R		milliseconds	Frequency:	N/	cycles per second
		Query Support: Optional	CO	пппапи Зир	port: Required	ACK Rqmnts: N	ione		
ield # 1	Field Na Switch B	ame ank Instance		•	eld Size: 1		Request Param Command Para		Required Required
	DD005	Generic numeric ID, short			Number of ro	oute, waypoint, event	mark, etc.		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	1 bit	Unit-les	ss number
	with all defi	s not specified in the "Request Gr ned Switch Bank Instances. (This Parameter is supported on any oth	PGN will	be transm	itted for each insta	nce.) If a Request Pa	arameter or		
2	Switch 1			•	eld Size: ield Size: <mark>2</mark>		Request Paran Command Para		Optional Required
	DD003	Generic command pair				ff, Disable, Reset, M n, Enable, Set, Make on			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	: 1	Used to	construct bit fields
3	Switch 2			•	eld Size: ield Size: 2		Request Paran Command Para		Optional Required
	DD003	Generic command pair				ff, Disable, Reset, M n, Enable, Set, Make on	4.		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	: 1	Used to	construct bit fields
4	Switch 3			•	eld Size: ield Size: 2		Request Param Command Para		Optional Required
	DD003	Generic command pair			-	ff, Disable, Reset, M n, Enable, Set, Make on	-		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	: 1	Used to	construct bit fields
5	Switch 4			•	eld Size: ield Size: <mark>2</mark>		Request Paran Command Para		Optional Required
	DD003	Generic command pair				ff, Disable, Reset, M m, Enable, Set, Make on			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	: 1	Used to	construct bit fields

6	Switch 5		Byte Field Size:	Request P	O p 1.01.101.
	DD003 Generic command pair		Bit Field Size: 2 00 = [Turn Off, Dis 01 = [Turn On, Ena 02 = Error, 03 = No action	able, Reset, Make "0"],	Parameter: Required
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1	Used to construct bit fields
7	Switch 6		Byte Field Size: Bit Field Size: 2	Request P Command	arameter Optional Parameter: Required
	DD003 Generic command pair		00 = [Turn Off, Dis. 01 = [Turn On, Ena. 02 = Error, 03 = No action	able, Reset, Make "0"], ble, Set, Make "1"],	
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1	Used to construct bit fields
8	Switch 7		Byte Field Size: Bit Field Size: 2	Request P Command	arameter Optional Parameter: Required
	DD003 Generic command pair		00 = [Turn Off, Dis 01 = [Turn On, Ena 02 = Error, 03 = No action	able, Reset, Make "0"], ble, Set, Make "1"],	
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1	Used to construct bit fields
9	Switch 8		Byte Field Size: Bit Field Size: 2	Request P Command	arameter Optional Parameter: Required
	DD003 Generic command pair		00 = [Turn Off, Dis. 01 = [Turn On, Ena 02 = Error, 03 = No action	able, Reset, Make "0"], ble, Set, Make "1"],	
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1	Used to construct bit fields
10	Switch 9		Byte Field Size: Bit Field Size: 2	Request P Command	arameter Optional Parameter: Required
	DD003 Generic command pair		00 = [Turn Off, Dis 01 = [Turn On, Ena 02 = Error, 03 = No action	able, Reset, Make "0"], ble, Set, Make "1"],	
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1	Used to construct bit fields
11	Switch 10		Byte Field Size: Bit Field Size: 2	Request P Command	arameter Optional Parameter: Required
	DD003 Generic command pair		00 = [Turn Off, Dis. 01 = [Turn On, Ena 02 = Error, 03 = No action	able, Reset, Make "0"], ble, Set, Make "1"],	
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1	Used to construct bit fields

12	Switch 11		Byte Field Size: Bit Field Size: 2	Request Parameter Command Parameter	Optional Required
	DD003 Generic command pair		00 = [Turn Off, Disa 01 = [Turn On, Enab 02 = Error, 03 = No action	able, Reset, Make "0"], ole, Set, Make "1"],	
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1 Used	to construct bit fields
13	Switch 12		Byte Field Size: Bit Field Size: 2	Request Parameter Command Parameter	Optional Required
	DD003 Generic command pair		00 = [Turn Off, Disa 01 = [Turn On, Enab 02 = Error, 03 = No action	able, Reset, Make "0"], ole, Set, Make "1"],	
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1 Used	to construct bit fields
14	Switch 13		Byte Field Size: Bit Field Size: 2	Request Parameter Command Parameter	Optional Required
	DD003 Generic command pair		00 = [Turn Off, Disa 01 = [Turn On, Enab 02 = Error, 03 = No action	nble, Reset, Make "0"], ole, Set, Make "1"],	
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1 Used	to construct bit fields
15	Switch 14		Byte Field Size: Bit Field Size: 2	Request Parameter Command Parameter	Optional Required
	DD003 Generic command pair		00 = [Turn Off, Disa 01 = [Turn On, Enab 02 = Error, 03 = No action	able, Reset, Make "0"], ole, Set, Make "1"],	
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1 Used	to construct bit fields
16	Switch 15		Byte Field Size: Bit Field Size: 2	Request Parameter Command Parameter	Optional Required
	DD003 Generic command pair		00 = [Turn Off, Disa 01 = [Turn On, Enab 02 = Error, 03 = No action	nble, Reset, Make "0"], ole, Set, Make "1"],	
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1 Used	to construct bit fields
17	Switch 16		Byte Field Size: Bit Field Size: 2	Request Parameter Command Parameter	Optional Required
	DD003 Generic command pair		00 = [Turn Off, Disa 01 = [Turn On, Enab 02 = Error, 03 = No action	able, Reset, Make "0"], ole, Set, Make "1"],	
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1 Used	to construct bit fields

18	Switch 1	7		Byte Fie Bit Fi	eld Size: eld Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Required
	DD003	Generic command pair			00 = [Turn Off, Disa 01 = [Turn On, Enab 02 = Error, 03 = No action			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used t	o construct bit fields
19	Switch 1	8		Byte Fie Bit Fi	eld Size: eld Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Required
	DD003	Generic command pair			00 = [Turn Off, Disa 01 = [Turn On, Enab 02 = Error, 03 = No action			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used t	o construct bit fields
20	Switch 1	9		Byte Fie Bit Fi	eld Size: eld Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Required
	DD003	Generic command pair			00 = [Turn Off, Disa 01 = [Turn On, Enab 02 = Error, 03 = No action		4.	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used t	o construct bit fields
21	Switch 2	0		Byte Fie Bit Fi	eld Size: eld Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Required
	DD003	Generic command pair			00 = [Turn Off, Disa 01 = [Turn On, Enab 02 = Error, 03 = No action			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used t	o construct bit fields
22	Switch 2	1		Byte Fie Bit Fi	eld Size: leld Size: 2		Request Parameter Command Parameter:	Optional Required
	DD003	Generic command pair			00 = [Turn Off, Disa 01 = [Turn On, Enab 02 = Error, 03 = No action			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used t	o construct bit fields
23	Switch 2	2		Byte Fie Bit Fi	eld Size: eld Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Required
	DD003	Generic command pair			00 = [Turn Off, Disa 01 = [Turn On, Enab 02 = Error, 03 = No action			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used t	o construct bit fields

24	Switch 23		Byte Field S Bit Field S			Request Parameter	Optional
	DD003 Generic	c command pair		00 = [Turn Off, Disable 01 = [Turn On, Enable 02 = Error, 03 = No action	le, Reset, Mal		Required
	DF52 Bit fi	eld bit(1	ı) Range: <mark>Var</mark>	riable	Resolution:	Used to	construct bit fields
25	Switch 24		Byte Field S Bit Field S			Request Parameter Command Parameter:	Optional Required
	DD003 Generic	c command pair		00 = [Turn Off, Disable 01 = [Turn On, Enable 02 = Error, 03 = No action			
	DF52 Bit fi	eld bit(1	ı) Range: <mark>Var</mark>	riable	Resolution:	Used to	construct bit fields
26	Switch 25		Byte Field S Bit Field S			Request Parameter Command Parameter:	Optional Required
	DD003 Generic	c command pair		00 = [Turn Off, Disable 01 = [Turn On, Enable 02 = Error, 03 = No action			
	DF52 Bit fi	eld bit(1	ı) Range: <mark>Var</mark>	iable	Resolution:	Used to	construct bit fields
27	Switch 26		Byte Field S Bit Field S			Request Parameter Command Parameter:	Optional Required
	DD003 Generic	c command pair		00 = [Turn Off, Disable 01 = [Turn On, Enable 02 = Error, 03 = No action			
	DF52 Bit fi	eld bit(1	ı) Range: <mark>Var</mark>	riable	Resolution:	1 Used to	construct bit fields
28	Switch 27		Byte Field S Bit Field S			Request Parameter Command Parameter:	Optional Required
	DD003 Generic	c command pair		00 = [Turn Off, Disable 01 = [Turn On, Enable 02 = Error, 03 = No action			
	DF52 Bit fi	eld bit (1	ı) Range: <mark>Var</mark>	riable	Resolution:	1 Used to	construct bit fields
29	DF52 Bit fi	eld bit(1	n) Range: <mark>Var</mark> Byte Field S Bit Field S	ize:		1 Used to Request Parameter Command Parameter:	Optional
29		233(Byte Field S Bit Field S	ize:	e, Reset, Mai	Request Parameter Command Parameter: ke "0"],	Optional

AC Input Status -DEPRECATED

PGN: 127503 hex: 1F20F

This PGN has been deprecated (as of NMEA Network Message Database version 1.300) and is not recommended for new designs. However, support of the deprecated PGN 127503 is strongly recommended to ensure compatibility with legacy equipment. Manufacturers shall use PGNs defined by J1939-75 for AC parameters related to Generators and Utility Connections. J1939-75 PGNs shall be implemented using the status bits as defined in J1939-71. The PGN description at the time of deprecation was as follows: Any device with an AC Input may transmit this message. Fields 3 through 12 may repeat as indicated by the Number of Lines. If requested via the ISO Request, a separate message will be returned for each AC Instance connected to the device.

-	ame: No	Priority Default: 6		Update R		500 millisec		Frequency:	.7	cycles per se	cond
	n: Global	Query Support: Required	Co	mmand Sup	port: Optiona	al AC	CK Rqmnts: <mark>N</mark> o	one			
<u>ield #</u> 1	Field Na			•	eld Size: 1			Request Para		Required Optional	
	DD005	Generic numeric ID, short			Number	of route, way	point, event,	mark, etc.			
	DF53 The subsec	Integer, 8 bit unsigned quent parameters pertain to this A	uint8 C source.	Range:	0 to 252		Resolution:	1 bit	Unit-les	s number	
2	Number	of Lines		•	eld Size: 1			Request Para Command Pa		Optional Optional	
	DD006	Generic counter, short			Numeric	count, event	counter, sequ	ience counter			
	DF53 This is the	Integer, 8 bit unsigned number of lines (tuples) being rep	uint8 orted.	Range:	0 to 252		Resolution:	1 bit	Unit-les	s number	
3	Line			•	eld Size: eld Size: 2			Request Para		Optional Optional	
	DD270	AC Line			0x00 = L 0x01 = L 0x02 = L 0x03 = R	ine 2, ine 3					
	DF52	Bit field	bit(n)	Range:	Variable		Resolution:	1	Used to	construct bit fie	lds
	This is the	physical connector that is supplyir	ng power.	In the case	e of split phase	there are tw	o lines.				
4	Acceptab	pility		Byte Fie Bit Fi	eld Size: ield Size: 2			Request Para Command Pa		Optional Optional	
	DD259	AC Acceptability			0x01 = B	Bad Level, Bad Frequency Being Qualific Bood					
	DF52	Bit field	bit(n)	Range:	Variable		Resolution:	1	Used to	construct bit fie	lds
5	NMEA Re	eserved		Byte Fie Bit Fi	eld Size: leld Size: <mark>res</mark>	sv 4		Request Para			
	DD001	Reserved field			Variable	number of re	eserved bits, a	ll set to logic "1	"		
	DF52 Used to alig	Bit field gn subsequent data on a byte bou	bit(n) ndary.	Range:	Variable		Resolution:	1	Used to	construct bit fie	lds
6	Voltage			•	eld Size: 2			Request Para Command Pa		Optional Optional	
	DD260	Voltage, AC RMS									
	DF96	Voltage, high, unsigned	uint16	Range:	+/- 655.32 V	7	Resolution:	1x10E-2 V			

AC Input Status -DEPRECATED PGN: 127503 hex: 1F20F

7	Current		Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter: Optional
	DD269 Current, Electric, Unsigne	d		
	DF95 Current, electric, high	uint16	Range: 0 - 6553.2 A	Resolution: 1x10E-1 A
8	Frequency		Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD267 Frequency			
	DF22 Frequency, low	uint16	Range: 0 to 655.32 Hz	Resolution: 1x10E-2 Hz
9	Breaker Size		Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter: Optional
	DD269 Current, Electric, Unsigne	d		
	DF95 Current, electric, high	uint16	Range: 0 - 6553.2 A	Resolution: 1x10E-1 A
10	Real Power		Byte Field Size: 4 Bit Field Size:	Request Parameter Command Parameter: Optional
	DD261 Power (watts)			
	DF94 Power	uint32	Range: 0 - 4,294,967,292 W	Resolution: 1 W
11	Reactive Power		Byte Field Size: 4 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD262 Volt Amps Reactive Power	er (VAR)		
	DF92 Power - VAR	uint32	Range: 0 - 4,294,967,292 VAR	Resolution: 1 VAR
12	Power Factor		Byte Field Size: 1 Bit Field Size:	Request Parameter Command Parameter: Optional
	DD271 Power Factor		Cosine of the angle	between the AC voltage and current
	DF97 Power Factor	int8	Range: +/- 1.00	Resolution: 1x10E-2

AC Output Status -DEPRECATED

PGN: 127504 hex: 1F210

This PGN has been deprecated (as of NMEA Network Message Database version 1.300) and is not recommended for new designs. However, support of the deprecated PGN 127504 is strongly recommended to ensure compatibility with legacy equipment. Manufacturers shall use PGNs defined by J1939-75 for AC parameters related to Generators and Utility Connections. J1939-75 PGNs shall be implemented using the status bits as defined in J1939-71. The PGN description at the time of deprecation was as follows: Any device with an AC Output may transmit this message. Fields 3 though 12 may repeat as indicated by the Number of Lines. If requested via the ISO Request, a separate message will be returned for each AC Instance connected to the device.

Single Fr	rame: No	Priority Default: 6	Default	Update Ra	ate: 1500	milliseconds	Frequency:	.7 cycles per second	
Destination	n: Global	Query Support: Require	e <mark>d</mark> Co	mmand Sup	port: Optional	ACK Rqmnts: N	lone		
Field #	Field Na	ame							
1	AC Insta	nce		•	eld Size: 1		Request Param Command Para	eter Required meter: Optional	
	DD005	Generic numeric ID, short			Number of re	oute, waypoint, event,	mark, etc.		
	DF53 The subsec	Integer, 8 bit unsigned quent parameters pertain to this A	uint8 AC source.	Range:	0 to 252	Resolution	1 bit	Unit-less number	
2	Number	of lines		-	eld Size: 1		Request Param Command Para	eter <mark>Optional</mark> meter: <mark>Optional</mark>	
	DD006	Generic counter, short			Numeric cou	int, event counter, seq	uence counter		
	DF53 This is the	Integer, 8 bit unsigned number of lines (tuples) being rep	uint8 ported.	Range:	0 to 252	Resolution	1 bit	Unit-less number	
3	Line			Byte Fie Bit Fi	eld Size: eld Size: 2		Request Param Command Para	eter Optional meter: Optional	
	DD270	AC Line			0x00 = Line 0x01 = Line 0x02 = Line 0x03 = Rese	2, 3			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to construct bit fields	
	This is the	physical connector that is supply	ing power.	In the case	of split phase the	ere are two lines.			
4	Wavefor	m		Byte Fie Bit Fi	eld Size: eld Size: 3		Request Param Command Para	eter Optional meter: Optional	
	DD273	Waveform			0x02 = Rese thru 0x05 = Rese 0x06 = Error	ified Sine Wave rved rved			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	: 1	Used to construct bit fields	
5	NMEA R	eserved		Byte Fie Bit Fi	eld Size: eld Size: resv	3	Request Param Command Para		
	DD001	Reserved field			Variable nun	nber of reserved bits,	all set to logic "1"		
	DF52 Used to alig	Bit field gn subsequent data on a byte bo	bit(n) undary.	Range:	Variable	Resolution	: 1	Used to construct bit fields	

AC Output Status -DEPRECATED 6 Voltage Byte Field Size: 2 Request Parameter Optional Optional

6	Voltage			-	eld Size: 2		Request Parameter Command Parameter:	Optional Optional
	DD260	Voltage, AC RMS						
	DF96	Voltage, high, unsigned	uint16	Range:	+/- 655.32 V	Resolution:	1x10E-2 V	
7	Current				eld Size: 2		Request Parameter Command Parameter:	Optional Optional
	DD269	Current, Electric, Unsigned						
	DF95	Current, electric, high	uint16	Range:	0 - 6553.2 A	Resolution:	1x10E-1 A	
8	Frequen	су			eld Size: 2		Request Parameter Command Parameter:	Optional Optional
	DD267	Frequency						
	DF22	Frequency, low	uint16	Range:	0 to 655.32 Hz	Resolution:	1x10E-2 Hz	
9	Breaker	Size			eld Size: 2		Request Parameter Command Parameter:	Optional Optional
	DD269	Current, Electric, Unsigned						
	DF95	Current, electric, high	uint16	Range:	0 - 6553.2 A	Resolution:	1x10E-1 A	
10	Real Pov	ver		•	eld Size: 4		Request Parameter Command Parameter:	Optional Optional
	DD261	Power (watts)						
	DF94	Power	uint32	Range:	0 - 4,294,967,292 W	Resolution:	1 W	
11	Reactive	Power		•	eld Size: 4		Request Parameter Command Parameter:	Optional Optional
	DD262	Volt Amps Reactive Power (V	VAR)					
	DF92	Power - VAR	uint32	Range:	0 - 4,294,967,292 VAR	Resolution:	1 VAR	
12	Power F	actor			eld Size: 1		Request Parameter Command Parameter:	Optional Optional
	DD271	Power Factor			Cosine of the angle b	etween the A	C voltage and current	
	DF97	Power Factor	int8	Range:	+/- 1.00	Resolution:	1x10E-2	

Fluid Level PGN: 127505

hex: 1F211

Fluid Level contains an instance number, type of fluid, level of fluid, and tank capacity. For example the fluid instance may be the level of fuel in a tank or the level of water in the bilge. Used primarily by display or instrumentation devices.

Single Fi	rame: Yes	Priority Default: 6	Default	Update Ra	nte: 2500 r	milliseconds	Frequency:	.4 cycles per second	
Destinatio	n: <mark>Global</mark>	Query Support: Require	d Cor	mmand Supp	ort: Required	ACK Rqmnts:	None		
ield#	Field Na	ame							
1	Fluid Inst	tance		Byte Fiel Bit Fie	ld Size: eld Size: 4		Request Paran Command Para	neter Required ameter: Required	
	DD169	Generic instance (4-bit)			0x0 to $0xF = I$	nstance number 0 t	o 15;		
	DF52	Bit field	bit(n)	Range:		Resolution	=	Used to construct bit fields	
	with all defin	s not specified in the "Request G ned Fluid Instances. (This PGN is supported on any other Data F	will be tran	smitted for	each instance.) If	a Request Parame	ter or Command		
2	Fluid Typ	oe		Byte Fiel Bit Fie	ld Size: eld Size: 4		Request Parameter Command Parameter: Optional Optional		
	DD208 Type of Fluid		0x00 = Fuel, 0x01 = Fresh Water (Potable 0x02 = Grey Water (Waste), 0x03 = Livewell, 0x04 = Oil, 0x05 = Black Water (Sewage) 0x06 = Gasoline, 0x07 = Diesel, 0x08 = Liquid Petroleum Ga 0x09 = Liquid Natural Gas (0x0A = Hydraulic Oil, 0x0B = Raw Water, 0x0C = Reserved, 0x0D = Reserved, 0x0E = Error,			Vater (Waste), ell, Water (Sewage), ne, Petroleum Gas (LNG ulic Oil, Vater, ved,	e), age), Gas (LPG), s (LNG),		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	n: 1	Used to construct bit fields	
3	Fluid Lev	rel Generic Percent of Range, M	edium	Byte Fie Bit Fie	ld Size: 2 eld Size:		Request Paran Command Para	neter <mark>Optional</mark> ameter: <mark>Optional</mark>	
	DF84	Percent, Relative Measur	int16	-	-131.072% to 131.056%	Resolution	n: 4x10E-3 %		
	Range 0 - 1	00%, where 0% =Empty and 1	00% = Full						
4	Tank Capacity			Byte Fie Bit Fie	ld Size: 4		Request Paran Command Para	neter <mark>Optional</mark> ameter: <mark>Optional</mark>	
	DD227	Volume							
	DF86	Volume. Large	uint32		0 to~4.296x10E- m	-5 cu Resolutio	7: 1x10E-4 cu m		

Fluid Level PGN: 127505 hex: 1F211

Range: Variable

5 NMEA Reserved Byte Field Size:

Bit Field Size: resv 8

Request Parameter
Command Parameter:

DD001 Reserved field

Variable number of reserved bits, all set to logic "1"

DF52 Bit field bit(n)

Resolution: 1 Used to construct bit fields

Used to align subsequent data on a byte boundary.

DC Detailed Status PGN: 127506 hex: 1F212

Provides parametric data for a specific battery, indicated by the battery instance field. Used primarily by display or instrumentation devices, but may also be used by battery management controls. This PGN is an extension, via the SID, to the DC Status PGN.

Single Fr	rame: No	Priority Default: 6	Default	Update R	ate: 1500	milliseconds	Frequency:	.7	cycles per second
Destinatio	n: Global	Query Support: Required	d Cor	mmand Sup	port: Optional	ACK Rqmnts: N	one		
ield#	Field Na	ame							
1	Sequenc	e ID			eld Size: 1 eld Size:		Request Param Command Para		Optional Optional
	DD056	Sequence ID			PGNs from a different PGN related data so in PGN 12902 data set.	26 to the Latitude and	. Identical SID va fies those PGN tra tical SID values b I Longitude values	lues with ansmissi and the (s in PGN	nin two or more ons as a single COG and SOG values I 129029 as a single
					data set)	ling available (when	SID value reaches	232, res	sume with 0 on next
					253 - 254 = re	eserved for future use			
					255 = No bind whenever practice	ding provided. NME ctical.	A recommends us	sing bind	ling SID values
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit	Unit-les	ss number
2					eld Size: 1 reld Size:		Request Param Command Para		Required Optional
	DD005	Generic numeric ID, short			Number of ro	ute, waypoint, event,	mark, etc.		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit	Unit-les	ss number
		quent parameters pertain to this D maps to the Battery Instance field							
3	DC Type			Byte Fie Bit Fi	eld Size: eld Size: 8		Request Param Command Para		Optional Optional
	DD288	DC Type			0x00 = Batter 0x01 = Altern 0x02 = Conve 0x03 = Solar 0x04 = Wind 0x05 Reserve thru 0xFD = Reser 0xFE = Error 0xFF = Data 1	ator, ertor, Cell, Generator, d,			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields
4	State of	Charge			eld Size: 1		Request Param Command Para		Optional Optional
	DD263	Generic Absolute Percentage	0-252%						
	DF93 % of total c	Percent, Absolute	uint8	Range:	0 - 252%	Resolution:	1%		

PGN: 127506

			hex: 1F212
5	State of Health	Byte Field Size: 1 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD263 Generic Absolute Percentage 0-252%		
	DF93 Percent, Absolute uint8 % of total life remaining	Range: 0 - 252%	Resolution: 1%
6	Time Remaining	Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD268 Time		
	DF98 Time interval, medium, u uint16 Time remaing at current rate of discharge	Range: 0 - 65,532 minutes	Resolution: 1 minute
7	Ripple Voltage	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD287 AC Ripple		
	DF102 AC Vrms uint16 Resolution is 1mV.	Range: 0 - 65.532	Resolution: 1x10E-3 V
8	Amp Hours	Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD283 Battery Capacity (Coulombs)		
	DF100 Battery Capacity uint16	Range: 0 - 235,915,200 Coulombs	Resolution: 3600 C This maps directly into Ampere Hours (AH) where
	The Amp Hours is the cumulative amp hours drawn sir Amp Hours should be zero. The Amp Hours differ from capacity of the battery (Which is influenced by the Peu The Amp Hours is defined as unsigned to keep the sar	the State Of Charge since it does not kert exponent and Battery Temperatur	depend on the effective e. e.g.)

1Ah]. The value is typically displayed as a (strictly) negative number to indicate that is the charge removed from the

DC Detailed Status

Charger Status- DEPRECATED

PGN: 127507 hex: 1F213

This PGN has been deprecated (as of NMEA Network Message Database version 2.000) and is not recommended for new designs. However, support of the deprecated PGN 127507 is strongly recommended to ensure compatibility with legacy equipment. PGN 127750 shall be used for new designs. The PGN description at the time of deprecation was as follows: Any device capable of charging a battery may transmit this message as a status report.

Single Fr	ame: No	Priority Default: 6	Default	t Update R	ate: 1500 m	illiseconds	Frequency: .	7 cycles per secor
Destinatio	n: Global	Query Support: Require	d Co	ommand Sup	port: Optional	ACK Rqmnts: N	one	
Field #	Field Na	ame						
1	Charger	Instance			eld Size: 1 ield Size:]	Request Parameter Command Parameter:	Required Required
	DD005	Generic numeric ID, short			Number of rout	e, waypoint, event,	mark, etc.	
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit Unit-le	ess number
2	Battery I	nstance			eld Size: 1 ield Size:		Request Parameter Command Parameter:	Required Required
	DD005	Generic numeric ID, short			Number of rout	e, waypoint, event,	mark, etc.	
	DF53 The subsec	Integer, 8 bit unsigned quent parameters pertain to this I	uint8 OC source	_	0 to 252	Resolution:	1 bit Unit-le	ess number
3	Operatin	g State		•	eld Size: ield Size: 4		Request Parameter Command Parameter:	Optional Optional
	DD264	Charger Operating State			0x00 = Not Chi 0x01 = Bulk, 0x02 = Absorp 0x03 = Overchi 0x04 = Equaliz 0x05 = Float, 0x06 = No Float 0x07 = Constan 0x08 = Disable 0x09 = Fault, thru 0x0D = Reserv 0x0E = Error 0x0F = Data No	tion, arge, ee, at nt VI, d,		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
4	Charge N	Mode		•	eld Size: ield Size: <mark>4</mark>		Request Parameter Command Parameter:	Optional Optional
	DD265	Charger Mode			0x00 = Standal 0x01 = Primary 0x02 = Second. 0x03 = Echo 0x04 = Reserve thru 0x0D = Reserve 0x0E = Error 0x0F = Data No	r, ary, ed		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used t	construct bit fields

Charger Status- DEPRECATED

PGN: 127507 hex: 1F213

5	Charger Enable/Disable		Byte Field S Bit Field S			Request Parame Command Para	O p 1
	DD002 Generic status pair			MSB/LSB: 00 = [No, Off, Disal 01 = [Yes, On, Enal 10 = Error, 11 = [Unavailable, U	oled, Set, "1"],	"],	
	DF52 Bit field	bit(n)	Range: Var	able	Resolution	1	Used to construct bit fields
6	Equalization Pending		Byte Field S Bit Field S			Request Parame Command Param	- p
	DD002 Generic status pair		MSB/LSB: 00 = [No, Off, Disabled, Reset, "0"] 01 = [Yes, On, Enabled, Set, "1"], 10 = Error, 11 = [Unavailable, Unknown]			"],	
	DF52 Bit field	bit(n)	Range: Var	able	Resolution:	1	Used to construct bit fields
7	NMEA Reserved		Byte Field S Bit Field S			Request Parame Command Param	
	DD001 Reserved field			Variable number of	reserved bits, a	all set to logic "1"	
	DF52 Bit field Used to align subsequent data on byte b	bit(n) oundary.	Range: Var	able	Resolution	1	Used to construct bit fields
8	Equalization Time Remaining		Byte Field S Bit Field S			Request Parame Command Param	- p
	DD268 Time						
	DF98 Time interval, medium,	uint16	Range: 0 - 6	5,532 minutes	Resolution	1 minute	

Battery Status PGN: 127508

hex: 1F214

Battery, Solar Cell, etc. Provides parametric data for a specific DC Source, indicated by the instance field. The type of DC Source can be identified from the DC Detailed Status PGN. Used primarily by display or instrumentation devices, but may also be used by power management controls.

Single Fi	rame: Yes	Priority Default: 6	Default	Update R	ate: 1500 m	nilliseconds	Frequency:	./ cycles per second
Destinatio	n: Global	Query Support: Require	d Co	mmand Sup	port: Optional	ACK Rqmnts: N	one	
ield#	Field Na	ame						
1	Battery I	nstance		•	eld Size: 1		Request Paramete	
	DD005	Generic numeric ID, short			Number of rou	te, waypoint, event,	mark, etc.	
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit Un	it-less number
		is not specified in the "Request G ned Battery Instances. (This PG				e of this PGN, the re	esponse will be	
2	Battery V	/oltage		•	eld Size: 2		Request Paramete Command Parame	
	DD136	Voltage, DC						
	DF42	Voltage, high	int16	Range:	+/- 327.64 V	Resolution:	1x10E-2 V	
3	Battery C	Current			eld Size: 2		Request Paramete	- p
	DD140	Current, Electric						
	DF07	Current, electric, high	int16	Range:	+/- 3,276.4 A	Resolution:	1x10E-1 A	
4	Battery C	Case Temperature			eld Size: 2		Request Paramete	
	DD043	Generic Temperature						
	DF39	Temperature, low	uint16	Range:	0 to 655.32 deg K	Resolution:	1x10E-2 deg K	
5	Sequenc	e ID		Byte Fie	eld Size: 1		Request Paramete	or Optional
				Bit Fi	eld Size:		Command Parame	eter: Optional
	DD056	Sequence ID			PGNs from a s different PGN related data set	ingle source address transmissions identi . For example, iden	i. Identical SID values fies those PGN transitical SID values bind	
					0 - 252 = bindi data set)	ng available (when	SID value reaches 25	2, resume with 0 on next
					253 - 254 = res	served for future use	;	
					255 = No binds whenever pract	~ .	A recommends using	binding SID values
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit Un	it-less number

Inverter Status- DEPRECATED

PGN: 127509 hex: 1F215

This PGN has been deprecated (as of version 2.000) and is not recommended for new designs. However, support of PGN 127509 may be necessary to ensure compatibility with legacy equipment. PGN 127751 shall be used for new designs. The PGN description at the time of deprecation was as follows: Any device capable of inverting a DC source to an AC output may transmit this message. If requested via the ISO Request, a separate message will be returned for each AC Instance connected to the device.

Single Fr	ame: No	Priority Default: 6	Default	Update R	ate: 1500 m	nilliseconds	Frequency:	.7 cycles per second
Destination	n: <mark>Global</mark>	Query Support: Required	Co	mmand Sup	port: Optional	ACK Rqmnts: N	one	
Field #	Field Na	ame						
1	Inverter I	Instance		•	eld Size: 1 ield Size:		Request Parameter Command Paramete	Required r: Optional
	DD005	Generic numeric ID, short			Number of rou	te, waypoint, event,	mark, etc.	
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit Unit-	less number
2	AC Insta	nce			eld Size: 1		Request Parameter Command Paramete	Required r: Optional
	DD005	Generic numeric ID, short			Number of rou	te, waypoint, event,	mark, etc.	
	DF53 The subsec	Integer, 8 bit unsigned quent parameters pertain to this A	uint8 .C source.	Range:	0 to 252	Resolution:	1 bit Unit-	less number
3					eld Size: 1 ield Size:		Request Parameter Command Paramete	Optional r: Optional
	DD005	Generic numeric ID, short			Number of rou	te, waypoint, event,	mark, etc.	
		Integer, 8 bit unsigned quent parameters pertain to this D maps to the Battery Instance field		Range:	0 to 252	Resolution:	1 bit Unit-	less number
4	Operatin	g State		•	eld Size: ield Size: 4		Request Parameter Command Paramete	Optional r: Optional
	DD266	Invertor Operating State			0x00 = Invert, 0x01 = AC Pas 0x02 = Load S 0x03 = Fault, 0x04 = Disable 0x05 = Reserve thru 0x0D = Reserve 0x0E = Error 0x0F = Data N	ense, ed ed		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used	to construct bit fields
5	Inverter l	Enable/Disable		•	eld Size: ield Size: 2		Request Parameter Command Paramete	Optional r: Optional
	DD002 Generic status pair					Disabled, Reset, "0" Enabled, Set, "1"], ble, Unknown]	·],	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used	to construct bit fields

Inverter Status- DEPRECATED

PGN: 127509

hex: 1F215

Used to construct bit fields

6 NMEA Reserved

DF52

Byte Field Size:

Bit Field Size: resv 2

Range: Variable

bit(n)

Request Parameter
Command Parameter:

DD001 Reserved field

Bit field

Variable number of reserved bits, all set to logic "1"

Resolution: 1

Used to align subsequent data on a byte boundary.

Charger Configuration Status

PGN: 127510 hex: 1F216

Any device capable of charging a battery may transmit this message. If requested via the ISO Request, a separate message will be returned for each Battery Instance connected to the device. The Request and Command group function messages (PGN 126208) can be used to set parameters within this PGN.

Single Fr	ame: No	Priority Default: 6		Update R		milliseconds	Frequency:	NA	cycles per second
Destination	n: <mark>Global</mark>	Query Support: Required	Col	mmand Sup	pport: Required	ACK Rqmnts: N	one		
ield#	Field Na	ame							
1	Charger	Instance		•	eld Size: 1 ield Size:		Request Parar Command Par		Required Required
	DD005	Generic numeric ID, short			Number of ro	oute, waypoint, event,	mark, etc.		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	1 bit	Unit-les	s number
2	Battery I	nstance		-	eld Size: 1		Request Parar Command Par		Required Required
	DD005	Generic numeric ID, short			Number of ro	oute, waypoint, event,	mark, etc.		
	DF53 The subsec	Integer, 8 bit unsigned quent parameters pertain to this DO	uint8 C source.	Range:	0 to 252	Resolution.	1 bit	Unit-les	s number
3	Charger	Enable/Disable		•	eld Size: ield Size: 2		Request Parar Command Par		Optional Optional
	DD003	Generic command pair				ff, Disable, Reset, Man, Enable, Set, Make			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution.	1	Used to	construct bit fields
4	NMEA R	eserved			eld Size: ield Size: resv	6	Request Parar Command Par		
	DD001	Reserved field			Variable num	nber of reserved bits,	all set to logic "1'	,	
	DF52 Used to alig	Bit field gn subsequent data on a byte bour	bit(n) ndary.	Range:	Variable	Resolution.	1	Used to	construct bit fields
5	Charge (Current Limit		•	eld Size: 1		Request Parar Command Par		Optional Optional
	DD263	Generic Absolute Percentage	0-252%						
	DF93 Limits char	Percent, Absolute ger output current to a percentage	uint8 (0-100%)	•	0 - 252% signed maximum.	Resolution.	1%		
6	Charging	g Algorithm		•	eld Size: ield Size: 4		Request Parar Command Par		Optional Optional
	DD272	Charging Algorithm			0x02 = 2 Sta; 0x03 = 3 Sta; 0x04 = Reser thru 0x0D = Rese 0x0E = Error	C (Constant Voltage (ge (No float) ge ved rved	Constant Current)	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution.	1	Used to	construct bit fields

Charger Configuration Status PGN: 127510

hex: 1F216

7	Charger Mode	Byte Field Size:	Request Parameter Optional
	DD265 Charger Mode	0x00 = Standalone, 0x01 = Primary, 0x02 = Secondary, 0x03 = Echo 0x04 = Reserved thru 0x0D = Reserved 0x0E = Error 0x0F = Data Not Available	Command Parameter: Optional
	DF52 Bit field bit(n)	Range: Variable Resoluti	on: 1 Used to construct bit fields
	Default is standalone. For installations where two or rethe primary and the others are secondary. Some charsecond battery bank (e.g., start battery).		
8	Estimated Battery Temp - When No Sensor Present	Byte Field Size:	Request Parameter Optional
		Bit Field Size: 4	Command Parameter: Optional
	DD274 Batt Temp - No Sensor	0x00 = Cold 0x01 = Warm 0x02 = Hot 0x03 = Reserved thru 0x0D = Reserved 0x0E = Error 0x0F = Data Not Available	
	DF52 Bit field bit(n)	Range: Variable Resoluti	on: 1 Used to construct bit fields
	If there is no battery temperature sensor or it is defect temperature.		
9	Equalize One Time Enable/Disable	Byte Field Size: Bit Field Size: 2	Request Parameter Command Parameter: Optional Optional
	DD003 Generic command pair	00 = [Turn Off, Disable, Reset, 01 = [Turn On, Enable, Set, Ma 02 = Error, 03 = No action	
	DF52 Bit field bit(n)	Range: Variable Resoluti	on: 1 Used to construct bit fields
	Equalizing over charges the battery in an attempt to be		arge.
10	Over Charge Enable/Disable	Byte Field Size: Bit Field Size: 2	Request Parameter Command Parameter: Optional Optional
	DD003 Generic command pair	00 = [Turn Off, Disable, Reset, 01 = [Turn On, Enable, Set, Ma 02 = Error, 03 = No action	
	DF52 Bit field bit(n)	Range: Variable Resoluti	on: 1 Used to construct bit fields
	For chargers that support regular over charging, this	field enables the feature.	
11	Equalize Time	Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD268 Time		
	DF98 Time interval, medium, u uint16	Range: 0 - 65,532 minutes Resolution	on: 1 minute

Inverter Configuration Status

PGN: 127511 hex: 1F217

Any device capable of inverting DC to AC may transmit this message. If requested via the ISO Request, a separate message will be returned for each AC Instance connected to the device. The Complex Request/Command/Acknowledgement group function message can be used to set the following parameters. Note: While less than 8 bytes... we are anticipating that this message is expected to grow.

Single Fr	ame: No	Priority Default: 6	Default	Update R	ate:	milliseconds	Frequency:	N/	cycles per sec	ond
Destinatio	n: <mark>Global</mark>	Query Support: Required	Co	mmand Sup	port: Required	ACK Rqmnts: N	lone			
ield#	Field Na	ame								
1	Inverter I	Instance		•	eld Size: 1 ield Size:		Request Parar Command Par		Required Optional	
	DD005	Generic numeric ID, short			Number of re	oute, waypoint, event	mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	1 bit	Unit-les	ss number	
2	AC Insta	nce			eld Size: 1 ield Size:		Request Parameter Command Parameter:		Required Optional	
	DD005	Generic numeric ID, short			Number of re	oute, waypoint, event	mark, etc.			
	DF53 Integer, 8 bit unsigned The subsequent parameters pertain to this AC		uint8 C source.	Range:	0 to 252	Resolution	: 1 bit	Unit-les	ss number	
3	DC Instance			•	eld Size: 1 ield Size:		Request Parar Command Par		Optional Optional	
	DD005	Generic numeric ID, short			Number of re	oute, waypoint, event	mark, etc.			
	DF53 Integer, 8 bit unsigned uint8 The subsequent parameters pertain to this DC source Note: This maps to the Battery Instance field.			Range:	0 to 252	Resolution	: 1 bit	Unit-les	ss number	
4	Inverter I	Enable/Disable		•	eld Size: ield Size: 2		Request Parar Command Par		Optional Optional	
	DD003	Generic command pair				Off, Disable, Reset, M On, Enable, Set, Make				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit field	ls
5	Inverter I	Mode		•	eld Size: ield Size: 4		Request Parar Command Par		Optional Optional	
	DD275 Inverter Mode				0x00 = Stand 0x01 = Serie 0x02 = Serie 0x03 = Paral 0x04 = Paral 0x05 = Reserthru 0x0D = Reserthru 0x0E = Error 0x0F = Data	s Master s Slave lel Master lel Slave rved				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	: 1	Used to	construct bit field	ls

Inverter Configuration Status

PGN: 127511 hex: 1F217

6	Load Sense Enable/Disable			Byte Field Size: Bit Field Size: 2				Request Param Command Para	Optional Optional	
	DD003	Generic command pair			01 = 02		isable, Reset, Ma lable, Set, Make			
	DF52	Bit field	bit(n)	Range:	Variabl	e	Resolution:	1	Used to	construct bit fields
7	Load Ser	nse Power Threshold		•	eld Size: ield Size:			Request Param Command Para		Optional Optional
	DD276	Power, medium (watts)								
	DF28	Power	uint16	Range:	0 to 65,	532 W	Resolution:	1 W		
		sensing is enabled and the inverto enter the inverting state.	ter is in the	standby s	state, a loa	nd requiring at I	least this amoun	t of power must		
8	Load Ser	nse Interval		•	eld Size: ield Size:			Request Param Command Para		Optional Optional
	DD036 Data transmit offset Offset in transmit time from time of request command: $0x0 = \text{transmit immediately}$ $0xFFFF = Do \text{ not change offset.}$									
	DF66	Time interval, .01sec	uint16	Range:	0 to 655	5.32s	Resolution:	1x10E-2sec		
	When load this interva	sensing is enabled and the inverl.	ter is in the	standby s	state, the i	nverter will per	iodically check fo	or a load on		

AGS Configuration Status

PGN: 127512 hex: 1F218

Automatic Generator Starter Any device that is capable of starting/stopping a generator may transmit this message. The Complex Request/Command/Acknowledgement group function message can be used to set the following parameters. Note: While less than 8 bytes... we are anticipating that this message is expected to grow.

Single Fr	ame: No	Priority Default: 6	Default	t Update R	ate:	milliseconds	Frequency:	NA	cycles per second	
Destinatio	n: <mark>Global</mark>	Query Support: Required	Co	ommand Sup	port: Optional	ACK Rqmnts:	None			
ield#	Field N	ame								
1	AGS Instance			-	eld Size: 1 ield Size:		Request Parameter Required Command Parameter: Optional			
	DD005	Generic numeric ID, short			Number of	route, waypoint, ever	nt, mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolutio	on: 1 bit	Unit-les	ss number	
2	Generato	or Instance		•	eld Size: 1		Request Par Command Pa		Required Optional	
	DD005	Generic numeric ID, short			Number of	route, waypoint, ever	nt, mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolutio	on: 1 bit	Unit-les	ss number	
3	AGS Mod	de		•	eld Size: ield Size: 4		Request Par Command Pa		Optional Optional	
	DD277	AGS Mode			0x00 = Off 0x01 = On 0x02 = Auto 0x03 = Reso thru 0x0D = Reso 0x0E = Erro 0x0F = Data	erved				
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	on: <mark>1</mark>	Used to	construct bit fields	
4	NMEA Reserved			•	eld Size: ield Size: resv	44	Request Parameter Command Parameter: Optional			
	DD001	Reserved field			Variable nu	mber of reserved bits	r of reserved bits, all set to logic "1"			
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	on: 1	Used to	construct bit fields	
	Used to alig	gn subsequent data on a byte bou	ndary.							

Battery Configuration Status

PGN: 127513 hex: 1F219

Any device connected to a battery may transmit this message. If requested via the ISO Request, a separate message will be returned for each Battery Instance connected to the device. The Complex Request/Command/Acknowledgement group function message can be used to set the following parameters.

Single Fr	rame: No	Priority Default: 6	Defaul	t Update R	Rate:	milliseconds	Frequency:	NA cycles pe	r secon
Destinatio	n: Global	Query Support: Require	d Co	ommand Sup	oport: <mark>Optional</mark>	ACK Rqmnts: N	None		
ield#	Field Na	ame							
1	Battery In	nstance		-	ield Size: 1		Request Parai Command Pai	meter Required optional	
	DD005	Generic numeric ID, short			Number of r	oute, waypoint, event	, mark, etc.		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	: 1 bit	Unit-less number	
	The subsec	quent parameters pertain to this D	C source						
2	Battery Type			•	ield Size: ield Size: 4		Request Parai Command Pai	meter Optional cameter: Optional	
	DD282	Battery Type			0x00 = Floo 0x01 = GEL 0x02 = AGN 0x03 = Lith: 0x04 = Rese thru 0x0D = Res 0x0E = Erro 0x0F = Data	M ium erved erved			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	n: 1	Used to construct bi	t fields
3	Supports	s Equalization		•	ield Size: ield Size: 2		Request Parai Command Pai	meter Optional rameter: Optional	
	DD002	Generic status pair			01 = [Yes, 0 10 = Error,	ff, Disabled, Reset, "(On, Enabled, Set, "1"] ilable, Unknown]	4.		
	DF52	Bit field the battery supports equalization	bit(n)	Range:	Variable	Resolution	: 1	Used to construct bi	t fields
4	NMEA Re		•	-	ield Size: iield Size: resv	2	Request Parai Command Pai		
	DD001	Reserved field			Variable nu	mber of reserved bits,	all set to logic "1	"	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	n: 1	Used to construct bi	t fields
	Used to alig	gn subsequent data on a byte boo	undary.						

Battery Configuration Status PGN: 127513 hex: 1F219

5 Nominal Voltage Byte Field Size: Request Parameter Bit Field Size: 4 Command Parameter:	Optional Optional
DD284 Nominal Voltage $0x00 = 6 \text{ Volts}$ $0x01 = 12 \text{ Volts}$ $0x02 = 24 \text{ Volts}$ $0x03 = 32 \text{ Volts}$ $0x04 = 36 \text{ Volts}$ $0x05 = 42 \text{ Volts}$ $0x06 = 48 \text{ Volts}$ $0x07 = \text{Reserved}$ $thru$ $0x0D = \text{Reserved}$ $0x0E = \text{Error}$ $0x0F = \text{Data Not Available}$	
DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to	construct bit fields
6 Battery Chemistry Byte Field Size: Request Parameter Bit Field Size: 4 Command Parameter:	Optional Optional
DD285 Battery Chemistry $0x00 = \text{Lead Acid} \\ 0x01 = \text{Lithium Ion} \\ 0x02 = \text{NiCad} \\ 0x03 = \text{ZnO} \\ 0x04 = \text{NiMH} \\ 0x05 = \text{Carbon Type} \\ 0x06 = \text{Fuel Cell} \\ 0x07 = \text{Battery Lead Crystal} \\ 0x08 = \text{Reserved} \\ 0x09 = \text{Reserved} \\ thru \\ 0x0D = \text{Reserved} \\ 0x0E = \text{Error} \\ 0x0F = \text{Data Not Available}$	
DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to	
	construct bit fields
Bit Field Size: Command Parameter:	Optional
Bit Field Size: Command Parameter: DD283 Battery Capacity (Coulombs)	Optional Optional
Bit Field Size: Command Parameter: DD283 Battery Capacity (Coulombs) DF100 Battery Capacity uint16 Range: 0 - 235,915,200 Resolution: 3600 C This ma	Optional Optional aps directly into Hours (AH) where
Bit Field Size: Command Parameter: DD283 Battery Capacity (Coulombs) DF100 Battery Capacity uint16 Range: 0 - 235,915,200 Resolution: 3600 C This management of Coulombs Ampere	Optional Optional aps directly into e Hours (AH) where = 1AH. Optional
Bit Field Size: Command Parameter: DD283 Battery Capacity (Coulombs) DF100 Battery Capacity uint16 Range: 0 - 235,915,200 Resolution: 3600 C This management Ampere 3600 C 8 Battery Temperature Coefficient Byte Field Size: 1 Request Parameter	Optional Optional aps directly into e Hours (AH) where = 1AH. Optional
Bit Field Size: Command Parameter: DD283 Battery Capacity (Coulombs) DF100 Battery Capacity uint16 Range: 0 - 235,915,200 Coulombs Resolution: 3600 C This may Ampere 3600 C 8 Battery Temperature Coefficient Byte Field Size: 1 Request Parameter Command Parameter:	Optional Optional aps directly into e Hours (AH) where = 1AH. Optional
Bit Field Size: DD283 Battery Capacity (Coulombs) DF100 Battery Capacity uint16 Range: 0 - 235,915,200 Coulombs Resolution: 3600 C This may Ampere 3600 C Byte Field Size: 1 Request Parameter Bit Field Size: Command Parameter: DD138 Generic percent of range	Optional Optional aps directly into e Hours (AH) where = 1AH. Optional Optional
Bit Field Size: Command Parameter: DD283 Battery Capacity (Coulombs) DF100 Battery Capacity uint16 Range: 0 - 235,915,200 Resolution: 3600 C This may Ampere 3600 C 8 Battery Temperature Coefficient Byte Field Size: 1 Request Parameter Command Parameter: DD138 Generic percent of range DF30 Percent, Relative measure int8 Range: +/- 124% Resolution: 1% 9 Peukert Exponent Byte Field Size: 1 Request Parameter	Optional Optional aps directly into e Hours (AH) where = 1AH. Optional Optional

Battery Configuration Status							PGN: 127513 hex: 1F219				
10	Charge E		•	eld Size: 1		Request Parameter Optional Command Parameter: Optional					
	DD138	Generic percent of range									
	DF30	Percent, Relative measure	int8	Range:	+/- 124%	Resolution:	1%				

AGS Status PGN: 127514 hex: 1F21A

Automatic Generator Starter Any device capable of starting/stopping a generator may transmit this message. Note: While less than 8 bytes... we are anticipating that this message is expected to grow.

-	ame: No	Priority Default: 6 Query Support: Required		Update R mmand Sup			nilliseconds ACK Ramnts: N	Frequency:	.7	7 cycles per second
ield #	Field Na		001	ппапа бар	роп. Орг	IOHAI	HOR Nymmo.	one		
1	AGS Inst	tance			eld Size: ield Size:	1]	Request Para Command Pa		Required Optional
	DD005	Generic numeric ID, short			Num	iber of rout	e, waypoint, event,	mark, etc.		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number
2	Generato	or Instance		•	eld Size: ïeld Size:	1		Request Para Command Pa		Required Optional
	DD005	Generic numeric ID, short			Nun	iber of rout	e, waypoint, event,	mark, etc.		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number
3	AGS Ope	erating State			eld Size: ield Size:	4		Request Para Command Pa		Optional Optional
	DD278	AGS Operating State			0x01 0x02 0x03 0x04 0x05 0x06 0x07 0x08 0x09 0x04 thru 0x01	6 = Externa 7 = Fault 8 = Suspend 9 = Not Ope A = Reserve D = Reserve E = Error	n ff On Off tor Shutdown I Shutdown d erating			
	DF52	Bit field	bit(n)	Range:	Variable	;	Resolution:	1	Used to	construct bit fields
4	Generato	or State		•	eld Size: ield Size:	4		Request Para Command Pa		Optional Optional
	DD279	Generator State			0x01 0x02 0x03 0x04 0x06 0x07 0x08 0x09 0x02 0x01 0x01 0x01	D = Preheat E = Start Do C = Crankir S = Starter of E = Warmir S = Cooling S = Stoppin C = Stoppin A = Stoppin A = Stoppe B = Crank I C = Reserve C = Reserve E = Error E = Data No	elay ng Cooling ng Up y Down g Down wn Bypass g d Delay			
	DF52	Bit field	bit(n)	Range:	Variable	;	Resolution:	1	Used to	construct bit fields

AGS Status PGN: 127514 hex: 1F21A

Generator On Reason Byte Field Size: Request Parameter 5 Optional Bit Field Size: 8 Command Parameter: Optional **DD280** Generator On Reason 0x00 = Not On0x01 = DC Voltage Low0x02 = Battery State Of Charge Low0x03 = AC Current High 0x04 = Contact Closed0x05 = Manual On0x06 = Exercise0x07 = Non Quiet Time0x08 = External On Via AGS 0x09 = External On Via Generator 0x0A = Unable to Stop0x0B = Reservedthru 0xFD = Reserved0xFE = Error0xFF = Data Not Available DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields 6 **Generator Off Reason** Byte Field Size: Request Parameter Optional Bit Field Size: 8 Command Parameter: Optional 0x00 = Not Off**DD281** Generator Off Reason 0x01 = DC Voltage High0x02 = Battery State Of Charge High0x03 = AC Current Low 0x04 = Contact Opened0x05 = Reached Absorption 0x06 = Reached Float0x07 = Manual Off0x08 = Max Run Time0x09 = Max Auto Cycle0x0A = Exercise Done0x0B = Quiet Time0x0C = External Off Via AGS0x0D = Safe Mode0x0E = External Off Via Generator 0x0F = External Shutdown 0x10 = Auto Off0x11 = Fault0x12 = Unable to Start0x13 = Reservedthru 0xFD = Reserved0xFE = Error0xFF = Data Not Available DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

AC Power / Current- Phase A

PGN: 127744 hex: 1F300

The purpose of this PGN is to provide a common way to report Phase A AC Current / Power status. It provides a mechanism to report on a specified connection address and instance with precision to 0.1 amperes and a range from 0 - 6553.2 Amperes.

It can be requested by another device such as a logic controller (Command Source) or display and can be broadcast periodically or upon a status change. Using the SID, this status information can be combined with the current and voltage information of phase B and C to provide the total power of a three phase power connection (input or output). This PGN is part of the Distributed Power System / Architecture.

Note 1: If Query Support for this PGN is implemented, then manufacturers shall include support for queries that specify a value for Field 2. Note 2: If command support for this PGN is implemented, then each command shall include a value for Field 2, which shall identify the connection being commanded.

Single Fra	ame: Y	Priority Default: 6	Default	Update Rate	1500 m	illiseconds	Frequency:	.7	7 cycles per sed	cond	
Destinatio	n: <mark>Global</mark>	Query Support: Optional	Со	mmand Suppor	t: Optional	ACK Rqmnts.	None				
ield#	Field Na	nme									
1	Sequence	e ID		Byte Field Bit Field]	Request Parai Command Pai		Optional Optional		
	DD056 Sequence ID				An upward counting number that binds information transmitted in two or more PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG values in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single data set.						
				0 - 252 = binding available (when SID value reaches 252, resume w data set)							
					253 - 254 = reserved for future use						
					255 = No bindi whenever pract	U 1	MEA recommends t	ising bind	ding SID values		
	DF53	Integer, 8 bit unsigned	uint8	Range: 0	to 252	Resolution	on: 1 bit	Unit-le	ss number		
	For example	e, an identical Sequence ID in this	field indi	cates simultar	neous measureme	ents for phases A	, B and C.				
2	Connection	on Number		Byte Field Bit Field			Request Parai Command Pai		Note 1 Note 2		
	DD005	Generic numeric ID, short			Number of rou	te, waypoint, eve	nt, mark, etc.				
	DF53	Integer, 8 bit unsigned	uint8	Range: 0	to 252	Resolution	on: 1 bit	Unit-le	ss number		
		nce within the source of this mess sending the message is bus wide		ifying the con	nection; the comb	ination of the Co	nnection Number				
3	AC RMS	Current		Byte Field Bit Field			Request Parai Command Pai		Optional Optional		
	DD269	Current, Electric, Unsigned									
	DF95	Current, electric, high	uint16	Range: 0	- 6553.2 A	Resolution	on: 1x10E-1 A				
4	Power			Byte Field Bit Field			Request Parai Command Pai		Optional Optional		
	DD349	Power- Extended Range				6 = Out of Range	: lable or Do not cha	nge			
	DF108	Power- Extended Range	int32		,147,483,648 to 2,147,483,644 V	Resolution					

AC Power / Current- Phase B

PGN: 127745 hex: 1F301

The purpose of this PGN is to provide a common way to report Phase B AC Current / Power status. It provides a mechanism to report on a specified connection address and instance with precision to 0.1 amperes and a range from 0 - 6553.2 Amperes. It can be requested by another device such as a logic controller (Command Source) or display and can be broadcast periodically or upon a status change. Using the SID, this status information can be combined with the current and voltage information of phase A and C to provide the total power of a three phase power connection (input or output).

This PGN is part of the Distributed Power System / Architecture.

Note 1: If Query Support for this PGN is implemented, then manufacturers shall include support for queries that specify a value for Field 2.

Single Fra	ame: Y	Priority Default: 6	Default	Update R	ate:	1500 mil	lliseconds	Frequency:	.7 cycles per second
Destinatio	n: Global	Query Support: Optional	Co	mmand Sup	port: Opti	onal	ACK Rqmnts	None	
Field #	Field Na	ame							
1	Sequenc	e ID		•	eld Size: ield Size:	1		Request Parar Command Par	meter Optional optional
	DD056	Sequence ID			PGNs differ relate in PG data s 0 - 25 data s 253 -	s from a sin tent PGN trad data set. SN 129026 set. S2 = binding set)	gle source addransmissions ide For example, ide to the Latitude g available (wh rved for future g provided. Ni	ress. Identical SID varifies those PGN to dentical SID values and Longitude value en SID value reache	a transmitted in two or more alues within two or more ransmissions as a single bind the COG and SOG values as in PGN 129029 as a single as 252, resume with 0 on next asing binding SID values
	DF53 For exampl	Integer, 8 bit unsigned e, an identical Sequence ID in thi	uint8 s field indi	•	0 to 252 Itaneous m	easuremer	Resolution		Unit-less number
2	Connecti	on Number		•	eld Size: ield Size:	1		Request Parar Command Par	neter Note 1 ameter: Note 2
	DD005	Generic numeric ID, short			Numl	ber of route	, waypoint, eve	nt, mark, etc.	
		Integer, 8 bit unsigned noe within the source of this mess sending the message is bus wide		•	0 to 252 connection;	the combir	Resolution ation of the Co		Unit-less number
3	AC RMS			-	eld Size: ield Size:	2		Request Parar Command Par	neter Optional optional Optional
	DD269	Current, Electric, Unsigned							
	DF95	Current, electric, high	uint16	Range:	0 - 6553.	2 A	Resoluti	on: <mark>1x10E-1 A</mark>	

AC Power / Current- Phase B

PGN: 127745 hex: 1F301

Power

Byte Field Size: 4 Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD349 Power- Extended Range

+2,147,483,645 = Reserved+2,147,483,646 = Out of Range

+2,147,483,647 = Data not available or Do not change

DF108 Power- Extended Range

Range: -2,147,483,648 to int32

Resolution: 1W

+2,147,483,644 Watts

AC Power / Current- Phase C

PGN: 127746 hex: 1F302

The purpose of this PGN is to provide a common way to report Phase C AC Current / Power status. It provides a mechanism to report on a specified connection address and instance with precision to 0.1 amperes and a range from 0 - 6553.2 Amperes. It can be requested by another device such as a logic controller (Command Source) or display and can be broadcast periodically or upon a status change.

Using the SID, this status information can be combined with the current and voltage information of phase A and B to provide the total power of a three phase power connection (input or output). This PGN is part of the Distributed Power System / Architecture.

Note 1: If Query Support for this PGN is implemented, then manufacturers shall include support for queries that specify a value for Field 2.

Single Fra	ame: Y	Priority Default: 6	Default	Update R	Rate:	1500 n	nilliseconds	Frequency:	.7 cycles per second
Destination	n: <mark>Global</mark>	Query Support: Optional	Co	mmand Sup	port: Op	tional	ACK Rqmnt	s: <mark>None</mark>	
Field#	Field Na	ame							
1	Sequence	e ID		•	eld Size: ield Size			Request Parar Command Par	meter Optional cameter: Optional
	DD056	Sequence ID			PGI diff rela in F data 0 - 1 data 253	Ns from a series PGN ted data series PGN 12902 a set. 252 = binda set) - 254 = res	ingle source add transmissions id t. For example, 6 to the Latitude ing available (whoserved for future ing provided. N	ress. Identical SID v lentifies those PGN t identical SID values and Longitude value then SID value reacher use	n transmitted in two or more alues within two or more ransmissions as a single bind the COG and SOG values es in PGN 129029 as a single es 252, resume with 0 on next using binding SID values
	DF53 For example	Integer, 8 bit unsigned e, an identical Sequence ID in this	uint8 s field indi	Range: cates simu				<i>ion: <mark>1 bit</mark></i> A, B and C.	Unit-less number
2	Connecti	on Number		•	eld Size: ield Size			Request Parar Command Par	meter Note 1 rameter: Note 2
	DD005	Generic numeric ID, short			Nuı	nber of rou	te, waypoint, ev	ent, mark, etc.	
		Integer, 8 bit unsigned noe within the source of this mess sending the message is bus wide			0 to 252 connectio			ion: 1 bit onnection Number	Unit-less number
3	AC RMS	Current		•	eld Size: ield Size			Request Parar Command Par	meter Optional rameter: Optional
	DD269 DF95	Current, Electric, Unsigned Current, electric, high	uint16	Range:	0 - 655	3.2 A	Resolut	ion: <mark>1x10E-1 A</mark>	

AC Power / Current- Phase C

PGN: 127746

hex: 1F302

Power

Byte Field Size: 4 Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD349 Power- Extended Range

+2,147,483,645 = Reserved+2,147,483,646 = Out of Range

+2,147,483,647 = Data not available or Do not change

DF108 Power- Extended Range

Range: -2,147,483,648 to int32

Resolution: 1W

+2,147,483,644 Watts

AC Voltage / Frequency-Phase A

PGN: 127747 hex: 1F303

This PGN is part of the Distributed Power System / Architecture.

The purpose of this PGN is to provide a common way to report Phase A AC Voltage/ Frequency status.

It provides a mechanism to report on a specified connection address and instance with precision to 0.1 Volts and a range from 0.1 to 6553.2 Volts. It can be requested by another device such as a logic controller (Command Source) or display and can be broadcast periodically or upon a status change.

Using the SID, this status information can be combined with the current and voltage information of phase B and C to provide the total power of a three phase power connection (input or output).

Note 1: If Query Support for this PGN is implemented, then manufacturers shall include support for queries that specify a value for Field 2.

Single Fr	ame: Y	Priority Default: 6	Default	Update Rate	e: 1500	milliseconds	Frequency:		7 cycles per secor
Destinatio	n: <mark>Global</mark>	Query Support: Optional	Co.	mmand Suppo	rt: Optional	ACK Rqmnts:	None		
Field #	Field Nam	е							
1	Sequence II	ס		Byte Field Bit Field			Request Paran Command Para		Optional Optional
	DD056 Sequence ID				PGNs from a different PGN related data s	single source address I transmissions ident et. For example, id		alues wit ansmission the	hin two or more
					0 - 252 = bino data set)	ding available (whe	en SID value reache	s 252, re	sume with 0 on next
					253 - 254 = r	eserved for future u	ise		
					255 = No bin whenever pra	0 1	MEA recommends u	sing bine	ding SID values
		nteger, 8 bit unsigned	uint8	Range: 0		Resolutio		Unit-le	ss number
	For example, a	an identical Sequence ID in this	s field indi	cates simulta	neous measuren	nents for phases A	, B and C.		
2	Connection	Number		Byte Field Bit Field			Request Paran Command Para		Note 1 Note 2
	DD005 Ge	eneric numeric ID, short			Number of ro	ute, waypoint, ever	nt, mark, etc.		
	DF53	nteger, 8 bit unsigned	uint8	Range: 0	to 252	Resolutio	n: <mark>1 bit</mark>	Unit-le	ss number
		within the source of this mess ading the message is bus wide	•	ifying the cor	inection; the com	nbination of the Cor	nnection Number		
3	AC RMS Vo	Itage Line to Neutral		Byte Field	Size: 2		Request Paran	neter	Optional
				Bit Field	d Size:		Command Para	ameter:	Optional
	DD347 Vo	oltage, AC or DC, High Rar	nge		6553.3 = Res 6553.4 = Out 6553.5 = Not		ot Change		
	DF106	Voltage - High Range	uint16	Range: 0	- 6553.2 V	Resolutio	on: 0.1V		

AC Voltage / Frequency-Phase A

PGN: 127747 hex: 1F303

4 AC RMS Voltage Line to Line

Byte Field Size:

2 Request Parameter
Optional
Optional

DD347 Voltage, AC or DC, High Range 6553.3 = Reserved 6553.4 = Out of Range

6553.5 = Not Available or Do Not Change

DF106 Voltage - High Range uint16 Range: 0 - 6553.2 V Resolution: 0.1V

5 AC Frequency

Byte Field Size:

2 Request Parameter Optional
Optional
Optional

DD348 Frequency-Medium 6553.3 = Reserved 6553.4 = Out of Range

6553.5 = Not Available or Do Not Change

DF107 Frequency-Medium uint16 Range: 0-6553.2 Hz Resolution: 0.1 Hz

AC Voltage / Frequency-Phase B

PGN: 127748 hex: 1F304

This PGN is part of the Distributed Power System / Architecture.

The purpose of this PGN is to provide a common way to report Phase B AC Voltage/ Frequency status.

It provides a mechanism to report on a specified connection address and instance with precision to 0.1 Volts and a range from 0.1 to 6553.2 Volts. It can be requested by another device such as a logic controller (Command Source) or display and can be broadcast periodically or upon a status change. Using the SID, this status information can be combined with the current and voltage information of phase A and C to provide the total power of a three phase power connection (input or output).

Note 1: If Query Support for this PGN is implemented, then manufacturers shall include support for queries that specify a value for Field 2.

Single Fr	ame: Y	Priority Default: 6	Default l	Update Ra	te: 15	<mark>)()</mark> millisecoi	nds /	Frequency:	.7	cycles per second
Destination	n: <mark>Global</mark>	Query Support: Optional	Con	nmand Supp	ort: Optiona	ACK	(Rqmnts: <mark>N</mark> a	one		
Field #	Field Nan	пе								
1	Sequence	D		Byte Fiel Bit Fie	d Size: 1			Request Paran Command Para		Optional Optional
	DD056 Sequence ID				PGNs from different I related date in PGN 12 data set.	n a single sou PGN transmiss a set. For exa 19026 to the I	arce address. sions identifications identifications. ample, identifications and	Identical SID va fies those PGN tr tical SID values b Longitude value	ulues with ansmissi pind the (es in PGN	
				data set) 253 - 254 = reserved for future use 255 = No binding provided. NMEA recommends using binding SID whenever practical.						
		Integer, 8 bit unsigned an identical Sequence ID in this	uint8 s field indic	Range: (Resolution: hases A, B		Unit-les	ss number
2	Connection	n Number		Byte Fiel Bit Fie	d Size: 1			Request Paran Command Para		Note 1 Note 2
	DD005 G	eneric numeric ID, short			Number o	f route, waypo	oint, event,	mark, etc.		
	Fixed instanc	Integer, 8 bit unsigned e within the source of this mess ending the message is bus wide	•	Range: (Resolution: of the Conne		Unit-les	ss number
3	AC RMS V	oltage Line to Neutral		Byte Fiel Bit Fie	d Size: 2			Request Paran Command Para		Optional Optional
	DD347 V	oltage, AC or DC, High Rar	nge			Reserved Out of Range Not Available	or Do Not	Change		
	DF106	Voltage - High Range	uint16	Range: () - 6553.2 V	F	Resolution:	0.1V		

AC Voltage / Frequency-Phase B

PGN: 127748 hex: 1F304

4 AC RMS Voltage Line to Line

Byte Field Size:

2 Request Parameter
Optional
Optional

DD347 Voltage, AC or DC, High Range 6553.3 = Reserved

6553.4 = Out of Range 6553.5 = Not Available or Do Not Change

DF106 Voltage - High Range uint16 Range: 0 - 6553.2 V Resolution: 0.1V

5 AC Frequency

Byte Field Size:

Request Parameter
Optional
Optional

DD348 Frequency-Medium
6553.3 = Reserved
6553.4 = Out of Range
6553.5 = Not Available or Do Not Change

DF107 Frequency-Medium uint16 Range: 0-6553.2 Hz Resolution: 0.1 Hz

AC Voltage / Frequency-Phase C

PGN: 127749 hex: 1F305

This PGN is part of the Distributed Power System / Architecture.

The purpose of this PGN is to provide a common way to report Phase C AC Voltage/ Frequency status.

It provides a mechanism to report on a specified connection address and instance with precision to 0.1 Volts and a range from 0.1 to 6553.2 Volts.

It can be requested by another device such as a logic controller (Command Source) or display and can be broadcast periodically or upon a status change.

Using the SID, this status information can be combined with the current and voltage information of phase A and B to provide the total power of a three phase power connection (input or output).

Note 1: If Query Support for this PGN is implemented, then manufacturers shall include support for queries that specify a value for Field 2.

Single Fi	ingle Frame: Y Priority Default: 6 De		Default Update Rate:	1500	milliseconds	Frequency:	.7 cycles per second				
Destination	on: <mark>Global</mark>	Query Support: Optional	Command Support:	Optional	ACK Rqmnts	s: None					
Field #	Field Nam	е									
1	Sequence II	D	Byte Field S Bit Field			Request Par Command P	- p				
	DD056 Se	equence ID		An upward counting number that binds information transmitte PGNs from a single source address. Identical SID values within different PGN transmissions identifies those PGN transmission related data set. For example, identical SID values bind the CG in PGN 129026 to the Latitude and Longitude values in PGN data set.							
				data set)	ling available (where		thes 252, resume with 0 on next				
				255 = No bino whenever prac		MEA recommend	s using binding SID values				
		Integer, 8 bit unsigned an identical Sequence ID in this	uint8 Range: 0 to s field indicates simultane			ion: <mark>1 bit</mark> A, B and C.	Unit-less number				
2	Connection	Number	Byte Field S Bit Field			Request Par Command P	rameter Note 1 Parameter: Note 2				
	DD005 G	eneric numeric ID, short		Number of rou	ite, waypoint, ev	ent, mark, etc.					
	Fixed instance	Integer, 8 bit unsigned within the source of this mess ading the message is bus wide				ion: <mark>1 bit</mark> onnection Number	Unit-less number				
3		Itage Line to Neutral	Byte Field S Bit Field			Request Par Command P	rameter Optional Parameter: Optional				
3	AC RMS Vo	Itage Line to Neutral oltage, AC or DC, High Rai	Bit Field	Size: 6553.3 = Rese 6553.4 = Out		Command P	- p				

AC Voltage / Frequency-Phase C

PGN: 127749 hex: 1F305

4 AC RMS Voltage Line to Line

Byte Field Size:

2 Request Parameter
Optional
Optional

DD347 Voltage, AC or DC, High Range 6553.3 = Reserved 6553.4 = Out of Range

6553.5 = Not Available or Do Not Change

DF106 Voltage - High Range uint16 Range: 0 - 6553.2 V Resolution: 0.1V

5 AC Frequency

Byte Field Size:

2 Request Parameter
Optional
Optional
Optional

DD348 Frequency-Medium 6553.3 = Reserved 6553.4 = Out of Range

6553.5 = Not Available or Do Not Change

DF107 Frequency-Medium uint16 Range: 0-6553.2 Hz Resolution: 0.1 Hz

Converter (Inverter/Charger) Status

PGN: 127750 hex: 1F306

Provides both state and status information about a Charger, Inverter or combined Inverter / Charger.

It provides a mechanism to broadcast the current state of a power Converter with single or multiple inputs and outputs/connections/pins/channels.

The values provided include the connection state and temperature.

This PGN also provides detailed status of the various characteristics of the connection(s) including: Low Power Mode, Fault, Bulk, Absorption, Float, Storage, Equalize, Pass-thru, Inverting, and Assisting

This PGN does not add 'On / Off' functionality for these devices/connection since they can be handled with other On/Off commands.

This PGN replaces PGN 127507 (Charger Status), which has been deprecated. This PGN can be used in conjunction with the DC Connection Status PGN to provide detailed information regarding the parameters of a Convertor device and all of its connections from/to the power grid.

The use of the SID can assist in combining this PGN with similar PGN broadcasts to control or report power and other parameters for multiple connections of the Converter.

The recommended/default frequency is every 1500 ms.

This PGN is part of the Distributed Power System / Architecture.

Note 1: If Query Support for this PGN is implemented, then manufacturers shall include support for queries that specify a value for Field 2.

Single Fra	me: Y	Priority Defaul	t: 6 Dei	'ault Update Ra	te: 1500	milliseconds	Frequency:	.7	cycles per	second
Destination	Global	Query Suppo	rt: <mark>Optional</mark>	Command Supp	ort: Optional	ACK Rqmnts	None			
ield#	Field Na	ame								
1	Sequenc	e ID		Byte Fiel Bit Fie	d Size: 1		Request Para Command Pa	_	Optional Optional	
	DD056	Sequence ID			PGNs from a different PGN related data so	single source addi transmissions ide et. For example, i	at binds informatio ress. Identical SID v entifies those PGN dentical SID values and Longitude value	values within transmission s bind the CC	n two or more is as a single OG and SOG	e values
					data set)	ling available (wh	en SID value reach	es 252, resur	me with 0 on	n next
						ling provided. N	MEA recommends	using bindin	g SID values	s
	DF53	Integer, 8 bit uns	signed uin	t8 Range:) to 252	Resoluti	on: 1 bit	Unit-less	number	
(Combine w	ith other PGN's to pr	ovide detailed stat	e and status of a	Converter Device					

Converter (Inverter/Charger) Status

PGN: 127750 hex: 1F306

2	Connect	ion Number			eld Size: 1		Request Param Command Para		Note 1 Note 2
	DD005	Generic numeric ID, short			Number of route, way	point, event,	mark, etc.		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit	Unit-le	ss number
	Number ar Remark: T	nce within the source of this mess id node sending is bus wide unique his field references to a (DC) conn When a device only has a single st	e. ection whe	en the devi	ce is capable of independe	ntly charging	several		
3	Operatin	g State		•	eld Size: ield Size: <mark>8</mark>		Request Param Command Para		Optional Optional
	DD342	Converter Operating State			0x0=Off, 0x1=Low Power Mod 0x2=Fault, 0x3=Bulk, 0x4=Absorption, 0x5=Float, 0x6=Storage, 0x7=Equalize, 0x8=Pass thru, 0x9=Inverting, 0xA=Assisting, 0xB-0xFE=Reserved, 0xFF=Not Available	ie,			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields
4	Tempera	ture State		•	eld Size: ield Size: <mark>2</mark>		Request Param Command Para		Optional Optional
	DD343	Converter Temperature State			0x0=Ok, 0x1=Warning, 0x2=Over Temperatus 0x3=Not Available	re,			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields
5	Overload	1 State		•	eld Size:		Request Param Command Para		Optional Optional
	DD344	Converter Overload State			0x0=Ok, 0x1=Warning, 0x2=Overload, 0x3=Not Available				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields
6	Low DC	Voltage State			eld Size: ield Size: <mark>2</mark>		Request Param Command Para		Optional Optional
	DD345	Converter Low DC Voltage S	tate		0x0=Ok, 0x1=Warning, 0x2=DC voltage too l 0x3=Not Available	ow,			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields

Converter (Inverter/Charger) Status

PGN: 127750 hex: 1F306

0x2=Ripple Too High, 0x3=Not Available

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

8 NMEA Reserved Byte Field Size: Request Parameter

Bit Field Size: resv 32 Command Parameter:

DD001 Reserved field Variable number of reserved bits, all set to logic "1"

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

Used to align subsequent data on byte boundary.

DC Voltage / Current

PGN: 127751 hex: 1F307

The purpose of this PGN is to provide a common way to report and extended range of DC Voltage and DC Current status including high voltage / high power systems.

The use of the SID can assist in combining the Voltage and Current of multiple connections with similar PGN broadcasts to control or report power and other parameters.

The message shall be broadcasted periodically or upon request. The recommended/default frequency is every 1500 ms. We do not recommend a period lower than 500 ms or beyond 5000 ms to maintain system integrity and optimal performance.

This PGN can be used in conjunction with 127506, 127508, and 127510 to provide precision voltage and current status.

This PGN replaces 127509 (Inverter Status), which has been deprecated.

The connection identification is system wide unique and includes the device and instance number allowing multiple connections within a single device.

This PGN is part of the Distributed Power System / Architecture.

Note 1: If Query Support for this PGN is implemented, then manufacturers shall include support for queries that specify a value for Field 2.

Single Fr	ame: Y	Priority Default: 6	Default	Update Ra	ate:	<mark> 500</mark> millise	conds	Frequency:		7 cycles per secon
Destination	n: <mark>Global</mark>	Query Support: Optional	Co	mmand Supp	oort: Option	n <mark>al</mark> A	CK Rqmnts: N	one		
Field #	Field Nar	те								
1	Sequence	ID		•	eld Size: 1 eld Size:			Request Param Command Para		Optional Optional
	DE53 Integer 8 bit unsigned				PGNs f differer related in PGN data set 0 - 252 data set 253 - 2	rom a single s at PGN transn data set. For 129026 to th = binding ava)	source address nissions identi example, iden e Latitude and ailable (when a	. Identical SID va fies those PGN tra tical SID values b I Longitude value SID value reaches	lues with ansmiss and the s in PGI	ions as a single COG and SOG values N 129029 as a single sume with 0 on next
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-le	ss number
	To Report mi	ultiple connections at a single po	int in time	Э						
2	Connectio	n Number		•	eld Size: 1 eld Size:			Request Param Command Para		Note 1 Note 2
	DD005	Generic numeric ID, short			Numbe	r of route, wa	ypoint, event,	mark, etc.		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-le	ss number
		ce within the source of this mess ending the message is bus wide	•	tifying the c	onnection; th	e combinatio	n of the Conne	ection Number		

DC Voltage / Current PGN: 127751

hex: 1F307

3	DC Voltage	Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD367 Voltage, DC, High Range/Resolution	6553.3 = Reserved 6553.4 = Out of Range 6553.5 = Not Available or Do No	ot Change
	DF106 Voltage - High Range uint16	Range: 0 - 6553.2 V Resolutio	n: <mark>0.1V</mark>
4	DC Current	Byte Field Size: 3 Bit Field Size:	Request Parameter Command Parameter: Optional
	DD368 Current, DC, High Range/Resolution	83886.06 = Reserved 83886.07 = Out of Range 83886.08 = Not Available or Do	Not Change
	DF114 Current, DC, high range/r int24	Range: -83886.08 A to Resolutio 83886.05 A	n: <mark>0.01A</mark>
5	NMEA Reserved	Byte Field Size: Bit Field Size: resv 8	Request Parameter Command Parameter:
	DD001 Reserved field	Variable number of reserved bits	all set to logic "1"
	DF52 Bit field bit(n) Used to align subsequent data on a byte boundary.	Range: Variable Resolutio	Used to construct bit fields

Nautical Leeway Angle

PGN: 128000 hex: 1F400

This PGN provides the Nautical Leeway Angle, which is defined as the angle between the vessel's heading (direction to which the vessel's bow points) and its course (direction of its motion (track) through the water).

The Nautical Leeway Angle is water referenced and does not account for slip due to current. This is commonly provided by dual-axis speed sensors.

Dual axis speed sensors are able to measure accurately the ship's speed in a longitudinal direction and a transverse direction. By measuring both speed components (i.e. the velocity vector), the Nautical Leeway Angle can be determined, and this angle can be used to optimize the vessel's course.

Note: This Nautical Leeway Angle is used primarily in the sailing segment of the maritime industry and may differ from oceanographic or scientific definitions of Leeway.

The Sequence ID field (SID) is used to link this PGN to other related PGN's from the same source address. When no linkage exists, the value of the SID shall be set to 255.

Single Fr	gle Frame: Yes Priority Default: 4			Update Ra	te: 200	milliseconds	Frequency:	5.	cycles per second
Destinatio	n: Global	Query Support: Option	al Co	ommand Supp	ort: Optional	ACK Rqmnts	S: No		
Field #	Field Na	ame							
1	Sequenc	e ID		Byte Fie Bit Fie	ld Size: 1		Request Para Command Pa		Optional Optional
	DD056 Sequence ID DF53 Integer, 8 bit unsigned uin				PGNs from a different PGN related data s in PGN 1290 data set. 0 - 252 = bin data set) 253 - 254 = r	single source add N transmissions id set. For example, i 226 to the Latitude ding available (where reserved for future ading provided. N	g provided. NMEA recommends using binding SID values		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resoluti	ion: 1 bit	Unit-les	s number
2	Nautical	Leeway Angle		Byte Fie Bit Fie	ld Size: 2		Request Para Command Pa		Optional Optional
	DD438	Nautical Leeway Angle					ge to starboard, that we angles indicate s		sel is tracking to the port.
	DF04	Angle, signed	int16	Range:	+/-Pi rad	Resoluti	ion: 1x10E-4 rad	Resolut	ion ~0.0057deg
3	NMEA R	eserved		Byte Fie Bit Fie	ld Size: eld Size: resv	40	Request Para Command Pa		
	DD001	Reserved field			Variable nun	nber of reserved bi	ts, all set to logic "	'1"	
	DF52 Used to alig	Bit field gn subsequent data on byte bou	bit(n) undary.	Range:	Variable	Resoluti	ion: <mark>1</mark>	Used to	construct bit fields

Vessel Acceleration PGN: 128001 hex: 1F401

The Vessel Acceleration message transmits the acceleration of the vessel in all three axes, ahead/astern, port/starboard, and up/down. The acceleration values may be used for performance evaluation or crash detection. The acceleration values are measured using the ground as a reference.

Single Fr	rame: Y	Priority Default: 5	Default	Update R	Pate: 100) milliseconds	Frequency:	10.	cycles per second
Destinatio	n: Global	Query Support: Optional	Co	mmand Sup	port: Prohibited	ACK Rqmnt	s: <mark>None</mark>		
ield#	Field Na	ame							
1	SID				eld Size: 1		Request Paran Command Par		Optional Prohibited
	DD056	Sequence ID			PGNs from a different PG related data	a single source add N transmissions id set. For example,	nat binds information lress. Identical SID va- lentifies those PGN to identical SID values e and Longitude value	alues with ansmissi bind the (nin two or more ons as a single COG and SOG values
					0 - 252 = bir data set)	nding available (w	hen SID value reache	s 252, res	sume with 0 on next
					253 - 254 =	reserved for future	use		
					255 = No bit whenever pr		MEA recommends u	sing bind	ling SID values
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolut	tion: 1 bit	Unit-les	ss number
2	Longitud	linal Acceleration		•	eld Size: 2		Request Paran Command Par		Optional Prohibited
	DD523	Acceleration			Acceleration	ı, high			
	DF01 Acceleratio	Acceleration n of the vessel along the ahead/as	int16 stern axis		+/- 327.64 m/s ² ralues represent ac		tion: <mark>1x10E-2 m/s*s</mark> orward direction.	G = 9.	80665 m/s*s
3	Transver	se Acceleration		•	eld Size: 2 ield Size:		Request Paran Command Par		Optional Prohibited
	DD523	Acceleration			Acceleration	ı, high			
	DF01 Acceleratio	Acceleration n of the vessel along the port/start	int16 coard axis		+/- 327.64 m/s ² values represent a		tion: <mark>1x10E-2 m/s*s</mark> starboard direction.	G = 9.	80665 m/s*s
4	Vertical A	Acceleration		•	eld Size: 2 ield Size:		Request Paran Command Par		Optional Prohibited
	DD523	Acceleration			Acceleration	ı, high			
	DF01	Acceleration	int16	Range:	+/- 327.64 m/s ²	*s Resolut	tion: <mark>1x10E-2 m/s*s</mark>	G = 9.	80665 m/s*s
	Acceleratio	n of the vessel along the vertical a	xis. Posi	ive values	represent accelera	ation in the downw	ard direction.		
5	NMEA R	eseved		•	eld Size: ield Size: resv	8	Request Paran Command Par		
	DD001	Reserved field			Variable nur	mber of reserved b	its, all set to logic "1'	,	
	DF52	Bit field	bit(n)	Range:	Variable	Resolut	ion: 1	Used to	construct bit fields

Electric Drive Status (Rapid Update)

PGN: 128002 hex: 1F402

This message provides the rapid status of an electric propulsion drive motor.

PGN update rate is not adjusted for communication between Motor and Inverter/Motor Controller. Intended use is for a HID.

Electrical input power of the 'motor-inverter-unit' can be calculated from DC voltage and current. Mechanical output power can be calculated from Rotational motor speed, motor torque and rotation direction.

Electrical motors for marine applications are constructed either with direct drive or with a gearbox but normally not with a shift gearbox (also no forward/reverse gear). Therefore motor, inverter and gearbox is considered as one unit = drive-unit or propulsion-unit

Application examples are located in NMEA 2000 Appendix D.

Single Fr	ame: Yes	Priority Default: 5	Default	Update Ra	<i>te:</i> 500 m	nilliseconds	Frequency: 2.	cycles per second
Destination	n: Global	Query Support: Optional	Co	mmand Supp	ort: Optional	ACK Rqmnts: Y	es	
Field#	Field Na	ame						
1	Inverter/	Motor Controller		Byte Fiel Bit Fie	ld Size: 1		Request Parameter Command Parameter:	Required Optional
	DD128	Generic instance			0 = Instance 0 1 = Instance 1 2 = Instance 2 n = Instance n, 253 = Reserved 254 = Error 255 = Not avai			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	1 bit Unit-le	ss number
2	Active M	otor Mode		Byte Fiel Bit Fie	ld Size:		Request Parameter Command Parameter:	Optional Optional
	DD498	Active Motor Mode			0x0 = Neutral, 0x1 = Reverse, 0x2 = Forward, 0x3 = Reserved, 0x4 = Reserved, 0x5 to 0xD = R 0xE = Error, 0xF = Data not	, 1, 1, Reserved		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	Used to	construct bit fields
3	Brake Mo	ode		Byte Fiel Bit Fie	ld Size:		Request Parameter Command Parameter:	Optional Optional
	DD002	Generic status pair				Disabled, Reset, "0" Enabled, Set, "1"], ble, Unknown]	"],	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	Used to	construct bit fields
	Brake mod	e: free spinning of prop in neutral i	s prevent	ed.				
4	NMEA R	eserved		Byte Fiel Bit Fie	ld Size: eld Size: resv 2	2	Request Parameter Command Parameter:	Optional Optional
	DD001	Reserved field			Variable numb	er of reserved bits, a	all set to logic "1"	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	Used to	construct bit fields

Electric Drive Status (Rapid Update) PGN: 128002 hex: 1F402

5	Rotational Shaft Speed	Byte Field Size: Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD129 Rate of rotation		
	DF72 Rotational rate, unsigned uint16	Range: 0-16,383 RPM Resolution	1/4 RPM
6	Motor DC Voltage	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD347 Voltage, AC or DC, High Range	6553.3 = Reserved 6553.4 = Out of Range 6553.5 = Not Available or Do Not	Change
	DF106 Voltage - High Range uint16	Range: 0 - 6553.2 V Resolution	0.1V
7	Motor DC Current	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD140 Current, Electric		

Resolution: 1x10E-1 A

int16 Range: +/- 3,276.4 A

DF07 Current, electric, high

Electric Energy Storage Status (Rapid Update)

PGN: 128003 hex: 1F403

This message provides real-time information for Electric Energy Storage Systems.

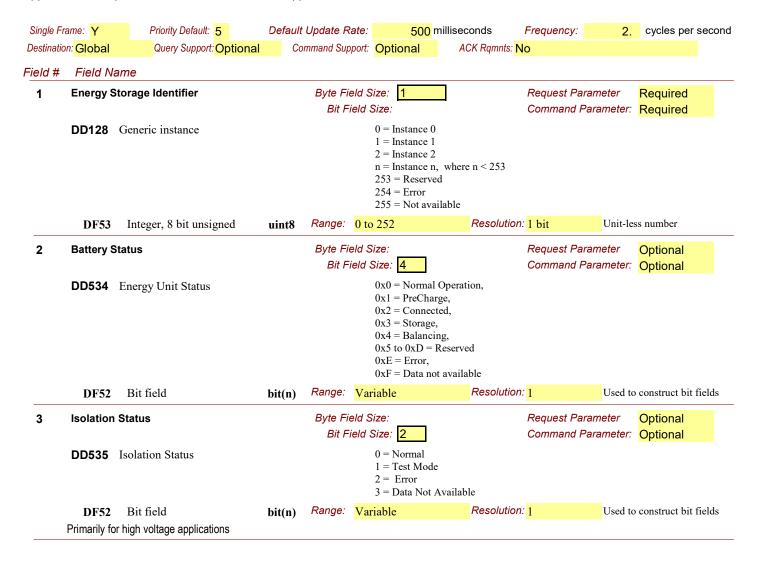
The message transmit rate is 500ms.

This PGN is used to provide Electric Energy Storage on sources such as batteries.

The Instance Identifier field (Field 1) specifies which battery the PGN message relates to and all following data fields refer only to that source.

When a field is not supported, an output value of 'Data not available' shall be used

Application examples are located in NMEA 2000 Appendix D.



Electric Energy Storage Status (Rapid Update)

PGN: 128003 hex: 1F403

4	Battery Error		Byte Field Size: Bit Field Size: 2			Request Param Command Para	O P 1.01.0.	
	DD536 Battery Error		0 = Normal Operation 1 = Error 2 = Reserved 3 = Data Not Available					
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to construct bit fields	
	Indicates the presence of a fault or error. S	ee Alert PG	N for detail	ls				
5	Battery Voltage		Byte Fi	eld Size: 2		Request Param	eter <mark>Optional</mark>	
			Bit F	ield Size:		Command Para	meter: Optional	
	DD347 Voltage, AC or DC, High R	ange	6553.3 = Reserved 6553.4 = Out of Range 6553.5 = Not Available or Do N			Change		
	DF106 Voltage - High Range	uint16	Range:	0 - 6553.2 V	Resolution:	0.1V		
6	Battery Current		Byte Field Size: 2 Bit Field Size:			Request Parameter Optional Command Parameter: Optional		
	DD140 Current, Electric							
	DF07 Current, electric, high	int16	Range:	+/- 3,276.4 A	Resolution:	1x10E-1 A		
	(-) equals 'current consumed' equals 'charg' (+) equals 'current supplied' equals 'discha			•				
7	NMEA Reserved		Byte Fi	eld Size:		Request Param	eter	
			Bit F	ield Size: resv 16		Command Para	meter:	
	DD001 Reserved field			Variable number of	of reserved bits, a	all set to logic "1"		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to construct bit fields	

Thruster Control Status PGN: 128006

hex: 1F406

This PGN is used to report status of thruster control and can be used with Command Group Function (PGN 126208) to command thruster equipment.

The Thruster Identifier Field (Field 2) specifies which thruster the PGN message is intended for, and all following data fields refer only to that thruster.

This PGN has several transmission rates dependent upon thruster operation: Static is 5s, Dynamic is 500ms, Control is 250ms. The message will be broadcasted periodically, but can also be requested as required. The default static update rate is 5 seconds to reduce bandwidth use when the thruster is not operating, this update rate is used when all control commands are OFF.

The default "dynamic" update rate is 500ms to provide the status of activity while the thruster is operated without use of the Command Group Function, through non-network manual means, by remote switches, etc. Control commands are transmitted using the Command Group Function (PGN 126208), with a default control update rate of 250ms.

The control commands are updated at a rapid rate to allow a safety mechanism to be implemented in the application logic, specifically the control functions can be turned OFF if continual command messages are not received within a timeout period.

This PGN can be used with PGN 128007 to provide the operating status, and PGN 128008 to provide the motor status of the thruster. The Sequence ID can be used to link the motor status PGN to the operating status PGN.

Fields output as "Not available" will be understood to be unsupported.

Begin Request Support:

A device receiving an ISO Request (PGN 059904) for this PGN, shall respond by providing as many of these PGNs as necessary for all thruster identifiers available. If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

- If no requested fields have been included with the Request Group Function then the response is to return one or more PGNs, just like responding to the ISO Request (PGN 059904).
- If the Request Group Function (PGN 126208) includes the Thruster Identifier then the response shall be filtered by this field and any other optional fields contained within this request resulting in one response.
- If all the fields requested are not valid then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported".
- If there are multiple request parameters and one or more but not all, are not valid, then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x3 = Access denied".
- Beginning in Field 6 and for each request parameter, an appropriate value in the parameter error code field shall be provided.

End Request Support.

Begin Command Support:

- Every Command Group Function (PGN 126208) transmitted for this PGN shall contain a value for Thruster Identifier (Field 2).
- The value commanded shall identify which thruster the remaining commanded fields apply to. In addition to the required Acknowledge Group Function, this PGN shall be sent as response to any Command Group Function.

Note 1: The flags within Control Events may be manually reset by setting the flag bit value to 0 with the Command Group Function (PGN 126208).

End Command Support.

Single Frame: Yes Priority Default: 2 Default Update Rate: 5000 milliseconds Frequency: .2 cycles per second

Destination: Global/Multica Query Support: Required Command Support: Required ACK Rymnts: Yes

Field # Field Name

Thruster Control Status PGN: 128006 hex: 1F406

1	Sequenc	ee ID			eld Size: 1		Request Parame Command Param	ter Prohibited neter: Prohibited		
	DD056	Sequence ID			An upward counting number that binds information transmitted in two or PGNs from a single source address. Identical SID values within two or n different PGN transmissions identifies those PGN transmissions as a sin related data set. For example, identical SID values bind the COG and Sin PGN 129026 to the Latitude and Longitude values in PGN 129029 as data set.					
					0 - 252 = binding ava data set)	nilable (when	SID value reaches 2	52, resume with 0 on next		
					253 - 254 = reserved	for future use				
					255 = No binding prowhenever practical.	ovided. NME	EA recommends using binding SID values			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit U	Init-less number		
2	Thruster	Identifier		•	eld Size: ield Size: <mark>8</mark>		Request Parame Command Param	· ·		
	DD470	Identifier			Unique Identifier of a 0 - 255	function wit	hin a Virtual Device	e:		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 U	Used to construct bit fields		
3	Thruster	Direction Control		•	eld Size: ield Size: <mark>4</mark>		Request Parame Command Param	- p		
	DD473	Thruster Direction Control				1 = Thruster Ready 2 = Thruster to PORT 3 = Thruster to STARBOARD				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 U	Jsed to construct bit fields		
	For azimut	h type thrusters, use Field 9 (Azim	uth Contro	ol) to comm	nand the required angle					
4	Power E	nable		•	eld Size: ield Size: <mark>2</mark>		Request Parame Command Param	- p		
	DD002	Generic status pair			MSB/LSB: 00 = [No, Off, Disabl 01 = [Yes, On, Enabl 10 = Error, 11= [Unavailable, Ur	ed, Set, "1"],	'],			
	DF52	Bit field	bit(n)	_	Variable	Resolution:	1	Jsed to construct bit fields		
	This field is	s used to enable the power supply	to the thru	ster						
5	Thruster	Retract Control		•	eld Size: ield Size: <mark>2</mark>		Request Parame Command Param	O P 1. 0		
	DD474	Thruster Retraction			0 = OFF 1 = Extend 2 = Retract 3 = Reserved					
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 U	Jsed to construct bit fields		

Thruster Control Status PGN: 128006

hex: 1F406

6	Speed Control	Byte Field Size: 1 Bit Field Size:	Request Parameter Optional Command Parameter: Required							
	DD485 Range, Restricted Percentage	0-100% 254 = Error 255 = Data Not Availab	ole							
	DF120 Percent, Restricted Range uint8		Resolution: 5x10E-1 0 = 0%, 100 = 50%, 200 = 100%							
The speed is proportional to a control input device that can select variable speeds, for example proportional paddle switches, hall effect push buttons, or speed dials.										
7	Thruster Control Events	Byte Field Size: Bit Field Size: 8	Request Parameter Optional Command Parameter: Note 1							
	DD475 Thruster Control Events		device controlling thruster red too fast to safely use thruster							
	DF52 Bit field bit(n)	Range: <mark>Variable</mark> F	Resolution: 1 Used to construct bit fields							
	Events are cleared when the condition is no longer true	e.								
8	Command Timeout	Byte Field Size: 1 Bit Field Size:	Request Parameter Optional Command Parameter: Optional							
	DD233 Time Value (Short resolution 5 msec)									
	DF88 Time Interval, short uint8	Range: 0 to 1.26 sec	Resolution: 5x10E-3 sec							
	If timeout elapses the thruster stops operating and rev	erts to static mode.								
9	Azimuth Control	Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional							
	DD486 Azimuth Angle, Signed	Angle, signed (+/-Pi rac	1 1x10E-4 rad int16)							
	DF04 Angle, signed int16	Range: +/-Pi rad	Resolution: 1x10E-4 rad Resolution ~0.0057deg							
	The angular direction control for azimuth capable thrus negative values are to port.	ters. Relative to the bow, positive values	s are to starboard and							

Thruster Information PGN: 128007 hex: 1F407

This PGN is used to provide information about thruster's operating specifications and ratings. The Thruster Identifier field (Field 2) specifies which thruster the PGN message relates to and all following data fields refer only to that thruster. The message will be sent upon request.

Begin Request Support:

A device receiving an ISO Request (PGN 059904) for this PGN, shall respond by providing as many of these PGNs as necessary for all thruster identifiers available. If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

- If no requested fields have been included with the Request Group Function then the response is to return one or more PGNs, just like responding to the ISO Request (PGN 059904).
- If the Request Group Function (PGN 126208) includes the Thruster Identifier then the response shall be filtered by this field and any other optional fields contained within this request resulting in one response.
- If all the fields requested are not valid then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported".
- If there are multiple request parameters and one or more but not all, are not valid, then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x3 = Access denied". Beginning in Field 6 and for each request parameter, an appropriate value in the parameter error code field shall be provided.

End Request Support.

Revisions: Created 2019 message database version 2.200

Single Fra	me: Yes	Priority Default: 7	Default	t Update R	ate:	milliseconds	Frequency:	NA cycles per second	
Destination	า: <mark>Global</mark>	<mark>/Multica</mark> Query Support: <mark>Require</mark>	d Co	ommand Sup	port: Optional	ACK Rqmnts: Y	'es		
ield#	Field N	Name							
1	Thruste	r Identifier		•	eld Size: ield Size: 8		Request Parar Command Par		
	DD470	Identifier			Unique Ider 0 - 255	ntifier of a function wi	thin a Virtual Dev	vice:	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to construct bit fields	
2	Thruster Motor Type			•	eld Size: ield Size: 4		meter Optional optional		
	DD487 Motor Power Type				0 = 12VDC 1 = 24VDC 2 = 48VDC 3 = 24VAC 4 = Hydraul 5-15 = Rese		nent		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to construct bit fields	
3	NMEA Reserved			•	eld Size: ield Size: resv	Request Parameter Command Parameter:			
	DD001 Reserved field				Variable nu	mber of reserved bits,	nber of reserved bits, all set to logic "1"		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to construct bit fields	
ı	Jsed to align subsequent data on byte boundary.								

PGN: 128007

								hex: 1F407	
4	Motor Po	ower Rating	Byte Field Size: 2 Bit Field Size:				Request Parameter Command Parameter: Optional Optional		
	DD276	Power, medium (watts)							
	DF28	Power	uint16	Range:	0 to 65,532 W	Resolution.	1 W		
5	Maximum Motor Temperature Rating			Byte Field Size: 2 Bit Field Size:			Request Parameter Command Paramet	- 1	
	DD043	Generic Temperature							
	DF39	Temperature, low	uint16	Range:	0 to 655.32 deg K	Resolution.	1x10E-2 deg K		
6	Maximum Rotational Speed			•	eld Size: 2		Request Parameter Command Parameter:		
	DD129	Rate of rotation							
	DF72	Rotational rate, unsigned	uint16	Range:	0-16,383 RPM	Resolution.	1/4 RPM		

Thruster Information

Thruster Motor Status PGN: 128008 hex: 1F408

This PGN is used to provide the motor status and data relevant to a specific thruster and can be used with Command Group Function (PGN 126208) to command thruster equipment.

The Thruster Identifier field (Field 2) specifies which thruster the PGN message relates to and all following data fields refer only to that thruster. This PGN has several transmission rates dependent upon thruster operation: Static is 5s, Dynamic is 500ms.

The message will be broadcasted periodically but can also be requested as required. The default static update rate is 5 seconds to reduce bandwidth use when the thruster is not operating.

The default dynamic update rate is 500ms to provide the status of activity while the thruster is operating.

This PGN can be used with PGN 128006 to provide the thruster control commands, and PGN 128007 to provide the operating status of the thruster.

The Sequence ID can be used to link the motor status PGN to the operating status PGN.

Fields output as "Data not available" will be understood to be unsupported.

Begin Request Support:

A device receiving an ISO Request (PGN 059904) for this PGN, shall respond by providing as many of these PGNs as necessary for all thruster identifiers available.

If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

- If no requested fields have been included with the Request Group Function then the response is to return one or more PGNs, just like responding to the ISO Request (PGN 059904).
- If the Request Group Function (PGN 126208) includes the Thruster Identifier, then the response shall be filtered by this field and any other optional fields contained within this request resulting in one response.
- If all the fields requested are not valid then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported".
- If there are multiple request parameters and one or more but not all, are not valid, then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x3 = Access denied". Beginning in Field 6 and for each request parameter, an appropriate value in the parameter error code field shall be provided.

End Request Support.

Begin Command Support:

Every Command Group Function (PGN 126208) transmitted for this PGN shall contain a value for Thruster Identifier (Field 2) The value commanded shall identify which thruster the remaining commanded fields apply to.

Note 1: The flags within Thruster Motor Events may be manually reset by setting the flag bit value to 0 with the Command Group Function (PGN 126208). This command support is required.

Note 2: Total Motor Operating Time may be reset by setting its value to 0 with the Command Group Function (PGN 126208). This command support is required. End Command Support

Revisions: Created 2019 message database version 2.200

Single Fran	me: Yes	Priority Default:	2	Default U	odate Rate:	5000	milliseconds	Frequency:	.2	cycles per s	econo
Destination.	Global/Mul	Itica Query Support:	Optional	Comn	nand Support:	Required	ACK Rqmnts:	Yes			
Field #	Field Name	e									

Thruster Motor Status	PGN: 128008 hex: 1F408

1	Sequenc	e ID		Byte Fie	eld Size: 1		Request Param	eter	Prohibited					
				Bit F	ield Size:			Command Para	meter:	Prohibited				
	DD056	Sequence ID			An upward counting number that binds information transmitted PGNs from a single source address. Identical SID values within different PGN transmissions identifies those PGN transmission related data set. For example, identical SID values bind the CC in PGN 129026 to the Latitude and Longitude values in PGN 1 data set.									
				0 - 252 = binding available (when SID value reaches 252, resume with data set)										
					255 = No t whenever p	A recommends us	ing bind	ling SID values						
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number				
2	Thruster	Identifier			eld Size: ield Size: 8]		Request Param Command Para		Required Required				
	DD470	Identifier		Unique Ide 0 - 255	ntifier of a	function with	nin a Virtual Devi	ce:						
	DF52	Bit field	bit(n)	Range:	Variable		Resolution:	1	Used to	construct bit fields				
3	Thruster	Motor Events		•	eld Size: ield Size: 8]		Request Param Command Para		Optional Note 1				
	DD471	Thruster Motor Events		0b0000 0000 = No errors present 0bxxxx xxx1 = Motor over temperature cutout 0bxxxx xx1x = Motor over current cutout 0bxxxx x1xx = Low oil level warning 0bxxxx 1xxx = Oil over temperature warning 0bxxx1 xxxx = Controller under voltage cutout 0bxxx1 xxxx = Manufacturer defined 0bx1x xxxx = Reserved 0b1xxx xxxx = Data Not Available										
	DF52	Bit field	bit(n)	Range:	Variable		Resolution:	1	Used to	construct bit fields				
	Events are (PGN 1262	cleared when the condition is no 08.	onger true	or by mar	nually resetting u	sing the Co	ommand Grou	p Function						
4	Motor Cu	ırrent		•	eld Size: 1			Request Param Command Para		Optional Prohibited				
	DD491	Current, electric , medium un	signed											
		Current, electric, Medium nt of electric thruster motor.	uint8	Range:	0-252		Resolution:	1 Amp						
5	Motor Te	mperature			eld Size: 2 ield Size:			Request Param Command Para		Optional Prohibited				
	DD043	Generic Temperature												
	DF39	Temperature, low	uint16	Range:	0 to 655.32 de	eg K		1x10E-2 deg K						

Thruster Motor Status	PGN: 128008
	hex: 1F408

Total Motor Operating Time

Byte Field Size:

2

Request Parameter
Optional
Bit Field Size:
Command Parameter:
Note 2

DD268 Time

DF98 Time interval, medium, u uint16 Range: 0 - 65,532 minutes Resolution: 1 minute

Total time thruster has operated since last reset.

Speed, Water Referenced

PGN: 128259 hex: 1F503

The purpose of this PGN is to provide a single transmission that describes the motion of a vessel over water. As of version 1.210 of this standard, the name of this PGN was changed from "Speed", field 4 "Speed Water Reference Type" was added, and field 3 "Speed Ground Referenced" was noted not for new designs. As of version 1.310 of this standard, field 5 "Speed Direction" was added to provide direction information. This reduced the reserved field (now field 6) from 16 bits to 12 bits.

Single Fr	rame: Yes	Priority Default: 2		Update R		milliseconds	Frequency:	1.	cycles per second	
Destination	n: Global	Query Support: Option	<mark>nal</mark> Co	mmand Sup	port: Optional	ACK Rqmnts:	None			
Field#	Field N	ame								
1	Sequenc	e ID			eld Size: 1 eld Size:	rameter Parameter:	Optional Optional			
	DD056 Sequence ID				PGNs from a different PGN related data s	ess. Identical SII ntifies those PGI entical SID valu	mation transmitted in two or more SID values within two or more PGN transmissions as a single values bind the COG and SOG values e values in PGN 129029 as a single			
				0 - 252 = binding available (when SID value reaches 252, resume wit data set)						
					253 - 254 = r	eserved for future u	se			
						255 = No binding provided. NME whenever practical.		EA recommends using binding SID values		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolutio	n: 1 bit	Unit-le:	ss number	
2	2 Speed Water Referenced			•	eld Size: 2		Request Pa		Optional Optional	
	DD044	Generic Speed								
	DF35	Speed	uint16	Range:	0 to 655.32 m/s	Resolutio	n: 1x10E-2 m/	's 1 Knot	= 0.5144 m/s	
3	Speed G	round Referenced			eld Size: 2 eld Size:		Request Parameter Optional Command Parameter: Optional			
	DD044	Generic Speed								
	DF35	Speed	uint16	_	0 to 655.32 m/s		n: 1x10E-2 m/	s 1 Knot	= 0.5144 m/s	
	Not for new	designs. Value to be obtained	d from PGN 1	29026. Va	lue to be set to Not	Available.				
4	Speed W	ater Referenced Type		Byte Fie Bit Fi	eld Size: eld Size: 8		Request Pa		Optional Optional	
	DD293	Speed Water Reference Ty	/pe	00 = Paddle Wheel 01 = Pitot Tube 02 = Doppler Log 03 = Correlation Log (Ultra-Sound) 04 = EM Log (Electro - Magnetic) 05 through 128 Reserved						
					253 = Not Su 254 = Error		ric Speed Sources other than those defined Not Available			
	DF52 Added as o	Bit field of version 1.210. Previously wa	bit(n) as reserved	Range:	Variable	Resolutio	n: <mark>1</mark>	Used to	construct bit fields	

Speed, Water Referenced PGN: 128259

hex: 1F503

5 Speed Direction Byte Field Size: Request Parameter Optional

Bit Field Size: 4 Command Parameter: Optional

DD356 Speed Direction 00 = Forward (Ahead) 01 = Astern (Backward) 02 through 14 Reserved 15 = Data Not Available

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

When provided, this field identifies the direction of the "Speed Water Referenced" value in field 2.

6 NMEA Reserved Byte Field Size: Request Parameter

Bit Field Size: resv 12 Command Parameter:

DD001 Reserved field Variable number of reserved bits, all set to logic "1"

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

Used to align subsequent data on byte boundary.

Water Depth PGN: 128267
hex: 1F50B

Water depth relative to the transducer and offset of the measuring transducer. Positive offset numbers provide the distance from the transducer to the waterline. Negative offset numbers provide the distance from the transducer to the part of the keel of interest.

Single Fra	ame: Yes	Priority Default: 3	Default	Update R	ate:	<mark>1000</mark> millis	seconds	Frequency:	1.	cycles per seco	ond	
Destinatio	n: Global	Query Support: Optional	Co	mmand Sup	port: Option	nal	ACK Rqmnts:	None				
ield#	Field Na	ame										
1	Sequenc	e ID		-	eld Size: 1			Request Para Command Pa		Optional Optional		
	DD056	Sequence ID			PGNs f differer related	rom a singl at PGN trandata set. For 129026 to	e source addressmissions iden or example, ide	ss. Identical SID tifies those PGN entical SID value	values with transmissi s bind the		ues	
					0 - 252 data set	_	g available (when SID value reaches 252, resume with 0 on next					
					253 - 2	54 = reserv	erved for future use					
						No binding provided. NMEA recommends using binding SID valuer practical.						
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution	n: 1 bit	Unit-le	ss number		
2	Water De	epth, Transducer		Byte Field Size: Bit Field Size:				Request Parameter Optional Command Parameter: Optional				
	DD162	Water Depth At Transducer				elative to the Range" (fie	o the transducer location. Range of value specified in "Maximum field 4).					
	DF09	Distance	uint32	Range:	0 to ~4.29	5x10E+7 1	m Resolution	n: 1x10E-2 m				
3	Offset				eld Size: 2 eld Size:			Request Para Command Pa		Optional Optional		
	DD161	Transducer Offset						e from transducer e transducer to th		ne and negative		
	DF46	Distance, signed, medium	int16	Range:	+/- 32.764	m	Resolution	n: 1x10E-3 m				
4	Maximun	n Depth Range		-	eld Size: 1 eld Size:			Request Para Command Pa		Optional Optional		
	DD350	Maximum Depth Range			measur 253 = I 254 = I	ed. Deeper than	2,520 meters	mum Range over	which wa	ter depth can be		
	DF109	Distance, Rough Approxi	uint8	Range:	0 - 2,520 n	neters	Resolution	n: 10 meters				

Distance Log PGN: 128275 hex: 1F513

This PGN provides two distance values recorded from one log which measures speed through water. The UTC time of the last distance increment is captured as Measurement Date & Time (which will be near current time). The distance values are stored during power down and resume counting after power up. Total Cumulative Distance is normally set to zero when the log is installed and never reset after that. Note 1: Distance Since Last Reset may manually be set to zero at any suitable time. The "Distance Since Last Reset" is reset by setting its value to 0 with the "Command Group Function" PGN 126208.

Single Frame: No		Priority Default: 6	Default	Update Rate:	1000 milliseconds		Frequency:	1.	cycles per se	econd
Destinatio	n: Global	Query Support: Option:	al Co	ommand Support:	Optional	ACK Rqmnts:	None			
ield#	Field N	ame								
1	Measurement Date			Byte Field S Bit Field		Request Parameter Op Command Parameter: Op		Optional Optional		
	DD039	Generic date			Days since Janua	ary 1, 1970, Da	ate is relative to U	TC Time.		
	DF41	Date, day count	uint16	Range: 0 to	o 65,532 days	Resolutio	on: <mark>1 day</mark>	0 = Janu ~179 ye	aary 1, 1970, ma ars	x =
2	Measure	ment Time		Byte Field S Bit Field			Request Para Command Pa		Optional Optional	
	DD158	Generic time of day		24 hour clock, 0 = midnight, time is in UTC						
	DF06	Time of day	uint32	Range: <mark>0 t</mark>	o 86,401 s	Resolutio	on: <mark>1x10E-4 s</mark>	range al	ors, 0 = midnight lows for up to two onds per day	,
3	Total Cu	mulative Distance		Byte Field S Bit Field			Request Para Command Pa		Optional Optional	
	DD120	Distance, voyage								
	DF11	Distance, long	uint32	Range: 0 to	o ~4.295x10E+9	Resolution	on: 1 m			
4	Distance	Since Last Reset		Byte Field S Bit Field			Request Para Command Pa		Optional Note 1	
	DD120	Distance, voyage								
	DF11	Distance, long	uint32	Range: 0 to	o ~4.295x10E+9	Resolution	on: 1 m			
-										

Tracked Target Data PGN: 128520

hex: 1F608

Message for reporting status and target data from tracking radar external devices. The reporting interval will vary by the values for target status and quantity of track data files.

Single Fr	ame: No	Priority Default: 2	Default	Update Ra	te: 1000	milliseconds	Frequency:	1.	cycles per second
Destinatio	n: Global	Query Support: Required	Co	mmand Supp	ort: Optional	ACK Rqmnts:	lone		
ield#	Field Na	ame							
1	Sequenc	e ID		Byte Fiel Bit Fie	d Size: 1 Id Size:		Request Para Command Pa		Optional Optional
	DD056 Sequence ID				PGNs from a different PGN related data se		s. Identical SID tifies those PGN ntical SID value	values with transmissi s bind the (nin two or more
					0 - 252 = bino data set)	ling available (wher	SID value reach	nes 252, res	sume with 0 on next
					253 - 254 = re	eserved for future us	e		
					255 = No bind whenever practice	ding provided. NM ctical.	EA recommends	using bind	ing SID values
	DF53	Integer, 8 bit unsigned	uint8	Range: () to 252	Resolution	1 bit	Unit-les	s number
2	Target ID #			Byte Fiel Bit Fie	d Size: 2		Request Para Command Pa		Required Optional
	DD007	Generic numeric ID, medium			Number of ro	ute, waypoint, event	, mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range: () to 65,532	Resolution	1 bit	Unit-les	s number
3	Track Status Byte Field Size: Bit Field Size: 4				Request Para Command Pa		Required Optional		
	DD216 Track Status				xx01 = Initial xx10 = Track xx11 = Lost T x0xx = Repor x1xx = Repor 0xxx = Acqui 1xxx = Acqui	Carget, ted Target No, ted Target Yes, sion Manual,	*		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	n: 1	Used to	construct bit fields
4	Bearing	Reference		Byte Fiel Bit Fie	d Size: ld Size: 2		Request Para Command Pa		Optional Optional
	DD218	Direction reference for target			0 = True, 1 = Magnetic, 2 = Error, 3 = Relative	,			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	n: 1	Used to	construct bit fields

Tracked Target Data PGN: 128520 hex: 1F608

nex. II ou

5	NMEA Reserved			Byte Field Size: Bit Field Size: resv 2			Request Parameter Command Parameter:		
	DD001	Reserved field	Variable number of reserved bits, a						
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	: 1	Used to	construct bit fields
	Used to alig	gn subsequent data on a byte bo	undary.						
6	Bearing			•	eld Size: 2		Request Paran Command Para		Optional Optional
	DD127	Generic Direction -True			Degrees clockwise r			Optional	
	DF02	Angle	uint16	Range:	0 to 2Pi rad	Resolution	1x10E-4 rad		tion ~0.0057deg, 1 01745 rad
7	Distance				eld Size: 4		Request Paran Command Para		Optional Optional
	DD115	Distance							
	DF15	Distance, signed	int32	Range:	+/-~2.147x10E+7 m	Resolution	1x10E-2 m		
8	Course				eld Size: 2		Request Paran Command Para		Optional Optional
	DD127	Generic Direction -True			Degrees clockwise r	elative to True	North.		
	DF02	Angle	uint16	Range:	0 to 2Pi rad	Resolution	1x10E-4 rad		tion ~0.0057deg, 1 01745 rad
9	Speed			Byte Field Size: Bit Field Size:			Request Parameter Command Parameter: Optional Optional		
	DD044	Generic Speed							
	DF35	Speed	uint16	Range:	0 to 655.32 m/s	Resolution	1x10E-2 m/s	1 Knot	= 0.5144 m/s
10	СРА			•	eld Size: 4		Request Paran Command Para		Optional Optional
	DD115	Distance							
	DF15	Distance, signed	int32	Range:	+/-~2.147x10E+7 m	Resolution	1x10E-2 m		
11	ТСРА				eld Size: 4		Request Paran Command Para		Optional Optional
	DD034	Time-elapsed/Time-to-go			Time interval in mil event.	lli-sec. "-" = t	ime elapsed since	event, "	+" = time to go before
	DF40	Time interval, signed, sta	int32	Range:	+/- ~2.148x10E+6 s	Resolution	1x10E-3 s		
12	UTC of F	ix			eld Size: 4		Request Paran Command Para		Optional Optional
	DD158	Generic time of day		24 hour clock, 0 = midnight, time is in UTC					
	DF06	Time of day	uint32	Range:	0 to 86,401 s	Resolution	1x10E-4 s	range a	urs, 0 = midnight, llows for up to two conds per day

Tracked Target Data PGN: 128520 hex: 1F608

Byte Field Size: 8 or 16 n Request Parameter 13 Name Optional Bit Field Size: Command Parameter: Optional

DD004 Name of place, route, waypoint, destination, vessel, vehicle, etc. Generic name string, short

ch8or16(n)Range: 0 to 250 ASCII or 0 to 125 Unicode Characters

Resolution: 1 ASCII or 1 Unicode Character

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

Byte Field Size: Request Parameter 14 **Reference Target** Optional Bit Field Size: 2 Command Parameter: Optional

DD002 Generic status pair MSB/LSB:

00 = [No, Off, Disabled, Reset, "0"], 01 = [Yes, On, Enabled, Set, "1"], 10 = Error,

11= [Unavailable, Unknown]

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

15 **NMEA Reserved** Byte Field Size: Request Parameter Bit Field Size: resv 6 Command Parameter:

DD001 Reserved field Variable number of reserved bits, all set to logic "1"

Range: Variable Resolution: 1 Used to construct bit fields DF52 Bit field bit(n)

Used to align subsequent data on a byte boundary.

String, variable, short

DF50

This PGN provides the status information of an elevator car. This includes the elevator car id and type, sensors for load and weight limits, smoke detection, door status, motor status, and brake status.

Also provided are weight and speed measurements, current and destination deck location, proximity switch status, inertial measurement unit status and Emergency button and buzzer status.

This PGN is generated at a high rate of 10 times a second due to the safety aspects of the elevator usage.

Begin Request Support:

Requests for this PGN using the NMEA Request Group Function (PGN 126208), shall be processed in the following manner:

- If no requested fields have been included with the Request Group Function (PGN 126208), then the response is to return one or more PGNs, just like responding to the ISO Request (PGN 055904) described above for both addressed and global requests.
- If the Request Group Function (PGN 126208) includes the Elevator Car ID (Field 2), then the response shall be filtered by that value contained within this request resulting in:
- If the request is global or addressed and valid the response is this PGN.
- If the request is global and not valid, there is no response.
- If the request is addressed and not valid, the response is the Acknowledgement Group Function PGN (126208) indicating the appropriate error code(s). The Sequence ID field (SID) is used to bind this PGN to other related PGN's from the same source address.

This PGN may be requested or commanded using the NMEA Group Function (PGN 126208).

End Request Support.

Begin Command Support:

The NMEA Acknowledge Group Function (PGN 126208) shall be sent as the response to the NMEA Command Group Function indicating acceptance or rejection of the command.

If the command is accepted, the Elevator Car Status PGN shall be transmitted to confirm the actual settings.

When using the NMEA Command (PGN 126208), Elevator Car ID (Field 2), must be provided to indicate which Elevator is subject to the command. Requests for this PGN using the ISO Request (PGN 059904), shall be processed in the following manner:

- A device receiving a global ISO (PGN 059904) for this PGN (128538), shall respond by providing one or more of this PGN for each Elevator Car ID.
- A device receiving an addressed ISO (PGN 059904) for this PGN (128538), shall respond by providing one or more this PGN for each Elevator Car ID or an ISO Acknowledge PGN (059392) indicating a Negative Acknowledgement.

End Command Support.

The Sequence ID field (SID) is used to bind this PGN to other related PGN's from the same source address.

Revisions:

Created 2019 message database version 2.100

Single Frame: N Priority Default: 6 Default Update Rate: 100 milliseconds Frequency: 10. cycles per second

Destination: Global Query Support: Required Command Support: Optional ACK Rymnts: None

Field # Field Name

1	Sequence ID		•	eld Size: 1 ield Size:		Request Parameter Command Parameter:	Optional Optional	
	DD056 Sequence ID		An upward counting number that binds information transmitted in two or report of PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a second data set. 0 - 252 = binding available (when SID value reaches 252, resume with 0 or data set) 253 - 254 = reserved for future use 255 = No binding provided. NMEA recommends using binding SID value whenever practical.					
	DF53 Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit Unit-le	ss number	
2	Elevator Car ID			eld Size: 1		Request Parameter Command Parameter:	Required Optional	
	DD005 Generic numeric ID, short			Number of route, v	vaypoint, event,	mark, etc.		
	DF53 Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit Unit-le	ss number	
3	Elevator Car Usage		•	eld Size: ield Size: <mark>4</mark>		Request Parameter Command Parameter:	Optional Optional	
	DD416 Elevator Type			0000 = Land 0001 = Marine 0010 - 1101 = Res 1110 = Error 1111 = Data Not A				
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields	
4	Smoke Sensor Status		•	eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Optional	
	DD426 Sensor Status			00 = disabled 01 = enabled 10 = detected 11 = fault				
	DF52 Bit field Detected = smoke detected	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields	
5	Limit Switch Sensor Status		•	eld Size:		Request Parameter Command Parameter:	Optional Optional	
	DD426 Sensor Status			00 = disabled 01 = enabled 10 = detected 11 = fault				
	DF52 Bit field Detected = limit detected	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields	

6	Proximit	y Switch Sensor Status		•	eld Size: ield Size: 2		Request Parameter Command Parameter.	Optional Optional
	DD426	Sensor Status			00 = disable 01 = enabled 10 = detecte 11 = fault	d		
	DF52 Detected =	Bit field proximity detected	bit(n)	Range:	Variable	Resolution:	1 Used t	o construct bit fields
7	Inertial N	Measurement Unit (IMU) Sens	or Status		eld Size: ield Size: 2		Request Parameter Command Parameter.	Optional Optional
	DD002	Generic status pair			01 = [Yes, C] 10 = Error,	ff, Disabled, Reset, "0' on, Enabled, Set, "1"], ilable, Unknown]],	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used t	o construct bit fields
8	Elevator	Load Limit Status		•	eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter	Optional Optional
	DD427	Load Limit			01 = load lin 10 = reserve	nit acceptable nit exceeded d nit unknown/error		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used t	o construct bit fields
9	Elevator	Load Balance Status		•	eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter	Optional Optional
	DD428	Load Balance			00 = load ba 01 = load un 10 = Reserve 11 = load ba	balanced		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used t	o construct bit fields
10	Elevator	Load Sensor 1 Status		•	eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter	Optional Optional
	DD426	Sensor Status			00 = disable $01 = enable$ $10 = detecte$ $11 = fault$	i		
	DF52 Detected =	Bit field load limit detected	bit(n)	Range:	Variable	Resolution:	1 Used t	o construct bit fields
11	Elevator	Load Sensor 2 Status		•	eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter	Optional Optional
	DD426	Sensor Status			00 = disable 01 = enabled 10 = detecte 11 = fault	d		
	DF52 Detected =	Bit field load limit detected	bit(n)	Range:	Variable	Resolution:	1 Used t	o construct bit fields

PGN: 128538

								hex: 1F61A
12	Elevator Load	Sensor 3 Status		•	eld Size: ield Size: <mark>2</mark>		Request Paramete	-
	DD426 Sens	or Status			00 = disabled $01 = enabled$ $10 = detected$ $11 = fault$			
	DF52 Bit		bit(n)	Range:	Variable	Resolution:	1 Us	sed to construct bit fields
13	Elevator Load	Sensor 4 Status		Byte Fie Bit Fi	eld Size: ield Size: <mark>2</mark>		Request Paramete	
	DD426 Sens	or Status			00 = disabled 01 = enabled 10 = detected 11 = fault			
	DF52 Bit		bit(n)	Range:	Variable	Resolution:	1 Us	sed to construct bit fields
14	NMEA Reserve	ed		Byte Fie Bit Fi	eld Size: resv 2		Request Paramete Command Parame	
	DD001 Rese	rved field			Variable number of r	eserved bits, a	ll set to logic "1"	
	_	field sequent data on byte bounda	bit(n) ry.	Range:	Variable	Resolution:	1 Us	sed to construct bit fields
15	Elevator Car N	Motion Status		Byte Fie Bit Fi	eld Size: ield Size: <mark>2</mark>		Request Paramete Command Parame	•
	DD435 Moti	on Status			00: Stop 01: Up 10: Down 11: unknown/error			
	DF52 Bit	field	bit(n)	Range:	Variable	Resolution:	1 Us	sed to construct bit fields
16	Elevator Car D	Ooor Status		Byte Fie Bit Fi	eld Size: ield Size: <mark>2</mark>		Request Paramete	- J
	DD429 Door	r Status			00 = Open 01 = Closed 10 = Error 11 = [Unavailable, U	nknown]		
	DF52 Bit	field	bit(n)	Range:	Variable	Resolution:	1 Us	sed to construct bit fields
17	Elevator Car E	Emergency Button Status			eld Size: ield Size: <mark>2</mark>		Request Paramete	- p
	DD002 Gene	eric status pair			MSB/LSB: 00 = [No, Off, Disable of the control of	led, Set, "1"],	'],	
	DF52 Bit	field	bit(n)	Range:	Variable	Resolution:	1 Us	sed to construct bit fields

Elevator Car Status

18	Elevator Car Buzzer Status			•	eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Optional
	DD002	Generic status pair			MSB/LSB: 00 = [No, Off, Disa 01 = [Yes, On, Enal 10 = Error, 11 = [Unavailable, U	bled, Set, "1"],	'],	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
19	Open Do	oor Button Status		•	eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Optional
	DD002	Generic status pair			MSB/LSB: 00 = [No, Off, Disa 01 = [Yes, On, Enal 10 = Error, 11 = [Unavailable, Unavailable,	bled, Set, "1"],	·],	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
20	Close Do	oor Button Status		•	eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Optional
	DD002	Generic status pair			MSB/LSB: 00 = [No, Off, Disa 01 = [Yes, On, Enal 10 = Error, 11 = [Unavailable, Unavailable,	bled, Set, "1"],	·],	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
21	NMEA R	eserved		•	eld Size: ield Size: resv 2		Request Parameter Command Parameter:	
	DD001	Reserved field			Variable number of	reserved bits, a	all set to logic "1"	
	DF52 Used to ali	Bit field gn subsequent data on byte bound	bit(n) lary.	Range:	Variable	Resolution:	1 Used to	construct bit fields
22	Current	Deck Position of Elevator Car	•		eld Size: 1		Request Parameter Command Parameter:	Optional Optional
	DD433	Floor/Deck Location			(-128) - (-1) = Belov 0 = Ground or Main 1 - 124 = Over grou 125 = Reserved 126 = Error 127 = Data Not Ava	n deck and or over mai		
	DF57	Integer, 8 bit 2's complem	int8	Range:	-128 to +124	Resolution:	1 bit Unit-le	ss number
23	Destinat	ion Deck			eld Size: 1		Request Parameter Command Parameter:	Optional Optional
	DD433 Floor/Deck Location				(-128) - (-1) = Belov 0 = Ground or Main 1 - 124 = Over grou 125 = Reserved 126 = Error 127 = Data Not Ava	n deck and or over mai		
_	DF57	Integer, 8 bit 2's complem	int8	Range:	-128 to +124	Resolution:	1 bit Unit-le	ss number

24	Total Number of Decks	Byte Field Size: 1	Request Parameter	Optional
		Bit Field Size:	Command Parameter:	Optional
	DD005 Generic numeric ID, short	Number of route, wa	ypoint, event, mark, etc.	
	DF53 Integer, 8 bit unsigned uint8	Range: 0 to 252	Resolution: 1 bit Unit-le	ss number
25	Weight of Elevator Car load cell No. 1	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter:	Optional Optional
	DD436 Weight of Elevator Car			
	DF118 Mass, medium uint16	Range: 0 – 65,532 kg	Resolution: 1 kg	
26	Weight of Car Elevator load cell No. 2	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter:	Optional Optional
	DD436 Weight of Elevator Car			
	DF118 Mass, medium uint16	Range: 0 – 65,532 kg	Resolution: 1 kg	
27	Weight of Elevator Car load cell No. 3	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter:	Optional Optional
	DD436 Weight of Elevator Car			
	DF118 Mass, medium uint16	Range: $0 - 65,532 \text{ kg}$	Resolution: 1 kg	
28	Weight of Elevator Car load cell No. 4	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter:	Optional Optional
	DD436 Weight of Elevator Car			
	DF118 Mass, medium uint16	Range: $0 - 65,532 \text{ kg}$	Resolution: 1 kg	
29	Speed of Elevator Car	Byte Field Size: 1 Bit Field Size:	Request Parameter Command Parameter:	Optional Optional
	DD437 Speed of Elevator car			
	DF119 Speed, low uint8	Range: 0 – 25.2 m/s	Resolution: 0.1 m/s	
30	Elevator Brake Status	Byte Field Size: Bit Field Size: 2	Request Parameter Command Parameter:	Optional Optional
	DD002 Generic status pair	MSB/LSB: 00 = [No, Off, Disab 01 = [Yes, On, Enab 10 = Error, 11 = [Unavailable, University of the content	oled, Set, "1"],	
	DF52 Bit field bit(n)	Range: Variable	Resolution: 1 Used to	o construct bit fields
31	Elevator Motor rotation control status	Byte Field Size: Bit Field Size: 4	Request Parameter Command Parameter:	Optional Optional
	DD430 Motor Control Status	00 = normal 01 = alarm		

10 = reserved 11 = unknown/error

Resolution: 1

Used to construct bit fields

bit(n) Range: Variable

DF52 Bit field

Elevator Car Status PGN: 128538

hex: 1F61A

32 NMEA Reserved

Byte Field Size:

Bit Field Size: resv 2

Request Parameter
Command Parameter:

DD001 Reserved field

Variable number of reserved bits, all set to logic "1"

DF52 Bit field bit Used to align subsequent data on byte boundary.

Range: Variable

bit(n)

Resolution: 1

Used to construct bit fields

Elevator Motor Control PGN: 128768
hex: 1F700

This PGN provides the status of an elevator motor controller.

Settings of the elevator motor controller may be changed using the NMEA Command Group Function.

This PGN is generated at the nominal of rate of 1 second and when state changes occur in Motor Rotation Control Statue (Field 5).

This PGN may be requested or commanded using the NMEA Group Function (PGN 126208).

Elevator Motor Control commands may be sent over the network by using the NMEA Command Group Function (PGN 126208) to change Motor Acceleration/Deceleration Profile Selection (Field 4) and Motor Rotation Control Status (Field 5).

The NMEA Acknowledge Group Function (PGN 126208) shall be sent as the response to the NMEA Command Group Function indicating acceptance or rejection of the command. If the command is accepted, the Elevator Motor Control PGN shall be transmitted to confirm the actual settings.

Begin Request Support:

When using the NMEA Command (PGN 126208), Elevator Car ID (Field 2), must be provided to indicate which Elevator is subject to the command. Requests for this PGN using the ISO Request (PGN 059904), shall be processed in the following manner:

- A device receiving a global ISO (PGN 059904) for this PGN (128768), shall respond by providing one or more of this PGN for each Elevator Car ID.
- A device receiving an addressed ISO (PGN 059904) for this PGN (128768), shall respond by providing one or more this PGN for each Elevator Car ID or an ISO Acknowledge PGN (059392) indicating a Negative Acknowledgement.

Requests for this PGN using the NMEA Request Group Function (PGN 126208), shall be processed in the following manner:

- If no requested fields have been included with the Request Group Function (PGN 126208), then the response is to return one or more PGNs, just like responding to the ISO Request (PGN 055904) described above for both addressed and global requests.
- If the Request Group Function (PGN 126208) includes the Elevator Car ID (Field 2), then the response shall be filtered by that value contained within this request resulting in:
 - If the request is global or addressed and valid, the response is this PGN.
 - If the request is global and not valid, there is no response.
 - If the request is addressed and not valid, the response is the Acknowledgement Group Function PGN (126208) indicating the appropriate error code(s). The Sequence ID field (SID) is used to bind this PGN to other related PGN's from the same source address.

End Request Support.



Elevator Motor Control PGN: 128768 hex: 1F700

1	Sequenc	ee ID			eld Size: ield Size:	1		Request Param Command Para		Optional Optional	
	DD056	Sequence ID			PGNs differ relate in PG data s	s from a single so tent PGN transm d data set. For each 129026 to the set.	ource address issions identi example, iden e Latitude and	binds information transmitted in two or more ss. Identical SID values within two or more tifies those PGN transmissions as a single intical SID values bind the COG and SOG values and Longitude values in PGN 129029 as a single in SID value reaches 252, resume with 0 on next see			
				253 - 254 = reserved for future use							
						No binding pro ever practical.	vided. NME.	A recommends us	ing bind	ling SID values	
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-le	ss number	
2	Elevator Car ID			•	eld Size: ield Size:	1		Request Param Command Para		Required Required	
	DD005	Generic numeric ID, short			Number of route, waypoint,		point, event,	mark, etc.	ommand Parameter: Required		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-le	ss number	
3	Elevator	car usage		•	eld Size: ield Size:	4		Request Param Command Para		Optional Optional	
	DD416	Elevator Type			0001 0010 1110	= Land = Marine - 1101 = Reserv = Error = Data Not Ava					
	DF52	Bit field	bit(n)	Range:	Variable		Resolution:	1	Used to	construct bit fields	
4		cceleration/Deceleration prof	le	Byte Fi	eld Size:			Request Param	eter	Optional	
	selection	1		Bit F	ield Size:	4		Command Para	meter:	Optional	
	DD432	Acceleration/Deceleration Pro	ofile		0001 0010 0011 1110	= Not Used = Profile 1 = Profile 2 - 1101 = Reserv = Error = Data Not Ava					
	DF52	Bit field	bit(n)	Range:	Variable		Resolution:	1	Used to	construct bit fields	
5	Motor ro	tation control status			eld Size: ield Size:	2		Request Param Command Para		Optional Optional	
	DD431 Elevator Motor Control										
	DF52	Bit field	bit(n)	Range:	Variable		Resolution:	1	Used to	construct bit fields	

Elevator Motor Control PGN: 128768

hex: 1F700

6 NMEA Reserved Byte Field Size: Request Parameter

Bit Field Size: resv 38 Command Parameter:

DD001 Reserved field Variable number of reserved bits, all set to logic "1"

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

Used to align subsequent data on byte boundary.

Elevator Deck Push Button

PGN: 128769 hex: 1F701

This PGN provides the status of an elevator call button.

This PGN is transmitted upon a change of state of Elevator Call Button Selection (Field 5).

This PGN may be requested using the NMEA Group Function (PGN 126208).

When using the NMEA Request Group Function (PGN 126208), Elevator Call Button ID, (Field 2) and Deck Button ID (Field 3) should be provided to indicate which Elevator Call Button ID (Field 2), and Deck Button ID (Field 3) is subject to the request.

Begin Request Support:

Requests for this PGN using the ISO Request (PGN 059904), shall be processed in the following manner:

- A device receiving a global ISO (PGN 059904) for this PGN (128769), shall respond by providing one or more of this PGN for each Elevator Call Button ID (Field 2) and Deck Button ID (Field 3) combination.
- A device receiving an addressed ISO (PGN 059904) for this PGN (128769), shall respond by providing one or more this PGN for each Elevator Call Button ID (Field 2) and Deck Button ID (Field 3) combination or an ISO Acknowledge PGN (059392) indicating a Negative Acknowledgement. Requests for this PGN using the NMEA Request Group Function (PGN 126208), shall be processed in the following manner:
 - If no requested fields have been included with the Request Group Function (PGN 126208), then the response is to return one or more PGNs, just like responding to the ISO Request (PGN 055904) described above for both addressed and global requests.
 - If the Request Group Function (PGN 126208) includes Elevator Call Button ID (Field 2) and Deck Button ID (Field 3), then the response shall be filtered by the values contained within this request resulting in:
 - If the request is global or addressed and valid, the response is this PGN.
 - If the request is global and not valid, there is no response.
 - If the request is addressed and not valid, the response is the Acknowledgement Group Function PGN (126208) indicating the appropriate error code(s).

End Request Support.

The Sequence ID field (SID) is used to bind this PGN to other related PGN's from the same source address

Single Frame:	Yes	Priority Default:	6	Dei	fault Update Rate:		milliseconds	Frequency:	NA	cycles per s	second
Destination: Glo	bal	Query Support:	Required		Command Support:	Optional	ACK Rqmnts:	None			
Field # Fiel	ld Name										

Elevator Deck Push Button PGN: 128769 hex: 1F701 Byte Field Size: 1 Request Parameter Sequence ID 1 Optional Bit Field Size: Command Parameter: Optional **DD056** Sequence ID An upward counting number that binds information transmitted in two or more PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG values in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single data set. 0 - 252 = binding available (when SID value reaches 252, resume with 0 on next data set) 253 - 254 = reserved for future use 255 = No binding provided. NMEA recommends using binding SID values whenever practical. Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: 1 bit Unit-less number 2 **Elevator Call Button ID** Byte Field Size: Request Parameter Required Bit Field Size: Command Parameter: Optional **DD005** Generic numeric ID, short Number of route, waypoint, event, mark, etc. Resolution: 1 bit Unit-less number Range: 0 to 252 **DF53** Integer, 8 bit unsigned uint8 **Deck Button ID** Byte Field Size: 1 3 Request Parameter Required Bit Field Size: Command Parameter: Optional **DD433** Floor/Deck Location (-128) - (-1) = Below ground or main deck 0 = Ground or Main deck 1 - 124 = Over ground or over main deck 125 = Reserved126 = Error127 = Data Not Available Range: -128 to +124 Resolution: 1 bit Unit-less number **DF57** Integer, 8 bit 2's complem int8 Byte Field Size: **Elevator Car Usage** Request Parameter Optional 4 Bit Field Size: 4 Command Parameter: Optional 0000 = Land**DD416** Elevator Type

0001 = Marine 0010 - 1101 = Reserved

00: not pushed 01: up 10: down

1111 = Data Not Available

Resolution: 1

Resolution: 1

11: call satisfied (turn off button illumination)

Request Parameter

Command Parameter: Optional

Used to construct bit fields

Optional

Used to construct bit fields

1110 = Error

Range: Variable

Byte Field Size:

Range: Variable

Bit Field Size: 2

bit(n)

bit(n)

Bit field

Elevator Call Button Selection

Bit field

DD434 Status of Floor Call Button

DF52

DF52

5

Elevator Deck Push Button

PGN: 128769 hex: 1F701

6 NMEA Reserved

Byte Field Size:

Bit Field Size: resv 34

Request Parameter
Command Parameter:

DD001 Reserved field

Variable number of reserved bits, all set to logic "1"

DF52 Bit field

bit(n) Range: Variable

Resolution: 1

Used to construct bit fields

Used to align subsequent data on byte boundary.

Windlass Control Status

PGN: 128776 hex: 1F708

This PGN is used to report status of anchor windlass controls and can be used with Command Group Function (PGN 126208) to command the windlass and anchoring equipment.

The Windlass Identifier Field (Field 2) specifies which windlass the PGN message is intended for, and all following data fields refer only to that windlass.

This PGN has several transmission rates dependent upon windlass operation: Static is 5s, Dynamic is 500ms, Control is 250ms. The message will be broadcasted periodically, but can also be requested as required.

The default static update rate is 5 seconds to reduce bandwidth use when the windlass is not operating, this update rate is used when all control commands are OFF.

The default dynamic update rate is 500ms to provide the status of activity while the anchor windlass is operating without use of the Command Group Function, through non-network manual means, by remote switches, etc.

Control commands are transmitted using the Command Group Function (PGN 126208), with a default control update rate of 250ms. The control commands are updated at a rapid rate to allow a safety mechanism to be implemented in the application logic, specifically the control functions can be turned OFF if continual command messages are not received within a timeout period. This PGN can be used with PGN 128777 to provide the operating status, and PGN 128778 to provide the monitoring status for windlasses.

The Sequence ID can be used to link the three windlass PGNs.

Fields output as "Unavailable" or "Data not available" will be understood to be unsupported.

Begin Request Support:

A device receiving an ISO Request (PGN 059904) for this PGN, shall respond by providing as many of these PGNs as necessary for all windlass identifiers available.

If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

- If no requested fields have been included with the Request Group Function then the response is to return one or more PGNs, just like responding to the ISO Request (PGN 059904).
- If the Request Group Function (PGN 126208) includes the Windlass Identifier then the response shall be filtered by this field and any other optional fields contained within this request resulting in one response.
- If all the fields requested are not valid then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported".
- If there are multiple request parameters and one or more but not all, are not valid, then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x3 = Access denied". Beginning in Field 6 and for each request parameter, an appropriate value in the parameter error code field shall be provided.

End Request Support.

Begin Command Support:

- In addition to the required Acknowledge Group Function, this PGN shall be sent as response to any Command Group Function.
- Every Command Group Function (PGN 126208) transmitted for this PGN shall contain a value for Windlass Identifier (Field 2).
- The value commanded shall identify which windlass the remaining commanded fields apply to.
- Note 1: The flags within Control Events may be manually reset by setting the flag bit value to 0 with the Command Group Function (PGN 126208). This command support is required.

End Command Support.

Single Frame: Yes Priority Default: 4 Default Update Rate: 5000 milliseconds Frequency: .2 cycles per second

Destination: Global/Multica Query Support: Optional Command Support: Required ACK Rapmuts: Yes

Field # Field Name

Windlass Control Status PGN: 128776 hex: 1F708

1	Sequence ID			ield Size: 1		Request Parameter Command Parameter:	Prohibited Prohibited		
	DD056 Sequence ID		ык ғ	An upward counting number that binds information transmitted in two or more PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG value in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single data set.					
				0 - 252 = binding ava data set)	ailable (when	SID value reaches 252, re	sume with 0 on next		
				253 - 254 = reserved	for future use				
			255 = No binding provided. NMEA recommends using binding SID values whenever practical.						
	DF53 Integer, 8 bit unsigned	uint8	_	0 to 252	Resolution:		ss number		
	An upward counting number used to link this	PGN to o	ther related	d PGNs sent from the same	e source addre	ess.			
2	Windlass Identifier		•	ield Size: Field Size: 8		Request Parameter Command Parameter:	Required Required		
	DD470 Identifier			Unique Identifier of a 0 - 255	ue Identifier of a function within a Virtual Device:				
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields		
3	Windlass Direction Control		•	ield Size: Field Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Required		
	DD484 Windlass Direction Control			0 = OFF (Status Only 1 = DOWN 2 = UP 3 = Reserved	y / cannot com	nmand)			
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields		
4	Anchor Docking Control		•	ield Size: Field Size: 2		Request Parameter Command Parameter:	Optional Required		
	DD002 Generic status pair			MSB/LSB: 00 = [No, Off, Disab 01 = [Yes, On, Enab 10 = Error, 11= [Unavailable, University of the content o	led, Set, "1"],	'],			
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields		
	This control field can be used for various fun the windlass retracts into a hidden location in during anchor docking.								
5	Speed Control Type		•	ield Size: Field Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Optional		
	DD488 Speed Type			0 = Single Speed 1 = Dual Speed 2 = Proportional Spe 3 = Data Not Availab					
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields		

Windlass Control Status PGN: 128776 hex: 1F708

NMEA Reserved Byte Field Size: Request Parameter 6 Bit Field Size: resv Command Parameter: **DD001** Reserved field Variable number of reserved bits, all set to logic "1" Bit field Range: Variable Resolution: 1 Used to construct bit fields DF52 bit(n) Used to align subsequent data on byte boundary. 7 **Speed Control** Byte Field Size: Request Parameter Optional Bit Field Size: 8 Command Parameter: Required **DD489** Speed Control Single speed: 0 = OFF1-100 = ONDual speed: 0 = OFF1-49 = SLOW50-100 = FASTProportional speed: 0 = OFF1-100 = Proportional speed Range: Variable Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) 8 **Power Enable** Byte Field Size: Request Parameter Optional Command Parameter: Required Bit Field Size: 2 MSB/LSB: **DD002** Generic status pair 00 = [No, Off, Disabled, Reset, "0"], 01 = [Yes, On, Enabled, Set, "1"], 10 = Error, 11= [Unavailable, Unknown] Bit field Range: Variable Resolution: 1 Used to construct bit fields DF52 bit(n) Used to enable power supply to windlass. Byte Field Size: Request Parameter 9 **Mechanical Lock** Optional Bit Field Size: 2 Command Parameter: Required DD002 Generic status pair 00 = [No, Off, Disabled, Reset, "0"], 01 = [Yes, On, Enabled, Set, "1"], 10 = Error11= [Unavailable, Unknown]

Deck and Anchor Wash Byte Field Size: 10 Bit Field Size: 2 Request Parameter Optional Command Parameter: Required

MSB/LSB:

Range: Variable

00 = [No, Off, Disabled, Reset, "0"], 01 = [Yes, On, Enabled, Set, "1"], 10 = Error,

11= [Unavailable, Unknown]

DF52 Bit field bit(n) Range: Variable

bit(n)

Used to disengage mechanical locks on the windlass. Where Enable is locked and Disable is unlocked.

Resolution: 1

Resolution: 1

Used to construct bit fields

Used to construct bit fields

Used to enable/disable the fresh water wash

DF52

Bit field

DD002 Generic status pair

Windlass Control Status PGN: 128776

hex: 1F708

11	Anchor Light	Byte Field Size: Bit Field Size: 2				Request Param Command Para		Optional Required
	DD002 Generic status pair			MSB/LSB: 00 = [No, Off, Dis 01 = [Yes, On, En: 10 = Error, 11 = [Unavailable,	abled, Set, "1"],	"],		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
12	Command Timeout		•	eld Size: 1		Request Param Command Para		Optional Optional
	DD233 Time Value (Short resolution	n 5 msec)						
	DF88 Time Interval, short	uint8	Range:	0 to 1.26 sec	Resolution	5x10E-3 sec		
	If timeout elapses the thruster stops operat	ing and rev	erts to stati	c mode.				
13	Windlass Control Events		•	eld Size: ield Size: <mark>4</mark>		Request Param Command Para		Optional Note 1
	DD478 Windlass Control Events			0b0000 = No error 0bxxx1 = Another 0bxx1x = Reserved 0bx1xx = Reserved 0b1xxx = Reserved	device controlli d d	ing windlass		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
	Events are cleared when the condition is no (PGN 126208).	o longer tru	e, or by ma	nually resetting using the	e Command Gro	oup Function		
14	NMEA Reserved			eld Size: ield Size: resv 4		Request Param Command Para		
	DD001 Reserved field			Variable number o	of reserved bits,	all set to logic "1"		
	DF52 Bit field Used to align subsequent data on byte bou	bit(n) ndary.	Range:	Variable	Resolution	1	Used to	construct bit fields

Anchor Windlass Operating Status

PGN: 128777 hex: 1F709

This PGN is used to provide the operating status and data relevant to a specific Anchor Windlass and can be used with Command Group Function (PGN 126208) to command windlass and anchoring equipment.

The Windlass Identifier (Field 2) specifies which windlass the PGN message relates to and all following data fields refer only to that windlass.

This PGN has several transmission rates dependent upon windlass operation: Static is 5s, Dynamic is 500ms.

The message will be broadcasted periodically, but can also be requested as required.

The default static update rate is 5 seconds to reduce bandwidth use when the windlass is not operating.

The default dynamic update rate is 500ms to provide the status of activity while the windlass is operating.

This PGN can be used with PGN 128776 to provide the windlass control status, and PGN 128778 to provide the monitoring status. The Sequence ID can be used to link the three windlass PGNs.

Fields 3, 4, and 8 output as "Unavailable" will be understood to be unsupported.

Begin Request Support:

A device receiving an ISO Request (PGN 059904) for this PGN, shall respond by providing as many of these PGNs as necessary for all windlass identifiers available.

If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

- If no requested fields have been included with the Request Group Function then the response is to return one or more PGNs, just like responding to the ISO Request (PGN 059904).
- If the Request Group Function (PGN 126208) includes the Windlass Identifier then the response shall be filtered by this field and any other optional fields contained within this request resulting in one response.
- If all the fields requested are not valid then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported".
- If there are multiple request parameters and one or more but not all, are not valid, then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x3 = Access denied". Beginning in Field 6 and for each request parameter, an appropriate value in the parameter error code field shall be provided.

End Request Support.

Begin Command Support:

- Every Command Group Function (PGN 126208) transmitted for this PGN shall contain a value for Windlass Identifier (Field 2).
- The value commanded shall identify which windlass the remaining commanded fields apply to.
- Note 1: Rode Counter Value may be reset by setting its value to 0 with the Command Group Function (PGN 126208). Command support is required.
- Note 2: The flags within Windlass Operating Events may be manually reset by setting the flag bit value to 0 with the Command Group Function (PGN 126208).

End Command Support.

Single Frame: Yes Priority Default: 4 Default Update Rate: 5000 milliseconds Frequency: 2 cycles per second

Destination: Global/Multica Query Support: Optional Command Support: Required ACK Ramnts: Yes

Field # Field Name

Anchor Windlass Operating Status

PGN: 128777 hex: 1F709

1	Sequenc	Sequence ID			eld Size: 1		Request Parameter Command Parameter:	Optional Optional		
	DD056	Sequence ID			An upward counting number that binds information transmitted in two or more PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG valu in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single data set. 0 - 252 = binding available (when SID value reaches 252, resume with 0 on nex data set) 253 - 254 = reserved for future use					
					255 = No binding provided. NMEA recommends using binding SID vi whenever practical.					
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit Unit-le	ss number		
2	Windlass	s Identifier		•	eld Size: ield Size: <mark>8</mark>		Request Parameter Command Parameter:	Required Optional		
	DD470	Identifier			Unique Identifier of 0 - 255	a function with	nin a Virtual Device:			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields		
3	Windlass Motion Status			•	eld Size: ield Size: 2		Request Parameter Command Parameter:	Optional Optional		
	DD480	Windlass Motion States			0 = Windlass stoppe 1 = Deployment occ 2 = Retrieval occurr 3 = Unavailable	curring				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields		
	Indicates c	urrent physical state of windlass n	novement.							
4	Rode Ty	pe Status		•	eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Optional		
	DD481	Rode Type States			0 = Chain presently 1 = Rope presently 2 = Error 3 = Unavailable					
	DF52		bit(n)		Variable	Resolution:	1 Used to	construct bit fields		
-	indicates w	hether chain or rope is currently b	eing depid	•						
5	NMEA Reserved			-	eld Size: ield Size: resv 4		Request Parameter Command Parameter:			
	DD001	Reserved field			Variable number of	reserved bits, a	ll set to logic "1"			
	DF52 Used to ali	Bit field gn subsequent data on byte bound	bit(n) dary.	Range:	Variable	Resolution:	1 Used to	construct bit fields		

Anchor Windlass Operating Status

PGN: 128777 hex: 1F709

_	5 . 6 V.		D. 4- 5	i-14 0i 0	Danier of D	- m
6	Rode Counter Value		•	ield Size: 2	Request Pa Command	arameter Optional Parameter: Note 1
	DD194 Distance, medium			Dependent upon I	PG Field definition.	
	DF75 Distance, Medium Distance of rode deployed.	uint16	Range:	0 to 6553.2 m	Resolution: 1x10E-1 m	l
7	Windlass Line Speed		•	ield Size: 2	Request Pa Command	arameter Optional Parameter: Optional
	DD044 Generic Speed					
	DF35 Speed Amount of rode deployed or retrieved per	uint16	Range:	0 to 655.32 m/s	Resolution: 1x10E-2 m	1 Knot = 0.5144 m/s
8	Anchor Docking Status	minute.	•	ield Size: ield Size: 2	Request Pa Command	arameter Optional Parameter: Optional
	DD482 Anchor Docking States			0 = Not docked 1 = Fully docked 2 = Error 3 = Data not avail	able	
	DF52 Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to construct bit fields
	Indicates current physical state of anchor been fully docked.	docking. Us	ed in autor	matic docking situations	to report when the anchor has	\$
9	Windlass Operating Events		,	ield Size: ield Size: <mark>6</mark>	Request Pa Command	arameter Optional Parameter: Note 2
	DD483 Windlass Operating Event	s		0bxxxxx1 = Syste 0bxxxx1x = Senso 0bxxx1xx = No w 0bxx1xxx = Retri- boat, so more care	or error rindlass motion detected eval docking distance reached e can be taken to complete doc of rode reached (rode has been	
				0b1xxxxx = Reserved	rved	

Anchor Windlass Monitoring Status

PGN: 128778 hex: 1F70A

This PGN is used to provide the monitoring status and data relevant to a specific Anchor Windlass and can be used with Command Group Function (PGN 126208) to command windlass and anchoring equipment.

The Windlass Identifier Field (Field 2) specifies which windlass the PGN message relates to and all following data fields refer only to that windlass.

This PGN has several transmission rates dependent upon windlass operation: Static is 5s, Dynamic is 500ms. The message will be broadcasted periodically, but can also be requested as required. The default static update rate is 5 seconds to reduce bandwidth use when the windlass is not operating.

The default dynamic update rate is 500ms to provide the status of activity while the windlass is operating.

This PGN can be used with PGN 128776 to provide the windlass control status, and PGN 128777 to provide the operating status. The Sequence ID can be used to link the three windlass PGNs.

Fields output as "Unavailable" will be understood to be unsupported. Begin Request Support: A device receiving an ISO Request (PGN 059904) for this PGN, shall respond by providing as many of these PGNs as necessary for all windlass identifiers available. If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

- If no requested fields have been included with the Request Group Function then the response is to return one or more PGNs, just like responding to the ISO Request (PGN 059904).
- If the Request Group Function (PGN 126208) includes the Windlass Identifier then the response shall be filtered by this field and any other optional fields contained within this request resulting in one response.
- If all the fields requested are not valid then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported".
- If there are multiple request parameters and one or more but not all, are not valid, then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x3 = Access denied".

Beginning in Field 6 and for each request parameter, an appropriate value in the parameter error code field shall be provided.

End Request Support.

Begin Command Support: Every Command Group Function (PGN 126208) transmitted for this PGN shall contain a value for Windlass Identifier (Field 2). The value commanded shall identify which windlass the remaining commanded fields apply to.

Note 1: The flags within Windlass Monitoring Events (Field 3) may be manually reset by setting the flag bit value to 0 with the Command Group Function (PGN 126208). This command support is required.

End Command Support

Single Frame: Yes Priority Default: 4 Default Update Rate: 5000 milliseconds Frequency: 2 cycles per second

Destination: Global/Multica Query Support: Optional Command Support: Required ACK Ramnts: Yes

Field # Field Name

Anchor Windlass Monitoring Status

PGN: 128778 hex: 1F70A

1	Sequence ID		В		eld Size: eld Size:	1		Request Parameter Command Paramete	Prohibited	
	DD056 Se	equence ID		Dit i i	An u PGN differ relate in PC data	s from a single rent PGN transied data set. For SN 129026 to the set.	g number that b source address. missions identifi example, identified the Latitude and	inds information trans Identical SID values v fies those PGN transmi	nitted in two or more vithin two or more ssions as a single the COG and SOG values GN 129029 as a single	
				data set) 253 - 254 = reserved for future use						
					255 =			A recommends using b	inding SID values	
	DF53	Integer, 8 bit unsigned ui	nt8 Ra	nge:	0 to 252	•	Resolution:	1 bit Unit-	less number	
	An upward cou	unting number used to link this PG	N to other	related	PGNs ser	nt from the sam	ne source addre	ess.		
2	Windlass Id	dentifier	В		eld Size:	0		Request Parameter	Required	
	DD470 Id	lantifian		BIT FI	eld Size:			Command Parametenin a Virtual Device:	r: Required	
	DD470 Id	ientinei			0 - 2:		a function with	iii a viituai Bevice.		
	DF52	Bit field bi	t(n) Ra	nge:	Variable		Resolution:	1 Used	to construct bit fields	
3	Windlass M	Ionitoring Events	В		eld Size: eld Size:	8		Request Parameter Command Paramete	Optional r: Note 1	
	DD477 Windlass Monitoring Events				0bxx 0bxx 0bxx 0bxx	xx xx1x = Con xx x1xx = Con xx 1xxx = Man	troller under vo troller over curr troller over tem urfacturer defin	rent cut-out perature cut-out ed		
	DE52	Bit field bi	v De	ngo:	0bxx Variable		Resolution:	1xxxx to 0b1xxx xxxx	= Reserved to construct bit fields	
		eared when the condition is no long	. ()						to construct of ficial	
4	Controller \	Voltage	В	•	eld Size: eld Size:	1		Request Parameter Command Paramete	Optional Optional	
	DD490 C	ontroller Voltage								
		Voltage Medium, unsigne ui e of electronic windlass controller.	nt8 Ra	nge:	0 - 50.4		Resolution:	0.2 Volts		
5	Motor Curre	ent	В		eld Size: eld Size:	1		Request Parameter Command Paramete	Optional r: Optional	
	DD491 C	urrent, electric , medium unsigr	ed							
	DF122	Current, electric, Medium ui	nt8 Ra	nge:	0-252		Resolution:	1 Amp		
	Load current of	of electric windlass motor.								

Anchor Windlass Monitoring Status

DF52

Bit field

Used to align subsequent data on byte boundary.

PGN: 128778 hex: 1F70A

Used to construct bit fields

Byte Field Size: 2 Request Parameter 6 **Total Motor Time** Optional Bit Field Size: Command Parameter: Required DD268 Time Resolution: 1 minute **DF98** Time interval, medium, u uint16 Range: 0 - 65,532 minutes Total time windlass has operated since last reset. Request Parameter Byte Field Size: **NMEA Reserved** Bit Field Size: resv 8 Command Parameter: Variable number of reserved bits, all set to logic "1" **DD001** Reserved field

Resolution: 1

Range: Variable

bit(n)

Linear Actuator Control/Status

PGN: 128780 hex: 1F70C

This PGN is used to report the status of a device being controlled by an actuator.

Actuator is a broad description of any device that embodies moving an object between two fixed limits, such as raising or lowering an outboard engine assembly. In the context of this PGN, the word "Device" refers to the object being moved. In the case of multiple Actuators per controller, the Actuator Identifier field specifies which Actuator the PGN message is intended for, and all following data fields refer only to that Actuator. This PGN supports manufacturer calibrated systems and retrofit systems where it is impractical for the installer to enter the Maximum Travel distance of the device.

This PGN has several transmission rates dependent upon Actuator operation: Static (No Movement) is 5s, Dynamic (Movement) is 200ms, Control is 200ms.

The message will be broadcasted periodically and can be requested as required. The default update rate when the Actuator is not operating is 5 seconds to reduce device bandwidth; this update rate can be used to provide Linear Actuator device status to a Human Interface Device (HID).

The default update rate while the Actuator is operating is 200ms to provide increased status of position while the Actuator is operated.

The Actuator may be controlled or configured using the Command Group Function PGN (PGN 126208). Two methods of actuator control is possible, either continuous transmission of the Direction of Travel (Field 5) every 200ms or a single transmission of the Commanded Device Position (Field 2).

When using the continuous transmission of the Direction of Travel (Field 5) control method, the Command Group Function PGN (PGN 126208) must be repeated every 200ms. This rapid update rate allows a safety mechanism to be implemented in the application logic if continual command messages are not received within a suitable timeout period (for example 250ms).

Begin Request Support:

This PGN may be Requested with ISO Request 059904 or with NMEA request group function (126208). An ISO Request will result in a Status response PGN for each Actuator managed by the controller.

Response to a Request Group Function without an Actuator Identifier field will be the same as an ISO Request.

End Request Support.

Begin Command Support:

Command parameter support is required for Field 1 (Actuator Identifier).

- If actuator position control is implemented using Command Group Function (PGN 126208), then Field 2 (Commanded Device Position) and Field 5 (Direction of Travel) also require Command parameter support.
- The Acknowledge Group Function (PGN 126208) shall be sent in response to each Command Group Function (PGN 126208) indicating acceptance or rejection of the command.
- If the Command Group Function (PGN 126208) does not contain Field 1 (Actuator Identifier), then the appropriate response is the Acknowledge Group Function PGN (126208), containing PGN error code "0x4 = Request or Command is not supported".

There are two available methods for control: specific direction or specific position.

Note 1: To move an Actuator in a specific direction, the Command Group Function (PGN 126208) shall contain a value for Field 1 (Actuator Identifier) and the value for Field 5 (Direction of Travel). The Command Group Function shall be sent every 200ms until the required extension of the Actuator is reached.

Note 2: To move an Actuator to a specified position, the Command Group Function (PGN 126208) shall contain a value for Field 1 (Actuator Identifier) and Field 2 (Commanded Device Position). A subsequent command to stop the Actuator before the specified position is reached shall cause the Actuator to stop immediately.

This PGN shall be sent in response to each Command Group Function providing status of the Linear Actuator.

Linear Actuator Control/Status

PGN: 128780 hex: 1F70C

End Command Support.

Refer to Class and Function codes for Linear Actuator Types. Application examples are located in NMEA 2000 Appendix D.

Single Fr	ame: Y	Priority Default: 5	Default	t Update Rat	te:	<mark>5000</mark> milli	seconds	Frequency:	.2	cycles per sec	cond
Destinatio	n: <mark>Global</mark>	Query Support: Required	d Co	ommand Suppo	ort: Requ	ired	ACK Rqmnts: N	one			
ield#	Field Nar	ne									
1	Actuator Id	dentifier		Byte Field Bit Field	d Size: 1	1		Request Par Command P		Required Required	
	DD128 (Generic instance			1 = Ins 2 = Ins n = Ins 253 = 1 254 = 1	Reserved	here n < 253				
	DF53 For one or m	Integer, 8 bit unsigned ore Actuators the value 0x00 is	uint8 always us	Range: (sed for the firs		le Actuator.	Resolution:	1 bit	Unit-les	s number	
2	Command	ed Device Position		Byte Field Bit Field	d Size: 1	l		Request Par Command P		Optional Note 2	
	DD485 F	Range, Restricted Percentage			0-100% 254 = 1 255 = 1	-	vailable				
		Percent, Restricted Range lative position where 0% is stow	uint8 red and 1	Range: (00% is fully d			Resolution:	5x10E-1	0 = 0%, 100%	, 100 = 50%, 200	=
3	Device Pos	sition		Byte Field Bit Field	d Size: 1	I		Request Par Command F		Optional Optional	
	DD485 F	Range, Restricted Percentage			0-100% 254 = 1 255 = 1	-	vailable				
		Percent, Restricted Range lative position where 0% is stow	uint8 red and 1	Range: (00% is fully d			Resolution:	5x10E-1	0 = 0%, 100%	, 100 = 50%, 200	=
4	Maximum	Device Travel		Byte Field Bit Field	d Size: 2	2		Request Par Command P		Optional Optional	
	DD517 I	Depth, Short, Precise									
	DF126	Distance Short, Precise	uint16	Range: () to 65.53	2m	Resolution:	1x10E-3			
	This is the ma	aximum distance the device cor ailable" when not configured.	ntrolled by						0		

Linear Actuator Control/Status

PGN: 128780 hex: 1F70C

5 Direction of Travel

Byte Field Size:

Bit Field Size:

Command Parameter:

DD516 Direction of Travel

Position of Travel

Byte Field Size:

0 = Stow/Stowing,

Optional

Command Parameter:

Note 1

1 = Deploy/Deploying, 2 = Stop/Stopped, 3 = Data not available

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

Used by HID to command a controller which direction to move the actuator.

6 NMEA Reserved Byte Field Size: Request Parameter

Bit Field Size: resv 22 Command Parameter:

DD001 Reserved field Variable number of reserved bits, all set to logic "1"

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

Used to align subsequent data on a byte boundry

Position, Rapid Update

PGN: 129025 hex: 1F801

This PGN provides latitude and longitude referenced to WGS84. Being defined as single frame message, as opposed to other PGNs that include latitude and longitude and are defined as fast or multi-packet, this PGN lends itself to being transmitted more frequently without using up excessive bandwidth on the bus for the benefit of receiving equipment that may require rapid position updates.

Single Frame: Yes		Priority Default: 2	Defaul	t Update Rate:	100	milliseconds	Frequency:	10.	cycles per se	econd
Destinatio	n: Global	Query Support: Optional	C	ommand Support:	Optional	ACK Rqmnts: N	None			
ield#	Field N	ame								
1	Latitude			Byte Field S	Size: 4		Request Para	meter	Optional	
				Bit Field	Size:		Command Pa	rameter:	Optional	
	DD022	Latitude, WGS-84			Latitude refere	enced to WGS-84.				
	DF23	Latitude	int32	Range: +/-	90 deg	Resolution	1x10E-7 deg	"-" = Sc	outh, resolution ~	-1.1
								cm		
2	Longitud	de		Byte Field S	Size: 4		Request Para	meter	Optional	
				Bit Field	Size:	_	Command Pa	rameter:	Optional	
	DD023	Longitude, WGS-84			Longitude refe	erenced to WGS-84.				
	DF25	Longitude	int32	Range: +/-	180 deg	Resolution	1x10E-7 deg	"-" = W	est, resolution ~	1.1
								cm		

COG & SOG, Rapid Update

PGN: 129026 hex: 1F802

This PGN is a single frame PGN that provides Course Over Ground (COG) and Speed Over Ground (SOG). Being a single frame message, as opposed to other PGNs that include COG and SOG and are defined as multi-packet, this PGN lends itself to being transmitted more frequently, without using up excessive bandwidth on the bus. This may be of benefit to receiving equipment requiring rapid COG and SOG updates.

Single Fra	ame: Yes	Priority Default: 2	Default	Update Rate	e: 250	milliseconds	Frequency:	4.	cycles per second
Destination	n: Global	Query Support: Optional	Со	mmand Suppo	rt: Optional	ACK Rqmnts: N	None		
Field#	Field Na	ame							
1	Sequenc	e ID		Byte Field Bit Field	-		Request Para Command Pa		Optional Optional
	DD056	Sequence ID			PGNs from a different PGN related data s	ounting number that single source addres N transmissions ident et. For example, ide 26 to the Latitude an	s. Identical SID v tifies those PGN ntical SID values	values with transmissi bind the	nin two or more ons as a single COG and SOG values
					0 - 252 = bin data set)	ding available (when	SID value reach	es 252, res	sume with 0 on next
					253 - 254 = r	reserved for future us	e		
					255 = No bin whenever pra	ding provided. NM	EA recommends	using bind	ling SID values
	DF53	Integer, 8 bit unsigned	uint8	Range: 0	to 252	Resolution	i 1 bit	Unit-les	ss number
2	COG Ref	ference		Byte Field Bit Field	l Size: d Size: <mark>2</mark>		Request Para Command Pa		Optional Optional
	DD117	Direction reference			0 = True, 1 = Magnetic 2 = Error, 3 = Null	·,			
	DF52	Bit field	bit(n)	Range: 🚺	ariable	Resolution	1: 1	Used to	construct bit fields
3	NMEA R	eserved		Byte Field Bit Field		6	Request Para Command Pa		
	DD001	Reserved field			Variable nun	nber of reserved bits,	all set to logic "1	."	
	DF52 Used to alig	Bit field gn subsequent data on a byte bou	bit(n) ndary.	Range: <mark>V</mark>	⁷ ariable	Resolution	n: 1	Used to	construct bit fields
4	Course C	Over Ground		Byte Field Bit Field	-		Request Para Command Pa		Optional Optional
	DD165	Course-Over-Ground (COG)			The direction	of the path over gro	und actually follo	owed by a	vessel.
	DF02	Angle	uint16	Range: <mark>()</mark>	to 2Pi rad	Resolution	2: 1x10E-4 rad		ion ~0.0057deg, 1 01745 rad
5	Speed O	ver Ground		Byte Field Bit Field			Request Para Command Pa		Optional Optional
	DD044	Generic Speed							
	DF35	Speed	uint16	Range: 0	to 655.32 m/s	Resolution	2: 1x10E-2 m/s	1 Knot	= 0.5144 m/s

COG & SOG, Rapid Update

PGN: 129026 hex: 1F802

6 NMEA Reserved

Byte Field Size:

Bit Field Size: resv 16

Request Parameter
Command Parameter:

DD001 Reserved field

Variable number of reserved bits, all set to logic "1"

DF52 Bit field

bit(n)

Range: Variable

Resolution: 1

Used to construct bit fields

Used to align subsequent data on a byte boundary.

Position Delta, High Precision Rapid Update

PGN: 129027 hex: 1F803

The "Position Delta, High Precision Rapid Update" Parameter Group is intended for applications where very high precision and very fast update rates are needed for position data. This PGN can provide delta position changes down to 1 millimeter with a delta time period accurate to 5 milliseconds. One example application for this PGN is high precision positioning and guidance of automated machinery such as tractor implements utilized in the agriculture industry. Similar high precision positioning needs in the marine industry may be satisfied with this parameter Group. This PGN only has meaning when it is associated (via the Sequence ID field) with another PGN such as the GNSS Position Data Parameter Group. Association with the "Altitude Delta, High Precision Rapid Update" PGN is needed for a complete 3D position update.

Single Fra	me: Yes	Priority Default: 2	Default	Update Ra	ate: 10	<mark>0</mark> milliseconds	Frequency:	10.	cycles per second
Destination	n: <mark>Global</mark>	Query Support: Optional	Co.	mmand Sup	oort: Optional	ACK Rqmnts:	None		
Field #	Field Na	ame							
1	Sequence	e ID		Byte Fie			Request Paran		Optional
				Bit Fi	eld Size:		Command Para	ameter:	Optional
	DD056	Sequence ID			PGNs from different P related data	counting number that a single source addre GN transmissions ider a set. For example, ide 9026 to the Latitude a	ss. Identical SID va ntifies those PGN tr entical SID values b	alues with ansmission of the	hin two or more ons as a single COG and SOG values
					0 - 252 = b data set)	inding available (whe	n SID value reache	s 252, re	sume with 0 on next
					253 - 254 =	reserved for future u	se		
					255 = No b whenever p	oinding provided. NM oractical.	EA recommends u	sing bind	ling SID values
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolutio	n: 1 bit	Unit-le	ss number
2	Time Delt	ta		Byte Fie Bit Fi	eld Size: 1 eld Size:		Request Paran Command Para		Optional Optional
	DD233	Time Value (Short resolution	5 msec)						
	DF88	Time Interval, short	uint8	Range:	0 to 1.26 sec	Resolutio	n: 5x10E-3 sec		
3	Latitude I	Delta		Byte Fie Bit Fi	eld Size: 3		Request Paran Command Para		Optional Optional
	DD234	Latitude							
	DF89	Latitude, 24 bit	int24	Range:	+/-83 sec (")	Resolutio	n: 1x10E-5 sec("))	
4	Longitud	e Delta		•	eld Size: 3		Request Paran Command Para		Optional Optional
	DD235	Longitude							
	DF90	Longitude, 24 bit	int24	Range:	+/-83 sec (")	Resolutio	n: 1x10E-5 sec("))	

Altitude Delta, High Precision Rapid Update

PGN: 129028 hex: 1F804

The "Altitude Delta, High Precision Rapid Update" Parameter Group is intended for applications where very high precision and very fast update rates are needed for altitude and course over ground data. This PGN can provide delta altitude changes down to 1 millimeter, a change in direction as small as 0.0057 degrees, and with a delta time period accurate to 5 milliseconds. One example application for this PGN is high precision positioning and guidance of automated machinery such as tractor implements utilized in the agriculture industry. Similar high precision positioning needs in the marine industry may be satisfied with this parameter Group. This PGN only has meaning when it is associated (via the Sequence ID field) with another PGN such as the GNSS Position Data Parameter Group. Association with the "Position Delta, High Precision Rapid Update" PGN is needed for a complete 3D position update.

Single Fr	ame: Yes	Priority Default: 2	Default	Update Ra	ate: 100 I	nilliseconds	Frequency:	10.	cycles per second
Destinatio	n: <mark>Global</mark>	Query Support: Optional	Co	mmand Supp	oort: Optional	ACK Rqmnts:	None		
ield#	Field Na	ame							
1	Sequenc	e ID		Byte Fie Bit Fie	eld Size: 1		Request Paran Command Para		Optional Optional
	DD056 Sequence ID				PGNs from a different PGN related data se	ingle source addr transmissions ide t. For example, ic		alues with ansmissi bind the	hin two or more
					0 - 252 = bind data set)	ing available (who	en SID value reache	s 252, res	sume with 0 on next
					253 - 254 = re	served for future t	ise		
					255 = No bind whenever prac		MEA recommends u	sing bind	ling SID values
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolutio	on: 1 bit	Unit-le	ss number
2	Time Del	ta		Byte Fie Bit Fie	eld Size: 1		Request Paran Command Para		Optional Optional
	DD233	Time Value (Short resolution	5 msec)						
	DF88	Time Interval, short	uint8	Range:	0 to 1.26 sec	Resolutio	on: 5x10E-3 sec		
3	GNSS Qu	uality		Byte Fie Bit Fie	eld Size: eld Size: 4		Request Paran Command Para		Optional Optional
	DD067	Quality, GNSS				x, NSS*, I Integer, (DR) mode, put, node, ed, S means no delibe	rate degradation (su frequencies are used		.) and higher ct atmospheric delays.
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	on: 1	Used to	construct bit fields

Altitude Delta, High Precision Rapid Update

PGN: 129028 hex: 1F804

4	Direction	Byte Field Size: Bit Field Size: 2				Request Param Command Para		Optional Optional	
	DD117	Direction reference			0 = True, 1 = Magnetic, 2 = Error, 3 = Null				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	: 1	Used to	construct bit fields
5	NMEA R	eserved		•	eld Size: iield Size: resv 2		Request Param Command Para		
	DD001	001 Reserved field			Variable number of reserved bits,				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	: 1	Used to	construct bit fields
	Used to ali	gn subsequent data on a byte bou	ndary.						
6	Course (Over Ground		•	eld Size: 2		Request Param Command Para		Optional Optional
	DD165	Course-Over-Ground (COG)			The direction of the p	path over grou	and actually follow	ved by a	vessel.
	DF02	Angle	uint16	Range:	0 to 2Pi rad	Resolution	1x10E-4 rad		tion ~0.0057deg, 1 01745 rad
7	Altitude	Delta		•	eld Size: 3		Request Param Command Para		Optional Optional
	DD236	Altitude							
	DF91	Altitude, 24 bit	int24	Range:	+/-8,388m	Resolution	1x10E-3m		

GNSS Position Data PGN: 129029 hex: 1F805

This PGN conveys a comprehensive set of Global Navigation Satellite System (GNSS) parameters, including position information. Equipment transmitting this PGN would typically also transmit PGN 129025 (Position – Rapid Update).

The Sequence ID may be used to synchronize the data with data from other PGNs originating from the same source. For example, a GPS chart plotter with an integrated depth finder might output both PGN 129025 (Position, Rapid Update) and PGN 128267 (Water Depth) for each position.

Single Fra	me: No	Priority Default: 3	Defau	lt Update Ra	te: 1000	milliseconds	Frequency:	1.	cycles per second
Destinat	tion: Globa	Query Support: Opti	onal	Command Supp	oort: Optional		ACK Rqmnts:	None	
ield#	Field N	ame						Origin	nal Reference ID # 19
1	Sequenc	e ID			ield Size: 1		Request P		Optional
				Bit F	ield Size:		Command	Parameter:	Optional
	DD056	Sequence ID				unting number used s . For example, the			together between together the COG,
					SOG and RAI		n position. 255		osition fix to tie it to.
	DF53	Integer, 8 bit unsigned	uint8	Range:		Resolution		I Init-le	ss number
	DISS	integer, o oit unsigned	uiiito	rtango.	0 10 232	7100014110	in 1 oit	omt ic	ss number
2	Position	date		Byte F	ield Size: 2		Request P	arameter	Optional
				Bit F	ield Size:		Command	Parameter:	Optional
	DD039	Generic date			Days since Jan	nuary 1, 1970, Da	te is relative to	UTC Time.	
	DF41	Date, day count	uint16	Range:	0 to 65,532 days	Resolutio	n: 1 day		uary 1, 1970, max =
								~179 y	ears
3	Position	time		Byte F	ield Size: 4		Request Pa	arameter	Optional
					ield Size:		Command	Parameter:	
	DD158	Generic time of day			24 hour clock,	0 = midnight, tin	ne is in UTC		
	DF06	Time of day	uint32	Range:	0 to 86,401 s	Resolutio	<i>n:</i> 1x10E-4 s		urs, 0 = midnight,
									llows for up to two conds per day
								•	
4	Latitude			Byte F	ield Size: 8		Request P		Optional
				Bit F	ield Size:		Command	Parameter:	Optional
	DD202	Latitude (Extended Resol	lution)		Latitude refere	enced to WGS-84			
	DF76	Latitude (Extended)	int64	Range:	+/- 90 deg	Resolutio	n: 1x10E-16		outh, resolution ~.01
								nanom	etei
5	Longitud	le		Byte F	ield Size: 8		Request P	arameter	Optional
				Bit F	ield Size:		Command	Parameter:	Optional
	DD203	Longitude (Extended Res	solution)		Longitude refe	erenced to WGS-84	1		
	DF77	Longitude (Extended)	int64	Range:	+/- 180 deg	Resolutio	n: 1x10E-16	<mark>deg</mark> "-" = W	Vest, resolution ~.01
								nanom	eter
6	Altitude			Byte F	ield Size: 8		Request P	arameter	Optional
				Bit F	ield Size:		Command	Parameter:	Optional
	DD204	Altitude (Extended Resol	ution)		Altitude refere	enced to WGS-84			
	DF78	Distance (Extended)	int64	Range:	+/-~9.223x10E+	12 m Resolutio	n: 1x10E-6 m	ı	

Version 3.000 GNSS Position Data
Printed: 10-Mar-22 15:50 PGN: 129029

GNSS Position Data PGN: 129029 hex: 1F805 Byte Field Size: 7 Request Parameter Type of System Optional Bit Field Size: 4 Command Parameter: Optional 0x0 = GPS**DD207** Type of System 0x1 = GLONASS0x2 = GPS + GLONASS0x3 = GPS + SBAS(WAAS)0x4 = GPS + SBAS + GLONASS0x5 - 0xF = Reserved for future combinations DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields **Optional** 8 Method, GNSS Byte Field Size: Request Parameter Bit Field Size: 4 Command Parameter: Optional DD067 Quality, GNSS 0 = no GPS1 = GNSS fix,2 = DGNSS fix,3 = Precise GNSS*, 4 = RTK Fixed Integer, 5 = RTK Float, 6 = Estimated (DR) mode,7 = Manual Input, 8 = Simulate mode, 9-13 = Reserved.15 = Null. *Precise GNSS means no deliberate degradation (such as SA) and higher resolution code (P-code), and 2 frequencies are used to correct atmospheric delays. Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) Range: Variable Position Fixed Method 9 Integrity Byte Field Size: Request Parameter Optional Bit Field Size: 2 Command Parameter: Optional 0 = No Integrity checking,* **DD209** GNSS Integrity 1 = Safe, 2 = Caution,3 = Unsafe* means the receiver does not have this capability Range: Variable DF52 Bit field bit(n) Resolution: 1 Used to construct bit fields Request Parameter Byte Field Size: **NMEA Reserved** 10 Bit Field Size: resv 6 Command Parameter: Variable number of reserved bits, all set to logic "1" **DD001** Reserved field Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) Range: Variable

Version 3.000 GNSS Position Data
Printed: 10-Mar-22 15:50 PGN: 129029

Byte Field Size:

Bit Field Size:

Range: 0 to 252

uint8

Request Parameter

Numeric count, event counter, sequence counter

Resolution: 1 bit

Command Parameter: Optional

Optional

Unit-less number

Used to align subsequent data on a byte boundary.

DD006 Generic counter, short

DF53 Integer, 8 bit unsigned

Number of SVs

11

PGN: 129029

									hex: 1F80
12	HDOP				Field Size: 2 Field Size:		Request Para Command Pa		Optional Optional
	DD055	DOP			geometry to po being introduc	- C	wer DOP value ponents: HDOP	is preferre (Horizont	d because less error is al), VDOP (Vertical).
	DF69	Ratio, Relative measure, small	int16	Range:	+/-327.64	Resolution:	1x10E-2	Unit-les	ss number
13	PDOP				Field Size: 2		Request Para Command Pa		Optional Optional
	DD055	DOP			geometry to po being introduc		tes the contribut wer DOP value ponents: HDOP	ion of sate is preferre (Horizont	ellite configuration d because less error is al), VDOP (Vertical)
	DF69	Ratio, Relative measure, small	int16	Range:	+/-327.64	Resolution:	1x10E-2	Unit-les	ss number
14	Geoidal	Separation			Field Size: 4 Field Size:		Request Para Command Pa		Optional Optional
	DD069	Geoidal Separation			the reference of	e between the earth el datum used in the pos erence datum is defin	sition solution, "	-" = mean-	
	DF15	Distance, signed	int32	Range:	+/-~2.147x10E+	<mark>7 m Resolution:</mark>	1x10E-2 m		
15	Number	of Reference Stations			Field Size: 1 Field Size:		Request Para Command Pa		Optional Optional
	DD006	Generic counter, short			Numeric coun	t, event counter, sequ	ience counter		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit	Unit-les	ss number
16	Reference	ce Station Type"1"		•	Field Size: Field Size: 4		Request Para Command Pa		Optional Optional
	DD070	Ref Station Type			Reference Sta 0x0=GPS; 0x1=GLONA 0x2 to 0xD=R 0XE=Error; 0XF=Null	SS;			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields
17	Reference	ce Station ID"1"		•	Field Size:		Request Para Command Pa		Optional Optional
	DD071	Ref Station				tion ID. Reference S erence document requ		s provided	by the Service
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields

GNSS Position Data

GNS	S Position Data		Р	GN: 129029 hex: 1F805	
18	Age of DGNSS Corrections "1"	Byte Field Size: 2	Request Parameter	Optional	

18	Age of DGNSS Corrections "1"			Byte Field Size: 2 Bit Field Size:			Request Parame Command Para		Optional Optional
	DD060	Differential Age		Age of Differential corrections					
	DF66	Time interval, .01sec	uint16	Range:	0 to 655.32s	Resolution	1x10E-2sec		
19	Referenc	e Station Type "n"		•	Field Size: Field Size: 4		Request Parame Command Para		Optional Optional
	DD070	Ref Station Type			Reference Station Ty 0x0=GPS; 0x1=GLONASS; 0x2 to 0xD=Reserved 0XE=Error; 0XF=Null				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields
		umber of fields, Field number 18	repeated						
20	Referenc	e Station ID "n"		,	Field Size: Field Size: 12		Request Parame Command Parame		Optional Optional
	DD071	Ref Station			Reference Station ID Provider.[Reference		Station number as provided by the Service equired]		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields
	Variable Nu	umber of fields, Field number 19	repeated						
21	Age of D	GNSS Reference Station "n		•	Field Size: 2 Field Size:		Request Parame Command Para		Optional Optional
	DD060	Differential Age			Age of Differential co	orrections			
	DF66	Time interval, .01sec	uint16	Range:	0 to 655.32s	Resolution:	1x10E-2sec		
	Variable Nu	umber of fields. Field number 20	reneated						

GNSS Position Data
PGN: 129029
hex: 1F805

19	Reference Station Type "n"	,	ield Size: iield Size: <mark>4</mark>		Request Parameter Command Parameter:	Optional Optional
	DD070 Ref Station Type		Reference Station Ty 0x0=GPS; 0x1=GLONASS; 0x2 = Galileo 0x3 = BDS (BeiDou) 0x4 = QZSS 0x5 = NavIC (IRNSS 0x6 to 0xD=Reserved 0XE=Error; 0XF=Null) S)		
	DF52 Bit field bit(n	Range:	Variable	Resolution: 1	Used to	construct bit fields
	Variable Number of fields, Field number 16 repeated					
20	Reference Station ID "n"	,	eld Size: iield Size: <mark>12</mark>		Request Parameter Command Parameter:	Optional Optional
	DD071 Ref Station		Reference Station ID Provider.[Reference		tion number as provided red]	by the Service
	DF52 Bit field bit(n	Range:	Variable	Resolution: 1	Used to	construct bit fields
	Variable Number of fields, Field number 17 repeated					
21	Age of DGNSS Reference Station "n"	,	eld Size: 2		Request Parameter Command Parameter:	Optional Optional
	DD060 Differential Age		Age of Differential co	orrections		
	DF66 Time interval, .01sec uint1 Variable Number of fields, Field number 18 repeated	•	0 to 655.32s	Resolution: 1	x10E-2sec	

Local Time Offset PGN: 129033

hex: 1F809

This PGN is used for the purpose of identifying the local time offset from UTC. It shall be transmitted on request or when the local offset is changed. The Time and Date Fields represent the current time. Current time is transmitted periodically using System Time PGN (126992). In Versions 1.301 and prior, the title of this PGN was "Time & Date". The default update rate was set at 1 second. The 1 second interval is not recommended for new designs. The description of this PGN was changed to clarify how and when it should be used.

Single Fr	ame: Yes	Priority Default: 3	Default	t Update Ra	te:	milliseconds	Frequency:	N/	cycles per s	econd
Destinatio	n: Global	Query Support: Optional	l Co	ommand Supp	ort: Optional	ACK Rqmnts.	None			
ield#	Field N	ame								
1	Date			Byte Fiel Bit Fie	d Size: 2 Id Size:		Request Parai Command Pai		Optional Optional	
	DD039	Generic date			Days since	January 1, 1970, D	ate is relative to UT	°C Time.		
	DF41	Date, day count	uint16	Range: () to 65,532 da	<mark>ys Resolutio</mark>	on: <mark>1 day</mark>	0 = Jan ~179 ye	aary 1, 1970, m ears	ax =
2	Time			•	d Size: 4		Request Parai Command Pai		Optional Optional	
	DD158	Generic time of day			24 hour clo	ck, 0 = midnight, ti	ime is in UTC			
	DF06	Time of day	uint32	Range: () to 86,401 s	Resolutio	on: <mark>1x10E-4 s</mark>	range al	ors, 0 = midnight lows for up to to onds per day	,
3	Local Of	fset, Minutes		Byte Fiel Bit Fie	d Size: 2		Request Parai Command Pai		Optional Optional	
	DD121	Time, Local Offset				from UTC to obtain vings Time, etc.	n Local Time. This	value inc	ludes Time Zon	ie,
	DF71	Time interval, medium	int16	Range: -	+/-32,764 min	utes Resolution	on: 1.0 minute			

PGN: 129038 hex: 1F80E

This parameter group provides data associated with the ITU-R M.1371 Messages 1, 2, and 3 Position Reports, autonomous, assigned, and response to interrogation.

An AIS device may generate this parameter group either upon a VHF Data Link reception of Message 1, 2, or 3 (see ITU-R M.1371 for additional information), or upon a device's own transmission of a Message 1, 2, or 3.

Command Support Requirement for Rebroadcasting of Messages 1, 2, and 3 by an AIS Base Station:

Only AIS Base Stations shall accept the Command Group Function PGN 126208 with this PGN for Messages 1, 2, and 3. All other types of AIS devices shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".

The AIS Station commanded to rebroadcast an AIS Message 1, 2, or 3 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel

All data fields (except for NMEA Reserved fields, Communication State, and Sequence ID) must be commanded when using the Command Group Function (PGN 126208) for rebroadcasting.

Note 1: The Repeat Indicator Command Parameter is "Required". The value should reflect the number of previous transmissions for this specific AIS Message. The AIS Base Station will increment this field accordingly prior to transmission.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Command Support Requirement for Relay of "Man Over Board" information by an AIS Class A Station:

This Command Support is required for AIS Class A Stations and is an additional requirement beyond the minimum requirements of IEC 61993-2. This supports external shipboard Man Over Board systems with the capability to utilize the own ship AIS Class A Station to relay an appropriate AIS Message 1 indicating Man Over Board, for both Active and Test conditions.

The MOB relays should be commended no more than once per minute while the MOB is active. Performing the MOB relay requires an additional Message 14 with each MOB AIS Message 1. Both messages shall be used under active and test conditions. See the AIS Safety Related Broadcast Message (PGN 129802)

The following fields shall be commanded when performing the AIS Message 1 MOB relay:

Message ID shall be set to a value of 1

Note 1: The Repeat Indicator Command Parameter is "Required". Repeat Indicator shall be set to a value of 1 User ID shall be set to a value of 97099xxxx, where xxxx has a range from 0000 to 9999 and is intended to identify individual MOBs being reported.

Longitude and Latitude may be commanded with the position of the MOB if known, otherwise they should not be commanded. When not command, the Class A Station will use its current position.

Navigational Status shall be set to a value 14 for an Active MOB or a value of 15 for a Test MOB.

Note 2: The AIS Transceiver Information Command Parameter is "Required". AIS Transceiver Information shall be set to a value of 31.

All other PGN data fields (except for NMEA Reserved field(s), Sequence ID) shall be commanded with an appropriate value if known. If appropriate values are unknown, the fields should be commanded to their default values. If no default value is defined for a specific field, the field shall be commanded to the Data Type's "Data not available" value.

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Revisions:

June 2017 – New description, new notes in field 12, and new command support requirements. Expanded states in DD246 for AIS Transceiver Information and DD183 for Navigational Status fields.

-	rame: No	Priority Default: 4		Update Rate		milliseconds	Frequency:	NA cycles per second
Destination	on: <mark>Global</mark>	Query Support: Optional	Co	mmand Suppo	rt: Required	ACK Rqmnts:	Vone	
F <u>ield #</u> 1	Field Nar Message I	-		Byte Field	Size:		Request Paramete	er <mark>Optional</mark>
-	J			•	d Size: 6		Command Param	-
	DD188	AIS Message Identifier			Message Iden	tifier (range of 0 to	63).	
					See the latest	version of ITU-R M	I.1371 for more inform	nation.
	DF52	Bit field	bit(n)	Range: V	ariable	Resolution	n: 1 U	sed to construct bit fields
	2 = Assigned	ously Scheduled Position Report Me Scheduled Position Report Me response to interrogation) Posit	ssage,					
2	Repeat Inc	dicator		Byte Field	Size:		Request Paramete	er Optional
				Bit Field	d Size: 2		Command Parame	· ·
	DD185 A	AIS Repeater Indicator			(range of 0 to		now many times a mes	sage has been repeated
					0 = Default 1 = First retra 2 = Second re 3 = Final retra	etransmission		
					See the latest	version of ITU-R N	1.1371 for more information	mation.
	DF52	Bit field	bit(n)	Range: V	ariable	Resolution	n: 1 U	sed to construct bit fields
3	User ID			Byte Field Bit Field	-		Request Paramete Command Parame	
	DD010	Generic numeric ID, large			Number of ro	ute, waypoint, even	t, mark, etc.	
	DF55 MMSI numbe	Integer, 32 bit unsigned er of mobile station reporting its	uint32 position.	Range: 0	to 4,294,967,2	92 Resolution	n: <mark>1 bit U</mark>	nit-less number
4	Longitude			Byte Field Bit Field	-		Request Paramete	
	DD023 I	Longitude, WGS-84			Longitude ref	erenced to WGS-84		
	DF25 Longitude of	Longitude mobile station reporting its posi	int32	Range: +	/- 180 deg	Resolution	n: <mark>1x10E-7 deg</mark> "- cr	" = West, resolution ~1.1
5	Latitude			Byte Field Bit Field			Request Paramete	- 1
	DD022 I	Latitude, WGS-84			Latitude refer	enced to WGS-84.		

6	Position Accuracy			•	eld Size: ield Size: 1		Request Parameter Command Parameter:	Optional	
	DD184	AIS Position Accuracy		ып	<u> </u>	> 10m such as non	ndifferential GNSS (defa	•	
					See the latest versi	ion of ITU-R M.13	371 for more information	l.	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to	construct bit fields	
7	RAIM-fla	g		•	eld Size: ield Size: 1		Request Parameter Command Parameter:	Optional Required	
	DD189	AIS RAIM-flag			0 = RAIM not in u 1 = RAIM in use	use (default),			
							371 for more information		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to	construct bit fields	
8	Time Sta	mp		•	eld Size: ield Size: <mark>6</mark>		Request Parameter Command Parameter:	Optional Required	
	DD186	AIS Time Stamp			0-59 = UTC secon 60 = time stamp n 61 = positioning s 62 = Electronic po mode, 63 = positioning s See the latest vers	ot available (defau ystem is in manua osition fixing syste ystem is inoperativ	ault), ual input mode, stem operates in estimated (dead reckoning) tive		
	DF52	Bit field	bit(n)	Range:	Variable Variable	Resolution: 1		construct bit fields	
9	cog				eld Size: 2		Request Parameter Command Parameter:	Optional Required	
	DD165	Course-Over-Ground (COG)			The direction of th	ne path over groun	d actually followed by a	vessel.	
	DF02	Angle bile station reporting its position.	uint16	Range:	0 to 2Pi rad	Resolution: 1		ion ~0.0057deg, 1 01745 rad	
10	SOG			•	eld Size: 2		Request Parameter Command Parameter:	Optional Required	
	DD044	Generic Speed							
	DF35 SOG of mo	Speed bille station reporting its position.	uint16	Range:	0 to 655.32 m/s	Resolution: 1	x10E-2 m/s 1 Knot	= 0.5144 m/s	
11	Commur	nication State		•	eld Size: ield Size: <mark>19</mark>		Request Parameter Command Parameter:	Optional Prohibited	
	DD187	AIS Communication State		The Communic		nication State contains information used by the verithms and synchronization information		various TDMA slot	
					See the latest versi	ion of ITU-R M.13	371 for more information	ı.	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to	construct bit fields	

12	AIS Transceiver Information			•	eld Size: ield Size: 5	j	Request Param Command Para		Optional Note 2	
	DD246 AI	IS Transceiver Information			1 = Channe 2 = Channe 3 = Channe 4 = Own ir 5 = Channe 6 = Channe 7 = Channe 9 = Channe 10 - 30 = F 31 = AIS d The AIS trachannel of PGN. This sentence to The AIS trachansmission the approphymatical behavior of the transmission of transmission of the transmission	el A VDL reception, el B VDL reception, el B VDL reception, el A VDL transmission, formation not broadcas els A & B VDL transmisel C (VHF Channel 75) el D (VHF Channel 76) el C (VHF Channel 76) el C (VHF Channel 76) el D (VHF Channel 76) el C (VHF Channel 76) el C (VHF Channel 76) el D	st, ssion reception, reception, transmission, transmission, transmission, transmission, treated (values 0, 1, 6 as received and plane mechanism used Message. The second of the second at transmitted A transmitted A tield (value 4) idented into the appropriate a 1hz rate to repeat.	n, 7) iden aced into d in the l , 9) iden assmitted ame mec AIS Mes tifies an riate AIS ort to oth	tifies the reception the appropriate A NMEA 0183 VDM tifies the d and then placed in the sage. AIS message that PGN. This is the shipboard systematical procession of the sage of the sag	AIS M into ee
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	: 1	Used to	construct bit field	ls
13	True Headir	ng		•	eld Size: 2		Request Param Command Para		Optional Required	
	DD127 Ge	eneric Direction -True			Degrees clo	ockwise relative to True	North.			
		Angle of mobile station reporting its po	uint16 sition.	Range:	0 to 2Pi rad	Resolution	1x10E-4 rad		ion ~0.0057deg, 1 01745 rad	
14	Rate of Turn			-	eld Size: 2		Request Param Command Para		Optional Required	
	DD150 Ra	ate of Turn			+ = Bow to	irning to starboard, 1 de	eg/min = .00029 ra	id/sec		
	DF73	Angular rate, signed	int16	Range:	+/-1.0 rad/s	Resolution	1/32 x 10E-3 rad/s	Resolut	ion 0.1 deg/min	
	Rate of turn of mobile station reporting its position		tion.							

15	Navigational Status DD183 AIS Navigational Status		•	ield Size: ield Size: 4	Request Parar Command Par	meter Optional rameter: Required	
	DD183 AIS Navigational Status			HS, or MP, or IMO 10 = reserved for a dangerous goods (IMO hazard or po 11 = power driven 12 = power driven 13 = reserved for a dangerous driven 14 = AIS-SART (a	hmand, hoeuvrability, hing, ling, hture amendment of navigational O hazard or pollutant category C, future amendment of navigationa DG), harmful substances (HS) or flutant category A, wing in groun a vessel towing astern (regional us a vessel pushing ahead or towing	high speed craft (HSC), I status for ships carrying marine pollutants (MP), or d (WIG); se), alongside (regional use),	
	DF52 Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to construct bit fields	
16	Special Maneuver Indicator		•	ield Size: ield Size: <mark>2</mark>	Request Parai Command Pai	meter Optional rameter: Required	
	DD310 Special Maneuver Indicator				default) n special Maneuver ecial Maneuver (i.e.: regional pas	sing arrangement on Inland	
	DF52 Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to construct bit fields	
17	NMEA Reserved		•	ield Size: resv 2	Request Parai Command Pai		
	DD001 Reserved field			Variable number of	of reserved bits, all set to logic "1	"	
	DF52 Bit field Used to align subsequent data on a byte bo	bit(n) oundary.	Range:	Variable	Resolution: 1	Used to construct bit fields	
18	AIS Spare		•	ield Size: iield Size: resv 3	Request Paral Command Pal	meter Optional rameter: Required	
	DD311 AIS Spare Field			bits in NMEA net	of reserved bits, all set to logic "0 work messages are encoded with or reserved bits are to be encoded	"0". Normally, spare or reserved ith logic 1's, however for AIS	
	DF115 Bit field defaulting to zer	` ′		N2KUnitless	Resolution: 1	Special data format	
	This field mirrors the "Spare" bit field found AIS message can also be accommodated to			ing AIS message such t	hat future definition within the	applicable to AIS field that must be set to zero for a NULL data condition or when unused - applies to AI	

19	NMEA Reserved		Byte Field Size: Bit Field Size: resv 5			Parameter nd Parameter:	
	DD001 Reserved field			Variable num	ber of reserved bits, all set to lo	gic "1"	
	DF52 Bit field Used to align subsequent data on byte both	bit(n) undary.	Range:	Variable	Resolution: 1	Used to construct bit fields	
20	Sequence ID		Byte Field Size: 1 Bit Field Size:			Parameter Optional of Parameter: Optional	
	DD056 Sequence ID			PGNs from a different PGN related data se	single source address. Identical transmissions identifies those et. For example, identical SID	mation transmitted in two or more SID values within two or more PGN transmissions as a single values bind the COG and SOG values e values in PGN 129029 as a single	
			0 - 252 = binding data set)		ling available (when SID value	reaches 252, resume with 0 on next	
				253 - 254 = re	eserved for future use		
				255 = No bind whenever pract	ding provided. NMEA recommends using binding SID values tical.		
	DF53 Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution: 1 bit	Unit-less number	

PGN: 129039 hex: 1F80F

This parameter group provides data associated with the ITU-R M.1371 Messages 18 Standard Class B Equipment Position Report.

An AIS device may generate this parameter group either upon a VHF Data Link reception of Message 18 (see ITU-R M.1371 for additional information), or upon a device's own transmission of a Message 18.

Command Support Requirement for Rebroadcasting of Messages 18 by an AIS Base Station:

Only AIS Base Stations shall accept the Command Group Function PGN 126208 with this PGN for Messages 18. All other types of AIS devices shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".

The AIS Station commanded to rebroadcast an AIS Message 18 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel. All data fields (except for NMEA Reserved fields, Communication State, and Sequence ID) must be commanded when using the Command Group Function (PGN 126208) for rebroadcasting.

Note 1: The Repeat Indicator Command Parameter is "Required". The value should reflect the number of previous transmissions for this specific AIS Message. The AIS Base Station will increment this field accordingly prior to transmission.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Revisions:

June 2017 – New description, new notes in fields 11 and 22, renamed fields 14 and 15 to "AIS Spare", and new command support requirements.

Single Fra		Priority Default: 4 Query Support: Optiona		Update Rat	e: rt: Required	milliseconds ACK Rqmnts	Frequency: None	N <i>A</i>	cycles per se	∍cond
Field #	Field Na	ame								
1	Message	ID		Byte Field Bit Fiel	l Size: d Size: <mark>6</mark>		Request Par Command P		Optional Required	
	DD188	AIS Message Identifier			Message Idea	ntifier (range of 0 to	o 63).			
					See the latest	t version of ITU-R	M.1371 for more	information	1.	
	DF52	Bit field	bit(n)	Range: \	ariable	Resolution	on: 1	Used to	construct bit fie	elds
	18 = Stand	ard Class B Equipment Position	Report Mes	ssage						
2	Repeat Indicator			Byte Field Size:			Request Par		Optional	
				Bit Fiel	d Size: 2		Command P	arameter:	Note 1	
	DD185	AIS Repeater Indicator			Used by the to (range of 0 to	repeater to indicate o 3).	how many times	a message l	has been repeated	d
	0 = Default 1 = First retransmission 2 = Second retransmission 3 = Final retransmission									
	DF52	Bit field	bit(n)	Range: \	ariable	st version of ITU-R Resolution			n. construct bit fie	elds

3	User ID				eld Size: 4		Request Paran Command Para		Optional Required
	DD010	Generic numeric ID, large			Number of ro	oute, waypoint, event,	mark, etc.		
	DF55 MMSI num	Integer, 32 bit unsigned ber of mobile station reporting pos	uint32	Range:	0 to 4,294,967,2	<mark>292 Resolution</mark> .	1 bit	Unit-le	ss number
4	Longitud	le			eld Size: 4		Request Paran Command Para		Optional Required
	DD023	Longitude, WGS-84			Longitude re	ferenced to WGS-84.			
	DF25 Longitude	Longitude of mobile station reporting position	int32	Range:	+/- 180 deg	Resolution.	1x10E-7 deg	"-" = W cm	/est, resolution ~1.1
5	Latitude				eld Size: 4		Request Paran Command Para		Optional Required
	DD022	Latitude, WGS-84			Latitude refe	renced to WGS-84.			
	DF23 Latitude of	Latitude mobile station reporting position.	int32	Range:	+/- 90 deg	Resolution.	1x10E-7 deg	"-" = Se cm	outh, resolution ~1.1
6	Position	Accuracy		-	eld Size: ield Size: 1		Request Paran Command Para		Optional Required
	DD184	AIS Position Accuracy $0 = low \ accuracy > 10m \ such \ as \ nondifferential GNSS (default), 1 = high \ accuracy < 10m \ such \ as \ DGNSS$							
					See the latest	version of ITU-R M.	1371 for more inf	ormation	1.
	DF52	Bit field	bit(n)	Range:	Variable	Resolution.	1	Used to	construct bit fields
7	RAIM-fla	g		•	eld Size: ield Size: 1		Request Paran Command Para		Optional Required
	DD189	AIS RAIM-flag		0 = RAIM not in use (default), 1 = RAIM in use					
					See the latest	version of ITU-R M.	1371 for more inf	ormation	1.
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
8	Time Sta	тр		•	eld Size: ield Size: 6		Request Paran Command Para		Optional Required
	DD186	AIS Time Stamp			60 = time sta 61 = position 62 = Electron mode,	second when the repo imp not available (def ing system is in manu- nic position fixing sys- ting system is inopera	ault), ual input mode, tem operates in es	stimated	(dead reckoning)
					See the lates	t version of ITU-R M	.1371 for more in	formatio	n.
	DF52	Bit field	bit(n)	Range:	Variable	Resolution.	1	Used to	construct bit fields

AIS Class B Position Report PGN: 129039 hex: 1F80F Byte Field Size: 2 Request Parameter COG 9 Optional Bit Field Size: Command Parameter: Required

DD165 Course-Over-Ground (COG) The direction of the path over ground actually followed by a vessel. uint16 Range: 0 to 2Pi rad Resolution: 1x10E-4 rad Resolution ~0.0057deg, 1 DF02 Angle

COG of mobile station reporting position.

deg = .01745 rad

10 SOG Byte Field Size: Request Parameter Optional Bit Field Size: Command Parameter: Required

DD044 Generic Speed

uint16 Range: 0 to 655.32 m/s **Resolution:** $1 \times 10E-2 \text{ m/s}$ 1 Knot = 0.5144 m/s DF35 Speed

SOG of mobile station reporting position.

11 **Communication State** Byte Field Size: Request Parameter Optional Command Parameter: Prohibited Bit Field Size: 19

DD187 AIS Communication State The Communication State contains information used by the various TDMA slot allocation algorithms and synchronization information

See the latest version of ITU-R M.1371 for more information.

Bit field Range: Variable Resolution: 1 Used to construct bit fields DF52 bit(n)

For Class B "CS" this field should be filled with the following value: 11000000000000110

AIS Transceiver Information 12

Byte Field Size:

Request Parameter

Command Parameter: Note 2

Optional

DD246 AIS Transceiver Information

Bit Field Size: 5 0 = Channel A VDL reception,

- 1 = Channel B VDL reception,
- 2 = Channel A VDL transmission,
- 3 = Channel B VDL transmission,
- 4 = Own information not broadcast,
- 5 = Channels A & B VDL transmission
- 6 = Channel C (VHF Channel 75) reception,
- 7 = Channel D (VHF Channel 76) reception,
- 8 = Channel C (VHF Channel 75) transmission,
- 9 = Channel D (VHF Channel 76) transmission,
- 10 30 = Reserved
- 31 = AIS device determines channel for Transmission

The AIS transceiver Information field (values 0, 1, 6, 7) identifies the reception channel of an AIS message that was received and placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDM sentence to report a received AIS Message.

The AIS transceiver Information field (values 2, 3, 8, 9) identifies the transmission channel of an AIS message that was transmitted and then placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDO sentence to report a transmitted AIS Message.

The AIS transceiver Information field (value 4) identifies an AIS message that was not transmitted and then placed into the appropriate AIS PGN. This is provided by AIS Mobile Stations at a 1hz rate to report to other shipboard systems its current dynamic navigation data.

The AIS transceiver Information field (values 5 and 31) are only used with the Command Group Function PGN 126208.

Bit field Resolution: 1 Used to construct bit fields bit(n) Range: Variable

DF52

AIS (Class B Position Report		PC	SN: 129039 hex: 1F80F		
13	True Heading	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Paramet			
	DD167 Heading	expressed in angular un		ship actually points or heads at any instant, ference direction, usually from 000 at the gh 359 degrees.		
	DF02 Angle uint1 True heading of mobile station reporting position. A			solution ~0.0057deg, 1 g = .01745 rad		
14	AIS Spare	Byte Field Size: Bit Field Size: resv 8	Request Parameter Command Paramet			
	DD311 AIS Spare Field	bits in NMEA network i	erved bits, all set to logic "0". Not messages are encoded with logic erved bits are to be encoded as lo	1's, however for AIS		
	DF115 Bit field defaulting to zer bit0 (in This field mirrors the "Reserved for Regional Applic that future definition within the AIS message can also bits in NMEA network messages are encoded with lencoded as logic 0's.	ations" bit field found within the correspondi	ng AIS message such app mus ally, spare or reserved I or reserved bits are to be whe spare	ecial data format olicable to AIS field that st be set to zero for a ILL data condition or en unused - applies to AIS re fields and AIS fields t are for future use		
15	AIS Spare	Byte Field Size: Bit Field Size: resv 2	Request Parameter			
	DD311 AIS Spare Field	Variable number of rese	erved bits, all set to logic "0". Not messages are encoded with logic erved bits are to be encoded as lo	rmally, spare or reserved 1's, however for AIS		
	DF115 Bit field defaulting to zer bit0()			ecial data format		
	This field mirrors the "Reserved for Regional Application that future definition within the AIS message can also bits in NMEA Network messages are encoded with encoded as logic 0's.	ations" bit field found within the correspondi	ally, spare or reserved or reserved bits are to be spar	olicable to AIS field that st be set to zero for a ILL data condition or en unused - applies to AIS re fields and AIS fields t are for future use		
16	Class B unit flag	Byte Field Size: Bit Field Size:	Request Parameter Command Paramet	•		
	DD294 AIS ClassB Unit Flag	0 = Class B SOTDMA u 1 = Class B "CS" unit	unit			
	DF52 Bit field bit(n		TTU-R M.1371 for more information and informat	ation. ed to construct bit fields		
17	Class B Display Flag	Byte Field Size: Bit Field Size: 1	Request Parameter Command Paramet	r Optional		
	DD295 AIS Class B Display Flag	0 = No display available and 14	e; not capable of displaying ITU-	R M.1371 Messages12		

See the latest version of ITU-R M.1371 for more information.

Used to construct bit fields

Resolution: 1

bit(n) Range: Variable

DF52 Bit field

AIS Class B Position Report PGN: 129039

hex: 1F80F

18	Class B	B DSC Flag		•	eld Size: ield Size:	1		Request Param Command Para		Optional Required
	DD296	AIS Class B DSC Flag				Not equipped wit Equipped with D		on dedicated or time-	-shared)	
					See 1	he latest version	of ITU-R M.	1371 for more info	ormation	1.
	DF52	Bit field	bit(n)	Range:	Variable	;	Resolution:	1	Used to	construct bit fields
19	Class B	Band Flag		•	eld Size: ield Size:	1		Request Param Command Para		Optional Required
	DD297	AIS Class B Band Flag			1 = 0		ting over the v	upper 525 kHz bar whole marine band		
					See 1	he latest version	of ITU-R M.	1371 for more infe	ormation	1.
	DF52	Bit field	bit(n)	Range:	Variable	;	Resolution:	1	Used to	construct bit fields
20	Class B	Msg 22 Flag		•	eld Size: ield Size:	1		Request Param Command Para		Optional Required
	DD298	AIS Class B Msg 22 Flag				No frequency mar Frequency manag			erating o	n AIS1 and AIS2 only
					See 1	he latest version	of ITU-R M.	1371 for more infe	ormation	1.
	DF52	Bit field	bit(n)	Range:	Variable	;	Resolution:	1	Used to	construct bit fields
21	Mode Fla	ag		•	eld Size: ield Size:	1		Request Param Command Para		Optional Required
	DD299	AIS Mode Flag				Station operating Station operating		us mode (default) node		
					See 1	he latest version	of ITU-R M.	1371 for more info	ormation	1.
	DF52	Bit field	bit(n)	Range:	Variable	;	Resolution:	1	Used to	construct bit fields
22	Commur	nication State Selector Flag		•	eld Size: ield Size:	1		Request Param Command Para		Optional Required
	DD245	AIS Communication State Se	lctor Flag			OTDMA commu DMA communic		,		
					See 1	he latest version	of ITU-R M.	1371 for more infe	ormation	1.
	DF52 Always a v	Bit field alue of 1 for Class-B "CS"	bit(n)	Range:	Variable	;	Resolution:	1	Used to	construct bit fields
23	NMEA R	eserved		•	eld Size:	resv 7		Request Param Command Para		Optional Optional
	DD001	Reserved field					eserved bits, a	ıll set to logic "1"		- paronar
	DF52	Bit field gn subsequent data on byte bound	bit(n) lary.	Range:	Variable		Resolution:		Used to	construct bit fields

PGN: 129039 hex: 1F80F

Sequence ID 24

Byte Field Size: 1 Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD056 Sequence ID

An upward counting number that binds information transmitted in two or more PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG values in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single

data set.

0 - 252 = binding available (when SID value reaches 252, resume with 0 on next data set)

253 - 254 = reserved for future use

255 = No binding provided. NMEA recommends using binding SID values whenever practical.

Integer, 8 bit unsigned uint8

Range: 0 to 252

Resolution: 1 bit

Unit-less number

PGN: 129040 hex: 1F810

This parameter group provides data associated with the ITU-R M.1371 AIS Message 19 AIS Class B Extended Position Report. An AIS device may generate this parameter group either upon a VHF Data Link reception of Message 19, upon receipt of an ISO or NMEA request PGN, in response to an accepted NMEA Command Group Function, or upon a device's own transmission of a Message 19.

The Sequence ID field (SID) is used to link this PGN to other related PGN's from the same source address. When no linkage exists, the value of the SID shall be set to 255.

ITU-R M.1371-5 dated (02/2014) deprecated use of Message 19 for future equipment. For future equipment: this AIS message is not needed and should not be used. All content is covered by Message 18, Message 24A and 24B.

Legacy AIS equipment may still transmit Message 19 and new AIS equipment should support this PGN for the reception of Message 19.

No Command support is necessary for this PGN as that functionality is provided by Message 24A and 24B.

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Revisions:

June 2017 - New description, renamed fields 11 and 12 to "AIS Spare".

Single Fra	ame: No	Priority Default: 4	Default	t Update R	Pate:	milliseconds	Frequency:	NA cycles per second	
Destinatio	n: Global	Query Support: Option	i <mark>al</mark> Co	ommand Sup	port: Optional	ACK Rqmnts	None		
Field #	Field N	ame							
1	Message	e ID		Byte Field Size: Bit Field Size: 6			Request Parameter Optional Command Parameter: Optional		
	DD188	AIS Message Identifier			Message Ide	entifier (range of 0 t			
			See the lates			test version of ITU-R M.1371 for more information.			
	DF52	Bit field	bit(n)	Range:	Variable	Resoluti	on: 1	Used to construct bit fields	
	19 = Exten	ded Class B Equipment Positio	n Report						
	Repeat Indicator		•	eld Size: ield Size: 2	Request Parameter Optional Command Parameter: Optional				
	DD185	AIS Repeater Indicator			Used by the (range of 0 t	1	how many times a	message has been repeated	
					0 = Default 1 = First ret: 2 = Second 3 = Final ret	retransmission			
					See the late	st version of ITU-R	M.1371 for more in	nformation.	
	DF52	Bit field	bit(n)	Range:	Variable	Resoluti	on: 1	Used to construct bit fields	
3	User ID			•	eld Size: 4		Request Parai Command Pai	meter Optional optional	
	DD010	Generic numeric ID, large			Number of 1	oute, waypoint, eve	ent, mark, etc.		
	DF55 MMSI num	Integer, 32 bit unsigned ber of mobile station reporting p	uint32 position.	Range:	0 to 4,294,967	, <mark>292 Resoluti</mark>	on: 1 bit	Unit-less number	

4	Longitud	de			eld Size: 4 ield Size:		Request Paran Command Para		Optional Optional		
	DD023	Longitude, WGS-84			Longitude re	ferenced to WGS-84.					
	DF25 Longitude	Longitude of mobile station reporting position	int32	Range:	+/- 180 deg	Resolution:	1x10E-7 deg	"-" = W cm	Vest, resolution ∼1.1		
5	Latitude				eld Size: 4		Request Paran Command Para		Optional Optional		
	DD022	Latitude, WGS-84			Latitude refe	renced to WGS-84.					
	DF23 Latitude of	Latitude mobile station reporting position.	int32	Range:	+/- 90 deg	Resolution:	1x10E-7 deg	"-" = Se cm	outh, resolution ~1.1		
6	Position	Accuracy		•	eld Size: ield Size: 1		Request Paran Command Para		Optional Optional		
	DD184	AIS Position Accuracy			1 = high acc	racy > 10m such as no uracy < 10m such as I t version of ITU-R M.	OGNSS	`	~		
	DF52	Bit field	bit(n)	Range:	Variable Variable	Resolution:			construct bit fields		
7	RAIM-fla	g		•	eld Size: ield Size: 1		Request Paran Command Para		Optional Optional		
	DD189 AIS RAIM-flag	AIS RAIM-flag			1 = RAIM in		1051 0				
	DF52	Bit field	bit(n)	Range:	Variable	t version of ITU-R M. Resolution:			o construct bit fields		
8	Time Sta	nmp			eld Size: ield Size: <mark>6</mark>		Request Paran Command Para		Optional Optional		
	DD186 AIS Time Stamp				60 = time sta 61 = position 62 = Electron mode,	second when the repo imp not available (def- ning system is in manu- nic position fixing sys- ning system is inopera	ault), ual input mode, tem operates in e		(dead reckoning)		
				See the latest version of ITU-R M.1371 for more information.							
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields		
9	COG			-	eld Size: 2 ield Size:		Request Paran Command Para		Optional Optional		
	DD165	Course-Over-Ground (COG)			The direction	n of the path over grou	and actually follow	wed by a	vessel.		
	DF02	Angle	uint16	Range:	0 to 2Pi rad	Resolution	1x10E-4 rad		tion ~0.0057deg, 1 01745 rad		
	COG OI MC	obile station reporting position.						9			

AIS Class B Extended Position Report PGN: 129040 hex: 1F810

10SOGByte Field Size:2Request ParameterOptionalBit Field Size:Command Parameter:Optional

DD044 Generic Speed

DF35 Speed **uint16** Range: 0 to 655.32 m/s Resolution: 1x10E-2 m/s 1 Knot = 0.5144 m/s

SOG of mobile station reporting position.

11AIS SpareByte Field Size:Request ParameterBit Field Size:resv 8Command Parameter:

DD311 AIS Spare Field Variable number of reserved bits, all set to logic "0". Normally, spare or reserved bits in NMEA network messages are encoded with logic 1's, however for AIS

PGNs the unused or reserved bits are to be encoded as logic 0's.

DF115 Bit field defaulting to zer bit0(n) Range: N2KUnitless Resolution: 1 Special data

This field mirrors the "Reserved for Regional Applications" bit field found within the corresponding AIS message such that future definition within the AIS message can also be accommodated within this field. Normally, spare or reserved bits in NMEA Network Messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's.

Special data format applicable to AIS field that must be set to zero for a NULL data condition or when unused - applies to AIS spare fields and AIS fields that are for future use

12 AIS Spare

Byte Field Size: Request Parameter

Bit Field Size: resv 4

Command Parameter:

DD311 AIS Spare Field

Variable number of reserved bits, all set to logic "0". Normally, spare or reserved bits in NMEA network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's.

DF115 Bit field defaulting to zer bit0(n) Range: N2KUnitless Resolution: 1

This field mirrors the "Reserved for Regional Applications" bit field found within the corresponding AIS message such that future definition within the AIS message can also be accommodated within this field. Normally, spare or reserved bits in NMEA Network Messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's.

Special data format applicable to AIS field that must be set to zero for a NULL data condition or when unused - applies to AIS spare fields and AIS fields that are for future use

NMEA Reserved

Byte Field Size: Request Parameter

Bit Field Size: resv 4 Command Parameter:

Variable number of reserved bits, all set to logic "1"

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

Used to align subsequent data on byte boundary.

14Ship/Cargo TypeByte Field Size:Request ParameterOptionalBit Field Size:8Command Parameter:Optional

DD193 Ship/Cargo Type 0=Not Available or no ship (default),

1-99= See the latest version of ITU-R M.1371,

100-199=Reserved for Regional (See the latest version of ITU-R M.1371), 200-255=Reserved for future (See the latest version of ITU-R M.1371).

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

15	True Heading	Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional		
	DD165 Course-Over-Ground (COG)	The direction of the path over g	round actually followed by a vessel.		
	DF02 Angle uint16 True Heading of mobile station reporting its position.	Range: 0 to 2Pi rad Resoluti	on: 1x10E-4 rad Resolution ~0.0057deg, 1 deg = .01745 rad		
16	NMEA Reserved	Byte Field Size: Bit Field Size: resv 4	Request Parameter Command Parameter:		
	DD001 Reserved field	Variable number of reserved bit	ts, all set to logic "1"		
	DF52 Bit field bit(n)	Range: Variable Resoluti	on: 1 Used to construct bit fields		
	Used to align subsequent data on byte boundary.				
17	Type of Electronic Positioning Device	Byte Field Size: Bit Field Size: 4	Request Parameter Optional Command Parameter: Optional		
	DD191 AIS Electronic Positioning Device Type	1 = GPS 2 = GLONASS 3 = Combined GPS/GLONASS 4 = Loran-C 5 = Chayka 6 = Integrated Navigation Syste 7 = Surveyed; For fixed AtoN a	em nd virtual AtoN, the charted position should be ances its function as a radar reference target		
	DF52 Bit field bit(n)	Range: Variable Resoluti	on: 1 Used to construct bit fields		
18	Ship Length	Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional		
	DD194 Distance, medium	Dependent upon PG Field defin	ition.		
	DF75 Distance, Medium uint16		on: <mark>1x10E-1 m</mark>		
	Length of mobile station reporting its position. A value of	of 65535 indicates that data is not available.			
19	Ship Beam	Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional		
	DD194 Distance, medium	Dependent upon PG Field defin	ition.		
	DF75 Distance, Medium uint16 Beam of mobile station reporting its position. A value of		on: 1x10E-1 m		
20	Position Reference Point from Starboard	Byte Field Size: Bit Field Size:	Request Parameter Command Parameter: Optional Optional		
	DD194 Distance, medium	Dependent upon PG Field defin	ion.		
	DF75 Distance, Medium uint16 Position reference point from starboard side of mobile sis not available.		^{2:} <mark>1x10E-1 m</mark> cates that data		

21	Position	Reference Point aft of Ship's	s Bow		eld Size: 2		Request Param Command Para		Optional Optional
	DD194	Distance, medium			Dependent upon	PG Field definition	on.		
	DF75 Position reliation is not available	Distance, Medium ference point from aft of ship's bo able.	uint16 w of mobil		0 to 6553.2 m eporting its position. A		T <mark>1x10E-1 m</mark> dicates that data		
22	Name			•	eld Size: char ield Size:		Request Param Command Para		Optional Optional
	DD192	Generic String, ASCII, Fixed	l length		Length specified	by PGN field def	inition.		
	DF63 This is a 20	String, fixed) character string, see ITU-R M.1:	` ′		0 to 1,785 characte nation.	rs Resolution.	1 char	count n specific Data D charact not ava	785 bytes. Character not included, length is ed by application in ictionary. Unused ters shall be treated as itlable, and filled with = Data not available.
23	Data Ter	minal Equipment (DTE)		•	eld Size: ield Size: 1		Request Param Command Para		Optional Optional
	DD242	Data Terminal Equipment (E	TE)		0=Available, 1=not available.	sion of ITU-R M.	1371 for more info	ormatio	n.
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
24	Mode Fla	ag		•	eld Size: ield Size: 1		Request Param Command Para		Optional Optional
	DD299	AIS Mode Flag			1 = Station opera		,•		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1371 for more info		n. construct bit fields
25	AIS Spar	e		•	eld Size: ield Size: resv 4]	Request Param Command Para		
	DD311	AIS Spare Field			bits in NMEA no	etwork messages a	all set to logic "0". are encoded with loare to be encoded a	gic 1's,	
	This field m	5 Bit field defaulting to zer nirrors the "Spare" bit field found of ge can also be accommodated with logic 1's, however for AIS	vithin the c	correspond eld. Norma	lly, spare or reserved b	oits in NMEA Netv	ion within the vork Messages	applica must be NULL when u spare fi	data format ble to AIS field that e set to zero for a data condition or mused - applies to AIS fields and AIS fields e for future use

26	AIS Transceiver Information		•	ield Size: ield Size: 5		Request Parameter Command Parameter:	Optional Optional					
	DD246 AIS Transceiver Information	n	Jan	0 = Channel 1 = Channel 2 = Channel 3 = Channel 4 = Own info 5 = Channel 6 = Channel 7 = Channel 8 = Channel 9 = Channel 10 - 30 = Re	D (VHF Channel 76) C (VHF Channel 75) D (VHF Channel 76) served	t, ssion reception, reception, transmission, transmission,	Ориона					
				6 = Channel C (VHF Channel 75) reception, 7 = Channel D (VHF Channel 76) reception, 8 = Channel D (VHF Channel 75) transmission, 9 = Channel D (VHF Channel 75) transmission, 10 - 30 = Reserved 31 = AIS device determines channel for Transmission The AIS transceiver Information field (values 0, 1, 6, 7) identifies the reception channel of an AIS message that was received and placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDM sentence to report a received AIS Message. The AIS transceiver Information field (values 2, 3, 8, 9) identifies the transmission channel of an AIS message that was transmitted and then placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDO sentence to report a transmitted AIS Message. The AIS transceiver Information field (value 4) identifies an AIS message that was not transmitted and then placed into the appropriate AIS PGN. This is provided by AIS Mobile Stations at a 1hz rate to report to other shipboard systems its current dynamic navigation data. The AIS transceiver Information field (values 5 and 31) are only used with the Command Group Function PGN 126208. Variable Resolution: 1 Used to construct bit fields Tield Size: Request Parameter Command Parameter: Variable Resolution: 1 Used to construct bit fields								
				transmission the appropria	PGN. This corresponds to the same mechanism used in the NMEA 0183 VDM sentence to report a received AIS Message. The AIS transceiver Information field (values 2, 3, 8, 9) identifies the transmission channel of an AIS message that was transmitted and then placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDO sentence to report a transmitted AIS Message. The AIS transceiver Information field (value 4) identifies an AIS message that was not transmitted and then placed into the appropriate AIS PGN. This is provided by AIS Mobile Stations at a 1hz rate to report to other shipboard systems its current dynamic navigation data.							
				was not trans provided by	NMEA 0183 VDO sentence to report a transmitted AIS Message. The AIS transceiver Information field (value 4) identifies an AIS message that was not transmitted and then placed into the appropriate AIS PGN. This is provided by AIS Mobile Stations at a 1hz rate to report to other shipboard systems its current dynamic navigation data. The AIS transceiver Information field (values 5 and 31) are only used with the							
				The AIS transceiver Information field (values 5 and 31) are only used with the Command Group Function PGN 126208.								
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields					
27	NMEA Reserved		•		5	•						
	DD001 Reserved field			Variable nur	mber of reserved bits, a	ıll set to logic "1"						
	DF52 Bit field Used to align subsequent data on byte both	bit(n) undary.	Range:	Variable	Resolution:	1 Used to	o construct bit fields					
28	Sequence ID			ield Size: 1		Request Parameter Command Parameter:	Optional Optional					
	DD056 Sequence ID			An upward counting number that binds information transmitted in two or more PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG val in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a sing data set.								
				0 - 252 = bir data set)	nding available (when	SID value reaches 252, re	sume with 0 on next					
					reserved for future use		ti am i					
				255 = No bin whenever pro		A recommends using bin	ding SID values					
	DF53 Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit Unit-le	ss number					

PGN: 129041 hex: 1F811

This parameter group provides data associated with the ITU-R M.1371 AIS Message 21 Aids to Navigation (AtoN) Report Message for AtoN AIS units.

An AIS device may generate this parameter group either upon VHF data link receptions of a Message 21, upon receipt of an ISO or NMEA request PGN, or upon a device's own transmission of a Message 21.

Command Support Requirement for Rebroadcasting of Messages 21 by an AIS Base Station:

Only AIS Base Stations shall accept the Command Group Function PGN 126208 with this PGN for Message 21. All other types of AIS devices shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".

The AIS Station commanded to rebroadcast a Message 21 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel.

All data fields (except for NMEA Reserved field(s) and Sequence ID) must be commanded when using the Command Group Function (PGN 126208) for rebroadcasting.

Note 1: The Repeat Indicator Command Parameter is "Required". The value should reflect the number of previous transmissions for this specific AIS Message. The AIS Base Station will increment this field accordingly prior to transmission. Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Configuring an AtoN Station and scheduling the transmission of a AIS Message 21 is done with PGN(s) (To be developed).

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Revisions:

June 2017 – New description, new notes identifying Synthetic AtoNs in fields 2 and 15, and new command support requirements.

Single Fra	ame: N	Priority Default:	4	Default	Update Rat	e: N/A	milliseconds	Frequency:	#Type!	cycles per s	second	
Destination	n: <mark>Global</mark>	Query Support	Optional	Co	mmand Suppo	rt: Required	ACK Rqmnts	None				
ield#	Field Nam	ne										
1	Message ID)			Byte Field Bit Fiel	d Size: d Size: <mark>6</mark>		Request Pa Command F	rameter Optional Parameter: Required			
	DD188 A	IS Message Identi	fier			C	ntifier (range of 0 to version of ITU-R	Ź	information			
	2102	Bit field to Navigation (AtoN	l) Report	bit(n)	Range: \	⁷ ariable	Resoluti	on: <mark>1</mark>	Used to	construct bit f	ïelds	

2	Repeat Indicator		•	eld Size: iield Size: 2		Request Parameter Command Parameter	Optional Note 1
	DD185 AIS Repeater Indicator			Used by the repeat (range of 0 to 3).	er to indicate ho	ow many times a message	has been repeated
				0 = Default 1 = First retransmi 2 = Second retrans 3 = Final retransmi	mission		
				See the latest vers	ion of ITU-R M	.1371 for more informati	on.
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	Used Used	to construct bit fields
	Synthetic AtoNs are identified when the F	Repeat Indicat	or in field 2	2 is a "1" and the Virtual A	AtoN Flag in fiel	d 15 is a "0".	
3	ID		•	eld Size: 4		Request Parameter Command Parameter	Optional Required
	DD010 Generic numeric ID, large		Number of route, waypoint, event, mark, etc.				
	DF55 Integer, 32 bit unsigned MMSI number of AtoN station reporting p	uint32 osition	Range:	0 to 4,294,967,292	Resolution	: <mark>1 bit </mark>	ess number
4	Longitude		-	ield Size: 4		Request Parameter Command Parameter	Optional Required
	DD023 Longitude, WGS-84			Longitude reference	ed to WGS-84.		
	DF25 Longitude	int32	Range:	+/- 180 deg	Resolution	1x10E-7 deg "-" = " cm	West, resolution ∼1.1
5	Latitude			ield Size: 4		Request Parameter Command Parameter	Optional Required
	DD022 Latitude, WGS-84			Latitude referenced	d to WGS-84.		
	DF23 Latitude	int32	Range:	+/- 90 deg	Resolution	"-" = 1 cm	South, resolution ~1.1
6	Position Accuracy		•	eld Size:		Request Parameter Command Parameter	Optional Required
	DD184 AIS Position Accuracy			0 = low accuracy > 1 = high accuracy		ondifferential GNSS (det DGNSS	ault),
				See the latest version	on of ITU-R M.	1371 for more information	on.
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	Used Used	to construct bit fields
7	RAIM Flag		•	eld Size:		Request Parameter Command Parameter	Optional Required
	DD189 AIS RAIM-flag			0 = RAIM not in u 1 = RAIM in use	se (default),		
				See the latest version	on of ITU-R M.	1371 for more information	on.
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	Used Used	to construct bit fields

AIS Aids to Navigation (AtoN) Report PGN: 129041 hex: 1F811 Request Parameter Byte Field Size: 8 **Time Stamp** Optional Bit Field Size: 6 Command Parameter: Required **DD186** AIS Time Stamp 0-59 = UTC second when the report was generated, 60 = time stamp not available (default), 61 = positioning system is in manual input mode, 62 = Electronic position fixing system operates in estimated (dead reckoning) mode. 63 = positioning system is inoperative See the latest version of ITU-R M.1371 for more information. Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) Range: Variable Request Parameter Byte Field Size: 9 AtoN Structure Length/Diameter Optional Bit Field Size: Command Parameter: Required DD194 Distance, medium Dependent upon PG Field definition. Distance, Medium uint16 Range: 0 to 6553.2 m Resolution: 1x10E-1 m See Message 21 Dimension/reference for position data field and notes for interpretation of these values in the latest version of ITU-R M.1371. Byte Field Size: Request Parameter AtoN Structure Beam/Diameter Optional 10 Bit Field Size: Command Parameter: Required Dependent upon PG Field definition. dd194 Distance, medium Distance, Medium uint16 Range: 0 to 6553.2 m Resolution: 1x10E-1 m See Message 21 Dimension/reference for position data field and notes for interpretation of these values in the latest version of ITU-R M.1371. Position Reference Point from Starboard Byte Field Size: Request Parameter Optional 11 Structure Edge/Radius Bit Field Size: Command Parameter: Required Dependent upon PG Field definition. **DD194** Distance, medium Resolution: 1x10E-1 m uint16 Range: 0 to 6553.2 m Distance, Medium See Message 21 Dimension/reference for position data field and notes for interpretation of these values in the latest version of ITU-R M.1371.

Byte Field Size:

uint16 Range: 0 to 6553.2 m

See Message 21 Dimension/reference for position data field and notes for interpretation of these values in the latest

Bit Field Size:

Dependent upon PG Field definition.

Request Parameter

Resolution: 1x10E-1 m

Command Parameter: Required

Optional

Position Reference Point from True North

facing Structure Edge/Radius

DF75 Distance, Medium

DD194 Distance, medium

version of ITU-R M.1371.

12

PGN: 129041 hex: 1F811

Aid to Navigation (AtoN) Type 13

Byte Field Size: Bit Field Size: 5 Request Parameter Command Parameter: Required

Optional

DD305 AIS Aids to Navigation Type

- 0 = Type of AtoN not specified (default)
- 1 = Reference point
- 2 = RACON
- 3 = Fixed structures off-shore, such as oil platforms, wind farms; This code identifies an obstruction that is fitted with an AtoN AIS station
- 4 = Spare, Reserved for future use

Fixed AtoN:

- 5 = Light, without sectors
- 6 = Light, with sectors
- 7 = Leading Light Front
- 8 = Leading Light Rear
- 9 = Beacon, Cardinal N
- 10 = Beacon, Cardinal E
- 11 = Beacon, Cardinal S
- 12 = Beacon, Cardinal W
- 13 = Beacon, Port hand
- 14 = Beacon, Starboard hand
- 15 = Beacon, Preferred Channel port hand
- 16 = Beacon, Preferred Channel starboard hand
- 17 = Beacon, Isolated danger
- 18 = Beacon, Safe water
- 19 = Beacon, Special mark

Floating AtoN:

- 20 = Cardinal Mark N
- 21 = Cardinal Mark E
- 22 = Cardinal Mark S
- 23 = Cardinal Mark W
- 24 = Port hand Mark
- 25 = Starboard hand Mark
- 26 = Preferred Channel Port hand 27 = Preferred Channel Starboard hand
- 28 = Isolated danger
- 29 = Safe Water
- 30 = Special Mark
- 31 = Light Vessel/LANBY/Rigs

NOTE 1: The types of aids to navigation listed above are based on the IALA Maritime Buoyage System, where applicable.

NOTE 2: There is potential for confusion when deciding whether an aid is lighted or unlighted. Competent authorities may wish to use the regional/local section of the message to indicate this.

See Latest version of ITU-R M.1371 for more information.

DF52 Bit field

bit(n)

Range: Variable

Resolution: 1

Used to construct bit fields

14	Off Position Indicator		•	eld Size: ield Size: <mark>1</mark>	•	Parameter d Parameter:	Optional Required
	DD306 Off position indicator			For floating AtoN	, only:		
				0 = on position 1 = off position			
				AtoN is a floating	g should only be considered aid, and if time stamp is econe parameters should be se	qual to or below	59. For floating
	DF52 Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to	construct bit fields
15	Virtual AtoN Flag		•	eld Size: ield Size: <mark>1</mark>	•	Parameter d Parameter:	Optional Required
	DD307 Virtual AtoN Flag				ndicated position (default) does not physically exist		
				See note 2 of MSC	G 21 in ITU-R M.1371 for 1	nore information	on.
	DF52 Bit field Synthetic AtoNs are identified when the Virtual	bit(n) al AtoN Fl	-	<mark>Variable</mark> 15 is a "0" and the Repe	Resolution: 1 at Indicator in field 2 is a "1		construct bit fields
16	Assigned Mode Flag		Byte Field Size: Bit Field Size: 1		•	Parameter d Parameter:	Optional Required
	DD308 AIS Assigned Mode Flag				ing in autonomous and con ing in assigned mode	tinuous mode (default)
	DF52 Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to	construct bit fields
17	AIS Spare		•	eld Size: ield Size: resv 1	·	Parameter d Parameter:	Optional Required
	DD311 AIS Spare Field			bits in NMEA net	of reserved bits, all set to low work messages are encoded or reserved bits are to be en	with logic 1's,	however for AIS
	DF115 Bit field defaulting to zer	bit0(n)	Range:	N2KUnitless	Resolution: 1		data format
	This field mirrors the "Spare" bit field found w AIS message can also be accommodated wit are encoded with logic 1's, however for AIS F	hin this fie	ld. Norma	lly, spare or reserved bit	ts in NMEA Network Messa	must be NULL when u spare fi	ble to AIS field that e set to zero for a data condition or mused - applies to AIS ields and AIS fields e for future use

18	Electroni	ic Fixing Position Fixing De	evice Type	•	eld Size: ield Size: 4	•	Parameter Optional Required		
				oe	4 = Loran-C 5 = Chayka 6 = Integrate 7 = Surveyer used. The ac 8 = Galilieo 9-14 = Reser 15 = Interna	SS ed GPS/GLONASS ed Navigation System d; For fixed AtoN and virtual Ato curate position enhances its func	Ç		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to construct bit fields		
19	NMEA R	eserved		•	eld Size: ield Size: resv		Parameter d Parameter:		
	DD001	Reserved field			Variable nur	mber of reserved bits, all set to lo	ts, all set to logic "1"		
	DF52 Bit field Used to align subsequent data on byte bou		bit(n) indary.	Range:	Variable	Resolution: 1	Used to construct bit fields		
20	AtoN Sta	AtoN Status		•	Byte Field Size: Bit Field Size: 8		Parameter Optional Required		
	DD309	AtoN Status			Reserved for	indicating AtoN Status; Only de	efined value is 00000000 (default).		
	DF52 Bit field bit(n)			Range:	Variable	Resolution: 1	Used to construct bit fields		

DF52 Bit field

Used to align subsequent data on byte boundary

PGN: 129041 hex: 1F811

Used to construct bit fields

21	AIS Transceiver Information		•	eld Size:		Request Parameter Command Parameter:	Optional Required		
	DD246 AIS Transceiver Information	on		0 = Channel A 1 = Channel A 3 = Channel A 3 = Channel A 4 = Own info 5 = Channel B 6 = Channel B 8 = Channel B 9 = Channel B 10 - 30 = Res 31 = AIS dev The AIS trans channel of an PGN. This consentence to re The AIS trans transmission of the appropria NMEA 0183 The AIS trans was not transiprovided by A its current dy The AIS trans Command Gr	sceiver Information of AIS message that worresponds to the san opport a received AIS of the sceiver Information of the AIS PGN. This could be appropriate to the AIS PGN. This could be appropriate to the AIS PGN. This could be appropriate to the AIS PGN. The sceiver Information of the AIS Mobile Stations an amic navigation data sceiver Information of the purpose of the AIS Mobile Stations and the AIS Mobile Stations are appropriate to the AIS Mobile Stations are appropriate to the AIS Mobile Stations are appropriated and the place of the AIS Mobile Stations are appropriated and the place of the AIS Mobile Stations are appropriated and the AIS M	st, ission reception, reception, transmission, transmission, transmission, iteld (values 0, 1, 6, 7) idea as received and placed into the mechanism used in the Message. Tield (values 2, 3, 8, 9) idea essage that was transmitted presponds to the same me port a transmitted AIS Mestield (value 4) identifies an ed into the appropriate AIS at a 1hz rate to report to out at. Tield (values 5 and 31) are 1,26208.	ntifies the reception of the appropriate AIS NMEA 0183 VDM ntifies the d and then placed into chanism used in the ssage. AIS message that S PGN. This is ther shipboard system only used with the		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	Used t	o construct bit fields		
22	NMEA Reserved		•	eld Size: iield Size: resv	3	Request Parameter Command Parameter:			
	DD001 Reserved field			Variable num	umber of reserved bits, all set to logic "1"				

bit(n) Range: Variable

Resolution: 1

PGN: 129041 hex: 1F811

Aid to Navigation (AtoN) Name 23

Byte Field Size: 8 or 16 n Bit Field Size:

Request Parameter Command Parameter: Required

Optional

DD004 Generic name string, short

Name of place, route, waypoint, destination, vessel, vehicle, etc.

DF50 String, variable, short

ch8or16(n)Range: 0 to 250 ASCII or 0 to 125 Unicode Characters

Resolution: 1 ASCII or 1 Unicode Character

This field is always transmitted using ASCII and combines two fields from ITU-R M.1371 message 21. 'Name of Aids-to-Navigation' is a fixed 20 ASCII character field that is always present, and 'Name of Aid-to-Navigation Extension' is an optional field of up to 14 ASCII characters. The total length of this vield is variable and will be from 20 to 34 ASCII characters.

See ITU-R M.1371 for more information.

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

Datum PGN: 129044 hex: 1F814

Local geodetic datum and datum offsets from a reference datum. This PGN is used to define the datum to which a position location output by the same device in other PGNs is referenced. This PGN will normally be requested as needed.

Single Fi	rame: No	Priority Default: 6	Default	Update R	ate: 10000	milliseconds	Frequency:	.1	cycles per sec	ond
Destinatio	on: <mark>Global</mark>	Query Support: Optiona	l Con	nmand Sup	port: Optional	ACK Rqmn	ts: None			
ield#	Field Nan	ne								
1	Local Datu	ım		-	eld Size: char	4	Request Para Command Pa		Optional Optional	
	DD068 I	Datum			The datum's first three ch is the local d	are defined in the aracters are the da	n currently being out HO Publication S-tatum ID as per the III code. A null charac or not used.	60, Append O tables.	lices B and C. The fourth charac	ne
2	DF63	String, fixed	char8(n)	Range:	0 to 1,785 char	<mark>acters Resolu</mark>	tion: <mark>1 char</mark>	count no specified Data Did characte not avail	35 bytes. Charact of included, length d by application is ctionary. Unused rs shall be treated lable, and filled w Data not availab	n is n l as vith
2	Delta Latit	ude		-	eld Size: 4		Request Para Command Pa		Optional Optional	
	DD106 I	Latitude, Offset				ne reference datur	position in the local of in the directions in			f
	DF23 '+' is North	Latitude	int32	Range:	+/- 90 deg	Resolu	tion: 1x10E-7 deg	"-" = So cm	uth, resolution ~1	.1
3	Delta Long	gitude		•	eld Size: 4		Request Para Command Pa		Optional Optional	
	DD107 I	Longitude, Offset				ne reference datur	position in the local of in the directions in			:f
	DF25 '+' is East	Longitude	int32	Range:	+/- 180 deg	Resolu	tion: 1x10E-7 deg	"-" = We	est, resolution ~1.	1
4	Delta Altitu	ude		•	eld Size: 4		Request Para Command Pa		Optional Optional	
	DD115 I	Distance								
	DF15 '+' is Up	Distance, signed	int32	Range:	+/-~2.147x10E	+7 m Resolu	tion: <mark>1x10E-2 m</mark>			

Datum PGN: 129044 hex: 1F814

5 Reference Datum

Byte Field Size: char 4

Request Parameter Optional

Bit Field Size: Command Parameter: Optional

DD068 Datum

4-character code for the datum currently being output for the position solution.

The datum's are defined in the IHO Publication S-60, Appendices B and C. The first three characters are the datum ID as per the IHO tables. The fourth character

is the local datum subdivision code. A null character indicates the datum or subdivision code is unknown or not used.

DF63 String, fixed char8(n) Range: 0 to 1,785 characters Resolution: 1 char 0 to 1,785 bytes. Character

count not included, length is specified by application in Data Dictionary. Unused characters shall be treated as not available, and filled with [0xFF] = Data not available.

User Datum Settings PGN: 129045

hex: 1F815

Transformation parameters for converting from WGS-84 to other Datums. This PGN will normally be requested as needed.

Single Fr	ame: No	Priority Default: 6	Default	Update R	ate:	milliseconds	Frequency:	NA cycles per second		
Destinatio	n: <mark>Global</mark>	Query Support: Optional	Co.	mmand Sup	pport: Optional	ACK Ro	mnts: None			
ield#	Field Na	ame								
1	Delta X			-	eld Size: 4 ield Size:		Request Param Command Para	optional ometer: Optional		
	DD108	Axis Delta shift			Delta Shift i	n X, Y, or Z az	is from WGS 84.			
	DF15	Distance, signed	int32	Range:	+/-~2.147x10E	+7 m Res	olution: 1x10E-2 m			
2	Delta Y				eld Size: 4 ield Size:		Request Param Command Para			
	DD108	Axis Delta shift			Delta Shift i	n X, Y, or Z as	xis from WGS 84.			
	DF15	Distance, signed	int32	Range:	+/-~2.147x10E	+7 m Res	olution: 1x10E-2 m			
3	Delta Z				eld Size: 4 ield Size:		Request Param Command Para	neter Optional nmeter: Optional		
	DD108	Axis Delta shift			Delta Shift i	n X, Y, or Z as	xis from WGS 84.			
	DF15	Distance, signed	int32	Range:	+/-~2.147x10E	+7 m Res	olution: 1x10E-2 m			
4	Rotation	in X			eld Size: 4 ield Size:		Request Param Command Para	- p		
	DD109	Axis Rotational shift			geodetic sign	n convention.	Z axis from WGS 84. Ro When looking along the potations are positive.			
	DF70	Angle, tiny	float32	Range:	Variable radian	ns Res	olution: Floats, radian			
5	Rotation	in Y			eld Size: 4 ield Size:		Request Param Command Para	optional meter: Optional		
	DD109	Axis Rotational shift			geodetic sign	n convention.	Z axis from WGS 84. Ro When looking along the potations are positive.			
	DF70	Angle, tiny	float32	Range:	Variable radian	ns Res	olution: Floats, radian			
6	Rotation	in Z		-	eld Size: 4 ield Size:		Request Param Command Para	neter Optional Optional		
	DD109	Axis Rotational shift			geodetic sign	n convention.	Z axis from WGS 84. Ro When looking along the potations are positive.			
	DF70	Angle, tiny	float32	Range:	Variable radian	ns Res	olution: Floats, radian			
7	Scale			Byte Field Size: 4 Bit Field Size:			Request Param Command Para	neter Optional nmeter: Optional		
	DD110	Scale			Scale factor	expressed in p	essed in parts-per-million			
	DF49	Ratio, Relative measure	float32	Range:	Variable	Res	olution: <mark>Floats</mark>	Unit-less number		

User Datum Settings PGN: 129045 hex: 1F815

8	Ellipsoid	Semi-major Axis	Byte Field Size: 4 Bit Field Size:				Request Param Command Para		Optional Optional	
	DD111	Ellipsoid Semi-major Axis			Semi-major axis (a)	of the User Da	tum ellipsoid.			
	DF15	Distance, signed	int32	Range:	+/-~2.147x10E+7 m	Resolution:	1x10E-2 m			
9	Ellipsoid	Flattening Inverse		•	eld Size: 4		Request Param Command Para		Optional Optional	
	DD112	Ellipsoid Flattening Inverse		Flattening (1/f) of the user Datum ellipsoid.						
	DF49	Ratio, Relative measure	float32	Range:	Variable	Resolution	Floats	Unit-le	ss number	
10	Datum N	ame		•	eld Size: char 4 ield Size:		Request Param Command Para		Optional Optional	
	DD068	Datum			4-character code for The datum's are defir first three characters is the local datum sul subdivision code is u	ned in the IHC are the datum bdivision code	Publication S-60 ID as per the IHO e. A null character	, Appen tables.	dices B and C. The The fourth charac	ne
	DF63	String, fixed	char8(n)	Range:	0 to 1,785 characters	Resolution:		count n specific Data D charact not ava	785 bytes. Charact tot included, lengthed by application in ictionary. Unused ers shall be treated ilable, and filled w = Data not availab	n is n l as vith

Cross Track Error PGN: 129283

hex: 1F903

This PGN provides the magnitude of position error perpendicular to the desired course.

Single Fr	ame: Yes	Priority Default: 3	Default Update R	<i>late:</i> 1000 r	milliseconds	Frequency:	1.	cycles per secon	
Destination	n: Global	Query Support: Optional	Command Sup	pport: Optional	ACK Rqmni	ts: None			
Field #	Field Na	nme							
1	Sequence	e ID	Byte Field Size: 1 Bit Field Size:			Request Parameter Optional Command Parameter: Optional			
	DD056	Sequence ID		PGNs from a s different PGN related data se in PGN 12902 data set.	single source add transmissions id t. For example, 6 to the Latitude	hat binds information dress. Identical SID values dentifies those PGN identical SID values e and Longitude values then SID value reach	values with transmissio s bind the C ues in PGN	in two or more ons as a single COG and SOG values 129029 as a single	
				data set)	New Silb (Wild Four)				
				253 - 254 = reserved for future use					
				255 = No bind whenever prac	NMEA recommends	recommends using binding SID values			
	DF53	Integer, 8 bit unsigned	uint8 Range:	0 to 252	Resolu	tion: 1 bit	Unit-less	s number	
2	XTE Mode		Byte Field Size: Bit Field Size: <mark>4</mark>			Request Parameter Optional Command Parameter: Optional			
	DD025 Mode, Data			0x0 = Autonor 0x1 = Differer 0x2 = Estimate 0x3 = Simulat 0x4 = Manual 0x5 to 0xD = 1 0xE = Error, 0xF = Data no	ntial, enhanced red mode, or mode, mode, Reserved	node,			
	DF52	Bit field	bit(n) Range:	Variable	Resolu	tion: 1	Used to	construct bit fields	
3	NMEA Reserved		•	Byte Field Size: Bit Field Size: resv 2		Request Parameter Command Parameter:			
	DD001	Reserved field		Variable number of reserved bits, all set to logic "1"					
	DF52 Used to alig	Bit field In subsequent data on a byte bou	- ()	Variable	Resolu	tion: 1	Used to	construct bit fields	

Cross Track Error PGN: 129283

hex: 1F903

4	Navigation Terminated			•	eld Size: eld Size: <mark>2</mark>		Request Parameter Command Paramete	Optional Optional	
	DD002	Generic status pair	eric status pair MSB/LSB: 00 = [No, Off, Disabled, Reset, " 01 = [Yes, On, Enabled, Set, "1"] 10 = Error, 11 = [Unavailable, Unknown]				·],		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used	to construct bit fields	
	Flag should be set as follows: NO - when Navigation is running normally, YES - In the last PGN when Navigation was Terminated (manually or automatically), ERROR - in case of a navigation error, UNAVAIL - if flag is not supported.								
5	XTE			Byte Field Size: 4			Request Parameter	Optional	
				Bit Fi	eld Size:	Command Paramete	r: Optional		
	DD114	XTE		Cross-track-error of a route. "-" = Left of track, need to steer right					
	DF15	Distance, signed	int32	Range:	+/-~2.147x10E+7 m	Resolution:	1x10E-2 m		
6	NMEA Reserved			Byte Field Size: Bit Field Size: resv 16			Request Parameter Command Parameter:		
	DD001	DD001 Reserved field			Variable number of re	eserved bits, a	all set to logic "1"		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used	to construct bit fields	
	Used to alig	gn subsequent data on a byte bou	ndary.						

Navigation Data PGN: 129284 hex: 1F904

This PGN provides essential navigation data for following a route. Transmissions will originate from products that can create and manage routes using waypoints. This information is intended for navigational repeaters. Transmission intervals should be aligned to latitude and longitude update rates

Single Frame: No		Priority Default: 3	Default	Update R	ate: 1000	milliseconds	Frequency:	1.	cycles per second	
Destination: Global Query Support: Optional		Cor	mmand Sup	port: Optional	ACK Rqmnts: N	lone				
Field #	Field Na	me								
1	Sequence ID			Byte Field Size: Bit Field Size:				Request Parameter Optional Optional Optional		
	DD056 Sequence ID			An upward counting number that binds information transmitted in two or more PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG value in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single data set.						
					0 - 252 = bin data set)	sinding available (when SID value reaches 252, resume with 0 on next				
					253 - 254 = r	e				
			255 = No binding provided. NMI whenever practical.				EA recommends using binding SID values			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	1 bit	Unit-les	ss number	
2	Distance to Destination WaypointDD199 Distance, Unsigned			Byte Field Size: 4 Bit Field Size:			Request Parameter Command Parameter: Optional Optional			
	DF09	Distance	uint32	Range:	0 to ~4.295x101	E+7 m Resolution	1x10E-2 m			
3	Course/Be	earing Ref.	Byte Fie Bit Fie		eld Size: ield Size: 2			neter ameter:	Optional Optional	
	DD117 I	Direction reference			0 = True, 1 = Magnetic 2 = Error, 3 = Null	·,				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields	
4	Perpendicular Crossed			Byte Field Size: Bit Field Size: 2			Request Parameter Command Parameter: Optional			
	DD002 (01 = [Yes, O 10 = Error,	f, Disabled, Reset, "0 n, Enabled, Set, "1"]. lable, Unknown]					
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields	

Navigation Data PGN: 129284 hex: 1F904

Arrival Circle Entered Byte Field Size: Request Parameter 5 Optional Bit Field Size: 2 Command Parameter: Optional MSB/LSB: **DD002** Generic status pair 00 = [No, Off, Disabled, Reset, "0"], 01 = [Yes, On, Enabled, Set, "1"], 10 = Error, 11= [Unavailable, Unknown] Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) Range: Variable Byte Field Size: **Calculation Type** Request Parameter 6 Optional Command Parameter: Optional Bit Field Size: 2 0 = Great Circle calculations, **DD119** Calculation Type 1 = Rhumb Line calculations, 2 = Error3 = NullRange: Variable DF52 Bit field bit(n) Resolution: 1 Used to construct bit fields Byte Field Size: 7 **ETA Time** Request Parameter Optional Bit Field Size: Command Parameter: Optional **DD158** Generic time of day 24 hour clock, 0 = midnight, time is in UTC DF06 Time of day Range: 0 to 86,401 s Resolution: 1x10E-4 s \sim 24 hours, 0 = midnight, uint32 range allows for up to two leap seconds per day 8 **ETA Date** Byte Field Size: Request Parameter Optional Bit Field Size: Command Parameter: Optional Days since January 1, 1970, Date is relative to UTC Time. DD039 Generic date 0 = January 1, 1970, max = uint16 Range: 0 to 65,532 days Resolution: 1 day DF41 Date, day count ~179 years 9 Bearing, Origin To Destination Waypoint Byte Field Size: Request Parameter Optional Bit Field Size: Command Parameter: Optional The horizontal direction of one terrestrial point from another, expressed as the **DD164** Bearing angular distance from a reference direction, measured from 000 at the reference direction clockwise through 359 degrees. Resolution: 1x10E-4 rad Resolution ~0.0057deg, 1 DF02 Angle uint16 Range: 0 to 2Pi rad deg = .01745 radByte Field Size: Request Parameter 10 Bearing, Position To Destination Waypoint Optional Bit Field Size: Command Parameter: Optional The horizontal direction of one terrestrial point from another, expressed as the **DD164** Bearing angular distance from a reference direction, measured from 000 at the reference direction clockwise through 359 degrees. Range: 0 to 2Pi rad Resolution: 1x10E-4 rad Resolution ~0.0057deg, 1 DF02 Angle uint16 deg = .01745 rad

Navigation Data PGN: 129284 hex: 1F904

Byte Field Size: 4 **Origin Waypoint Number** Request Parameter 11 Optional Bit Field Size: Command Parameter: Optional **DD010** Generic numeric ID, large Number of route, waypoint, event, mark, etc. Integer, 32 bit unsigned uint32 Range: 0 to 4,294,967,292 Resolution: 1 bit Unit-less number Applies to current route and at this time is limited to 16 bits 12 **Destination Waypoint Number** Byte Field Size: Request Parameter Optional Bit Field Size: Command Parameter: Optional **DD010** Generic numeric ID, large Number of route, waypoint, event, mark, etc. Integer, 32 bit unsigned uint32 Range: 0 to 4,294,967,292 Resolution: 1 bit Unit-less number DF55 Applies to current route and at this time is limited to 16 bits Byte Field Size: **Destination Wpt Latitude** Request Parameter 13 Optional Bit Field Size: Command Parameter: Optional DD022 Latitude, WGS-84 Latitude referenced to WGS-84. DF23 Latitude int32 Range: +/- 90 deg Resolution: 1x10E-7 deg "-" = South, resolution ~ 1.1 Byte Field Size: 4 Request Parameter 14 **Destination Wpt Longitude** Optional Bit Field Size: Command Parameter: Optional DD023 Longitude, WGS-84 Longitude referenced to WGS-84. "-" = West, resolution ~ 1.1 DF25 Longitude int32 Range: +/- 180 deg Resolution: 1x10E-7 deg cm **Waypoint Closing Velocity** Byte Field Size: Request Parameter Optional 15 Bit Field Size: Command Parameter: Optional Positive values represent ahead or starboard transverse speed and negative values **DD228** Generic speed, signed - large represent astern or port transverse speed. Resolution: 1x10E-2 m/s **DF87** Speed, signed - large int16 Range: +/- 327.66 m/s

(+/- 636 knots)

Positive value indicates approaching Wpt, negative indicates moving away from Wpt

Navigation - Route/WP information

PGN: 129285 hex: 1F905

This PGN shall return Route and WP data ahead in the Active Route. It can be requested or may be transmitted without a request, typically at each Waypoint advance. When navigating the Route in Forward direction, the Waypoints shall be included in the order of increasing RPS#s. When navigating in Reverse direction the order shall be decreasing RPS#s. The first Waypoint shall be the origin WP. When navigating towards a single WP or when the first WP of the Route is not yet passed, the origin RPS# shall be 65535 (NA). The WP Name and Position may optionally be filled with the name and position where the navigation started, or it shall be set to NA. ISO request for this PGN shall return origin and destination WP, next WP may be added - but it is not required. For a complete description of the Route and WP PGNs, see the application note in Appendix D.

Single Fr	rame: No	Priority Default: 6	Default	t Update R	ate:	milliseconds	Frequency:	N/	🕽 cycles per secon
Destinatio	on: <mark>Global</mark>	Query Support: Optional	Co	ommand Sup	port: Optional	ACK Rqmnts: N	lone		
ield#	Field Na	ame							
1	Start RPS	S#		-	eld Size: 2 ield Size:		Request Para Command Pa		Optional Optional
	DD007	Generic numeric ID, medium			Number of r	oute, waypoint, event	, mark, etc.		
	DF54 Route Poin	Integer, 16 bit unsigned t Sequence Number (RPS#) of the	uint16 e Origin W		0 to 65,532 et to 65535 (NA) if	Resolution the origin WP is not o		Unit-le	ss number
2	nitems			-	eld Size: 2		Request Para Command Pa		Required Optional
	DD007	Generic numeric ID, medium			Number of r	oute, waypoint, event	, mark, etc.		
		Integer, 16 bit unsigned equested/sent. fied in the request, the default is n	uint16 = 2.	Range:	0 to 65,532	Resolution	² 1 bit	Unit-le	ss number
3	Database	e ID		-	eld Size: 2 ield Size:		Request Para Command Pa		Optional Optional
	DD007	Generic numeric ID, medium			Number of r	oute, waypoint, event	, mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resolution	1 bit	Unit-le	ss number
4	Route ID				eld Size: 2 ield Size:		Request Para Command Pa		Optional Optional
	DD007	Generic numeric ID, medium			Number of r	oute, waypoint, event	, mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resolution	: 1 bit	Unit-le	ss number
5	Navigatio	on direction in route		•	eld Size: ield Size: 3		Request Para Command Pa		Optional Optional
	DD241	Navigation Direction			0=Forward, 1=Reverse, 2-5 Reserved 6= Error, 7=Null (info	d, o not available)			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	: 1	Used to	construct bit fields
	Forward=in	creasing Route Point Sequence N	lumber (F	RPS#)					

Navigation - Route/WP information

PGN: 129285 hex: 1F905

6	Supplementary Route/WP data available			Byte Field Size: Bit Field Size: 2				Request Parameter Optional Command Parameter: Optional		•	
	DD002	Generic status pair			01 = 10 =	/LSB: [No, Off, Disabl [Yes, On, Enabl Error, Unavailable, Un	ed, Set, "1"],],			
		Bit field are supplementary data availa ase ID, Route ID, WPID/RPS# tary data.			Variable other "Rou	te and WP Servi	Resolution:	-	Used to	construct bit field	ls
7	NMEA Re			,	eld Size: ield Size:			Request Paran Command Para	ameter:		
	DF52	Reserved field Bit field gn subsequent data on a byte b	bit(n)	Range:	Varia Variable	ble number of re	Resolution:	ll set to logic "1" 1		construct bit field	ls
8	Route Na	ame			eld Size: ield Size:	8 or 16 n		Request Paran Command Para		Optional Optional	
	DD004	Generic name string, short			Name	e of place, route,	waypoint, de	stination, vessel,	vehicle,	etc.	
	DF50 Max 30 AS	String, variable, short CII or Unicode Characters	ch8or16(n)Range:	0 to 250 0 to 125 Characte	Unicode		1 ASCII or 1 Unicode Character	string (byte inc of bytes includin Control in strin; The Co the strin charact Unicod Control charact Control charact A string (total le	byte = 1 => ASC	t terrete vte vte. si if CII v16). code
9	NMEA Re	eserved		•	eld Size: ield Size:	resv 8		Request Paran Command Para			
	DD001	Reserved field			Varia	ble number of re	eserved bits, a	ll set to logic "1"			
	DF52	Bit field	bit(n)	Range:	Variable		Resolution:	1	Used to	construct bit field	ls

Navigation - Route/WP information

PGN: 129285 hex: 1F905

10	WPID				eld Size: ield Size:	2		Request Paran Command Par		Optional Optional
	DD007	Generic numeric ID, mediu	m		Num	ber of route, way	point, event,	mark, etc.		
	DF54 Shall have	Integer, 16 bit unsigned valid data if the Waypoint exists	uint16 s in the WP-L		0 to 65,5	532	Resolution:	1 bit	Unit-le	ss number
	The waypo	ints shall be included in the ord	er of appeara	nce in the	Navigatio	n Direction.				
11	WP Nam	е			eld Size: ield Size:	8 or 16 n]	Request Paran Command Par		Optional Optional
	DD004	Generic name string, short			Nam	e of place, route,	waypoint, de	stination, vessel,	vehicle,	etc.
	DF50	String, variable, short	ch8or16(n)Range:		Unicode	Resolution:	1 ASCII or 1 Unicode Character	string (byte in	2 bytes. First byte in uint8) is the Count dicating the number in the string,
		SCII or Unicode Characters							Control in strin The Co the strin charact Unicod Control charact Control charact A strin (total le	byte = 1 => ASCII
12	WP Latit	ude			eld Size: ield Size:	4		Request Paran Command Par		Optional Optional
	DD022	Latitude, WGS-84			Latit	ude referenced to	WGS-84.			
	DF23	Latitude	int32	Range:	+/- 90 de	eg	Resolution:	1x10E-7 deg	"-" = Se	outh, resolution ~1.1
13	WP Long	jitude		•	eld Size: ield Size:	4		Request Paran Command Par		Optional Optional
	DD023	Longitude, WGS-84			Long	gitude referenced	to WGS-84.			
	DF25	Longitude	int32	Range:	+/- 180	leg	Resolution:	1x10E-7 deg	"-" = W	Vest, resolution ∼1.1
14	Fields 10	thru 13 repeat as needed			eld Size: ield Size:	? n		Request Paran Command Par		Optional Optional
	DD000	Undefined								
	DF00	Undefined	Undefined	Range:	undefine	ed	Resolution:	undefined	Applica at time	ation specific, defined of use.

Set & Drift, Rapid Update

PGN: 129291 hex: 1F90B

The Set and Drift effect on the Vessel is the direction and the speed of a current. The Course & Speed (through water) vector added to the Set & Drift vector is the COG & SOG vector. The bearings may be True or Magnetic referenced. When Set & Drift is calculated from data from a GPS, a compass and a speed log, the Set & Drift estimate will be influenced by current, weather and anything that sets the ship off from the intended Course. The Sequence ID may be used to tie the data to time, position, sample number.

Sequence ID Byte Field Size: Request Parameter Optional	Single Fr	ame: Yes	Priority Default: 3	Default	Update Rate	1000	milliseconds	Frequency:	1.	cycles per second
Sequence ID Byte Field Size: Request Parameter Optional Optional	Destinatio	n: Global	Query Support: Optional	Со	mmand Suppor	t: Optional	ACK Rqmnts:	None		
DD056 Sequence ID An upward counting number that binds information transmitted in two or more PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG value in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single data set. 0 - 252 = binding available (when SID value reaches 252, resume with 0 on new data set.) 253 - 254 = reserved for future use 255 = No binding provided. NMEA recommends using binding SID values whenever practical. DF53 Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: bit Unit-less number 2 Set Reference Byte Field Size: Request Parameter Command Parameter: Optional Optional DD117 Direction reference Byte Field Size: Request Parameter Command Parameter: Optional Optional DF52 Bit field bit(n) Range: Variable Resolution: Used to construct bit field DF52 Bit field bit(n) Range: Variable Resolution: Used to construct bit field DF52 Bit field bit(n) Range: Variable Resolution: Used to construct bit field DF52 Bit field bit(n) Range: Variable Resolution: Used to construct bit field DF52 Bit field bit(n) Range: Variable Resolution: Used to construct bit field DF53 Bit field bit(n) Range: Variable Resolution: Used to construct bit field DF54 Bit field Size: Request Parameter Command Parameter: Optional Optional Direction towards which current flows. Degrees relative to True North. DF02 Angle uint16 Range: 0 to 2Pi rad Resolution: Ix10E-4 rad Resolution -0.0057deg. 1 dg = .01745 rad Optional Optional Optional Optional Direction Towards which current flows. Degrees relative to True North. Bit Field Size: Request Parameter: Optional Optional Optional Optional DE044 Generic Speed	Field#	Field N	ame							
PGNs from a single source address. Identical SID values within two or more different PGN transmissions identical SID values within two or more different PGN transmissions identical SID values bind the COG and SOG values in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single data set. 0 - 252 = binding available (when SID value reaches 252, resume with 0 on new data set) 253 - 254 = reserved for future use 255 = No binding provided. NMEA recommends using binding SID values whenever practical. PDF53 Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: 1 bit Unit-less number 2 Set Reference Byte Field Size: Request Parameter Optional Command Parameter: Optional Option	1	Sequenc	e ID							-
data set) 253 - 254 = reserved for future use 255 = No binding provided. NMEA recommends using binding SID values whenever practical. DF53 Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: 1 bit Unit-less number 2 Set Reference Byte Field Size: Request Parameter Optional Command Parameter: Optional DD117 Direction reference 0 = 0 = True, 1 = Magnetic, 2 = Error, 3 = Null DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit field 3 NMEA Reserved Byte Field Size: Request Parameter Command Parameter: DD001 Reserved field Variable number of reserved bits, all set to logic "1" DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit field Used to align subsequent data on a byte boundary. 4 Set Byte Field Size: Request Parameter Optional DD048 Current flow direction Direction towards which current flows. Degrees relative to True North. DF02 Angle uint16 Range: 0 to 2Pi rad Resolution: 1 x10E-4 rad Resolution -0.0057deg, 1 deg = .01745 rad 5 Drift Byte Field Size: Request Parameter Command Parameter: Optional DD044 Generic Speed		DD056	Sequence ID			PGNs from a different PGN related data s in PGN 1290	single source address I transmissions iden et. For example, ide	ss. Identical SID v tifies those PGN t entical SID values	values with transmissi bind the	nin two or more ons as a single COG and SOG values
255 = No binding provided. NMEA recommends using binding SID values whenever practical. DF53 Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: 1 bit Unit-less number 2 Set Reference Byte Field Size: Request Parameter Command Parameter: Optional DD117 Direction reference Bit Field Size: Request Parameter: Optional Optional DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit field 3 NMEA Reserved Byte Field Size: Request Parameter Command Parameter: Bit Field Size: Request Parameter Command Parameter: Bit Field Size: Resolution: 1 Used to construct bit field Variable number of reserved bits, all set to logic "1" Used to construct bit field Used to align subsequent data on a byte boundary. 4 Set Byte Field Size: Request Parameter Command Parameter: Optional DD048 Current flow direction Direction towards which current flows. Degrees relative to True North. DF02 Angle uint 16 Range: 0 to 2Pi rad Resolution: 1x10E-4 rad Resolution: Optional Optional DD044 Generic Speed							ding available (wher	sID value reach	es 252, re	sume with 0 on next
whenever practical. DF53 Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: 1 bit Unit-less number 2 Set Reference Byte Field Size: Request Parameter Command Parameter: Optional Optional DD117 Direction reference 0 = True, 1 = Magnetic, 2 = Error, 3 = Null DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit field 3 NMEA Reserved Byte Field Size: Request Parameter Command Parameter: DD001 Reserved field Variable number of reserved bits, all set to logic "1" DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit field Used to align subsequent data on a byte boundary. 4 Set Byte Field Size: Request Parameter Command Parameter: Optional DD048 Current flow direction Direction towards which current flows. Degrees relative to True North. DF02 Angle uint16 Range: 0 to 2Pi rad Resolution: 1x10E-4 rad Resolution -0.0057deg, 1 deg = .01745 rad 5 Drift Byte Field Size: Request Parameter Command Parameter: Optional DD044 Generic Speed						253 - 254 = r	eserved for future us	se		
2 Set Reference Byte Field Size: Bit Field Size: DD117 Direction reference 0 = True, 1 = Magnetic, 2 = Error, 3 = Null DF52 Bit field Byte Field Size: DD001 Reserved Byte Field Size: Bit Field Size: DD001 Reserved field Variable number of reserved bits, all set to logic "1" DF52 Bit field bit(n) Range: Variable Resolution: Variable Resolution: 1 Used to construct bit field Range: Variable Resolution: 1 Used to construct bit field Variable number of reserved bits, all set to logic "1" DF52 Bit field bit(n) Used to align subsequent data on a byte boundary. Byte Field Size: DD048 Current flow direction DF02 Angle DD048 Current flow direction DF02 Angle DF04 Byte Field Size: DF05 Byte Field Size: DF06 Command Parameter Optional Resolution: DF07 Angle DF06 Resolution: DF07 Angle DF08 Byte Field Size: DF08 Request Parameter Optional Resolution: Optional Optional Optional Optional Optional Optional Optional Optional								EA recommends	using bind	ling SID values
DD117 Direction reference D		DF53	Integer, 8 bit unsigned	uint8	Range: 0	to 252	Resolution	7: 1 bit	Unit-le	ss number
DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit field 3 NMEA Reserved Byte Field Size: Request Parameter Command Parameter: DD001 Reserved field Variable number of reserved bits, all set to logic "1" DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit field Used to align subsequent data on a byte boundary. 4 Set Byte Field Size: Request Parameter Command Parameter: Used to construct bit field Used to align subsequent data on a byte boundary. 4 Set Byte Field Size: Request Parameter Command Parameter: Optional Optional Direction towards which current flows. Degrees relative to True North. DD048 Current flow direction Direction towards which current flows. Degrees relative to True North. DF02 Angle uint16 Range: 0 to 2Pi rad Resolution: 1x10E-4 rad Resolution -0.0057deg, 1 deg = .01745 rad 5 Drift Byte Field Size: Request Parameter Command Parameter: Optional Opti	2	Set Refe	rence		•					•
3 NMEA Reserved Byte Field Size: DD001 Reserved field Variable number of reserved bits, all set to logic "1" DF52 Bit field bit(n) Used to align subsequent data on a byte boundary. 4 Set Byte Field Size: Pariable Resolution: Range: Variable Resolution: Resolution: Pariameter Command Parameter: Optional Optional DD048 Current flow direction Direction towards which current flows. Degrees relative to True North. DF02 Angle Used to construct bit field Size: Dommand Parameter: Optional Resolution: North. Resolution: North. Resolution: Resolution: North. Resolution: North. Resolution: North. Resolution: North. Byte Field Size: Direction towards which current flows. Degrees relative to True North. Resolution: North. DF02 Angle Site Field Size: North. Resolution: North. North. Resolution: North. North. North. North. North. Resolution: North. Nort		DD117	Direction reference			1 = Magnetic 2 = Error,	·,			
Bit Field Size: resv 6 Command Parameter: DD001 Reserved field Variable number of reserved bits, all set to logic "1" DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit field Used to align subsequent data on a byte boundary.		DF52	Bit field	bit(n)	Range: <mark>V</mark>	ariable	Resolution	n: 1	Used to	construct bit fields
DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit field Used to align subsequent data on a byte boundary. 4 Set Byte Field Size: 2 Request Parameter Command Parameter: Optional Optional DD048 Current flow direction Direction towards which current flows. Degrees relative to True North. DF02 Angle uint16 Range: 0 to 2Pi rad Resolution: 1x10E-4 rad Resolution ~0.0057deg, 1 deg = .01745 rad DD044 Generic Speed Byte Field Size: 2 Request Parameter Command Parameter: Optional Optional Optional	3	NMEA R	eserved		•		6	•		
Used to align subsequent data on a byte boundary. 4 Set Byte Field Size: 2 Request Parameter Optional Bit Field Size: Command Parameter: Optional DD048 Current flow direction Direction towards which current flows. Degrees relative to True North. DF02 Angle uint16 Range: 0 to 2Pi rad Resolution: 1x10E-4 rad Resolution ~0.0057deg, 1 deg = .01745 rad Byte Field Size: 2 Request Parameter Optional Bit Field Size: 2 Command Parameter: Optional DD044 Generic Speed		DD001	Reserved field			Variable num	ber of reserved bits,	all set to logic "1	"	
DD048 Current flow direction DF02 Angle uint16 Range: 0 to 2Pi rad Resolution: 1x10E-4 rad Resolution ~0.0057deg, 1 deg = .01745 rad Drift Byte Field Size: 2 Request Parameter Command Parameter: Optional Optional Optional Optional DD044 Generic Speed		_		` '	Range: V	ariable	Resolution	n: <u>1</u>	Used to	construct bit fields
DF02 Angle uint16 Range: 0 to 2Pi rad Resolution: 1x10E-4 rad deg = .01745 rad Byte Field Size: Request Parameter Command Parameter: Optional Optional DD044 Generic Speed	4	Set						•		
deg = .01745 rad 5 Drift Byte Field Size: 2 Request Parameter Command Parameter: Optional Optional Optional		DD048	Current flow direction			Direction tow	vards which current	flows. Degrees re	lative to	True North.
Bit Field Size: Command Parameter: Optional DD044 Generic Speed		DF02	Angle	uint16	Range: 0	to 2Pi rad	Resolution	n: 1x10E-4 rad		•
DD044 Generic Speed	5	Drift						•		
·		DD044	Generic Speed							
		DF35	•	uint16	Range: 0	to 655.32 m/s	Resolution	n: 1x10E-2 m/s	1 Knot	= 0.5144 m/s

Set & Drift, Rapid Update

PGN: 129291

hex: 1F90B

6 NMEA Reserved

Byte Field Size:

Bit Field Size: resv 16

Range: Variable

Request Parameter
Command Parameter:

DD001 Reserved field

Variable number of reserved bits, all set to logic "1"

Resolution: 1

DF52 Bit field bit(n) Used to align subsequent data on a byte boundary.

Time to/from Mark PGN: 129301

hex: 1F915

Time to go to or elapsed from a generic mark, that may be non-fixed. The mark is not generally a specific geographic point but may vary continuously and is most often determined by calculation (the recommended turning or tacking point for sailing vessels, the wheel-over point for vessels making turns, a predicted collision point, etc.)

Single Fra	ame: No	Priority Default: 3	Default	Update Ra	ate: 1000	milliseconds	Frequency:	1.	cycles per	second
Destinatio	n: Global	Query Support: Optional	Co	mmand Supp	oort: Optional	ACK Rqmnts:	None			
Field #	Field N	ame								
1	Sequenc	e ID		Byte Fie Bit Fie	eld Size: 1		Request Para Command Pa		Optional Optional	
	DD056	Sequence ID			PGNs from a different PGN related data s in PGN 1290 data set.	ounting number that single source addrest transmissions iderent. For example, id 26 to the Latitude at this gavailable (whe	ess. Identical SID values ntifies those PGN entical SID values nd Longitude values	values with transmissi s bind the Gues in PGN	nin two or mor ons as a single COG and SOC I 129029 as a	re e G values single
					data set)	ing available (whe	ii bib value reach	.03 232, 10.	diffe with 0 of	ii iicat
					253 - 254 = r	eserved for future u	se			
					255 = No bin whenever pra	ding provided. NM ctical.	IEA recommends	using bind	ling SID value	es :
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolutio	n: 1 bit	Unit-les	ss number	
2	Time ela	psed (from) or to-go to mark		-	eld Size: 4 eld Size:		Request Para Command Pa		Optional Optional	
	DD034	Time-elapsed/Time-to-go			Time interval event.	in milli-sec. "-" =	time elapsed sinc	e event, "-	-" = time to go	before
	DF40	Time interval, signed, sta	int32	Range:	+/- ~2.148x10E	+6 s Resolutio	n: 1x10E-3 s			
3	Mark Typ	De .		Byte Fie Bit Fie	eld Size: eld Size: 4		Request Para Command Pa		Optional Optional	
	DD122	Mark Type			0 = Collision 1 = Turnin 2 = Referen 3 = Wheelen 4 = Waypo 5-13 = Reser 14 = Error, 15 = Null	g Point, nce (general), over, int,				
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: 1	Used to	construct bit	fields
4	NMEA R	eserved		Byte Fie Bit Fie	eld Size: eld Size: resv	4	Request Para Command Pa			
	DD001	Reserved field			Variable num	ber of reserved bits	, all set to logic "1	"		
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: 1	Used to	construct bit	fields
	Used to all	gn subsequent data on a byte bou	ndary.							
5	Mark ID			-	eld Size: 4 eld Size:		Request Para Command Pa		Optional Optional	
	DD010	Generic numeric ID, large			Number of ro	ute, waypoint, ever	it, mark, etc.			
	DF55	Integer, 32 bit unsigned	uint32	Range:	0 to 4,294,967,2	92 Resolutio	n: 1 bit	Unit-les	ss number	

Bearing and Distance between two Marks

PGN: 129302 hex: 1F916

Bearing and distance from the origin mark to the destination mark, calculated at the origin mark, for any two arbitrary generic marks. The calculation type (Rhumb Line, Great Circle) is specified, as well as the bearing reference (Mag, True). This PGN will normally be requested as needed.

Single Fr	rame: No	Priority Default: 6	Default	Update Ra	ate:	milliseconds	Frequency:	NA cycles per second
Destination	n: Global	Query Support: Optional	Cor	nmand Supp	ort: Optional	ACK Rqmnts	S: None	
Field #	Field Na	ame						
1	Sequence	e ID		Byte Fie Bit Fie	ld Size: 1		Request Paral Command Pal	
	DD056	Sequence ID			PGNs from different PC related data	a single source add N transmissions id set. For example, i	ress. Identical SID v entifies those PGN t dentical SID values	n transmitted in two or more values within two or more transmissions as a single bind the COG and SOG values es in PGN 129029 as a single
					0 - 252 = bi data set)	nding available (wh	nen SID value reach	es 252, resume with 0 on next
					253 - 254 =	reserved for future	use	
					255 = No bi	0 1	MEA recommends u	using binding SID values
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolut	ion: 1 bit	Unit-less number
2	Bearing F	Ref.		Byte Fie Bit Fie	ld Size: eld Size: <mark>2</mark>		Request Paral Command Pal	meter Optional optional
	DD117	Direction reference			0 = True, 1 = Magneti 2 = Error, 3 = Null	ic,		
	DF52	Bit field	bit(n)	Range:	Variable	Resolut	ion: 1	Used to construct bit fields
3	Calculation	on Type		Byte Fie Bit Fie	ld Size: eld Size: <mark>2</mark>		Request Paral Command Pal	meter Optional optional
	DD119	Calculation Type				ircle calculations, Line calculations,		
	DF52	Bit field	bit(n)	Range:	Variable	Resolut	ion: 1	Used to construct bit fields
4	NMEA Re	served		Byte Fie Bit Fie	ld Size: eld Size: <mark>resv</mark>	4	Request Paral Command Pal	
	DD001	Reserved field			Variable nu	mber of reserved bi	ts, all set to logic "1	"
	DF52	Bit field	bit(n)	Range:	Variable	Resolut	ion: 1	Used to construct bit fields
	Used to alig	ın subsequent data on a byte boui	ndary.					

Bearing and Distance between two Marks

PGN: 129302 hex: 1F916

5	Bearing,	Origin To Destination		Byte Fie Bit Fie	ld Size: 2		Request Parame Command Para		Optional Optional
	DD164	Bearing			angular distance	irection of one terr	estrial point from lirection, measured	another,	
	DF02	Angle	uint16	Range:	0 to 2Pi rad	Resolution:			ion ~0.0057deg, 1 01745 rad
6	Distance			-	ld Size: 4		Request Parame Command Para		Optional Optional
	DD199	Distance, Unsigned							
	DF09	Distance	uint32	Range:	0 to ~4.295x10E+7	7 m Resolution:	1x10E-2 m		
7	Origin M	ark Type		Byte Fie Bit Fie	ld Size: eld Size: <mark>4</mark>		Request Parame Command Para		Optional Optional
	DD122	Mark Type			0 = Collision, 1 = Turning P 2 = Reference 3 = Wheelove 4 = Waypoint, 5-13 = Reserved 14 = Error, 15 = Null	(general), r,			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields
8		Bit field on Mark Type	bit(n)	Byte Fie		Resolution:	1 Request Parame	eter	Optional
8	Destinati		bit(n)	Byte Fie	ld Size:	oint, (general), r,	Request Parame	eter	Optional
8	Destinati	on Mark Type	bit(n)	Byte Fie	old Size: ld Size: 0 = Collision, 1 = Turning P 2 = Reference 3 = Wheelove 4 = Waypoint, 5-13 = Reserved 14 = Error, 15 = Null	oint, (general), r,	Request Param Command Para	eter meter:	Optional
9	Destinati	on Mark Type Mark Type Bit field		Byte Fie Bit Fie Range:	old Size: ld Size: 0 = Collision, 1 = Turning P 2 = Reference 3 = Wheelove 4 = Waypoint, 5-13 = Reserved 14 = Error, 15 = Null Variable	oint, (general), r, , , , , , , , , , , , Resolution:	Request Param Command Para	eter meter: Used to	Optional Optional construct bit fields Optional
	Destination DD122 DF52 Origin M	on Mark Type Mark Type Bit field		Byte Fie Bit Fie Range:	of Size: and Size: 0 = Collision, 1 = Turning P 2 = Reference 3 = Wheelove 4 = Waypoint, 5-13 = Reserved 14 = Error, 15 = Null Variable Id Size: 4	oint, (general), r, , , , , , , , , , , , Resolution:	Request Parame Command Para I Request Parame Command Para	eter meter: Used to	Optional Optional construct bit fields Optional
	Destination DD122 DF52 Origin M	on Mark Type Mark Type Bit field ark Id		Byte Fie Bit Fie Range: Byte Fie Bit Fie	of Size: and Size: 0 = Collision, 1 = Turning P 2 = Reference 3 = Wheelove 4 = Waypoint, 5-13 = Reserved 14 = Error, 15 = Null Variable Id Size: 4	oint, (general), r, , Resolution:	Request Parama Command Para Request Parama Command Para mark, etc.	eter meter: Used to eter meter:	Optional Optional construct bit fields Optional
	DESTINATION DESTIN	on Mark Type Mark Type Bit field ark Id Generic numeric ID, large	bit(n)	Range: Byte Fie Bit Fie Range: Byte Fie Byte Fie	old Size: ld Size: 0 = Collision, 1 = Turning P 2 = Reference 3 = Wheelove 4 = Waypoint, 5-13 = Reserved 14 = Error, 15 = Null Variable Id Size: Number of route	oint, (general), r, , Resolution: , waypoint, event, Resolution:	Request Parama Command Para Request Parama Command Para mark, etc.	eter meter: Used to eter meter: Unit-les	Optional Optional construct bit fields Optional Optional s number Optional
9	DESTINATION DESTIN	on Mark Type Mark Type Bit field ark Id Generic numeric ID, large Integer, 32 bit unsigned	bit(n)	Range: Byte Fie Bit Fie Range: Byte Fie Byte Fie	of Size: of Collision, of Turning P of Reference of Wheelove of Waypoint of Size: Number of route of to 4,294,967,292 of Size: of Size: of Collision, of	oint, (general), r, , Resolution: , waypoint, event, Resolution:	Request Parame Command Parame Request Parame Command Parame mark, etc. 1 bit Request Parame Command Parame	eter meter: Used to eter meter: Unit-les	Optional Optional construct bit fields Optional Optional s number Optional

GNSS Control Status PGN: 129538 hex: 1FA02

GNSS common satellite receiver parameter status. This PGN will be requested as needed.

-	rame: No on: Global	Priority Default: 6 Query Support: Optional		Update Rommand Sup	eate: Optional	milliseconds ACK Rqmnts: N	Frequency: one	NA cycles per se	∍cond
ield#	Field N	ame							
1	SV Eleva	ation Mask		•	eld Size: 2 ield Size:		Request Param Command Para	neter Optional nmeter: Optional	
	DD054	Elevation			Angle above	or below the horizon.	-90° to +90°; neg	ative below the horizon	
	DF04 Do not use	Angle, signed satellites below this value.	int16	Range:	+/-Pi rad	Resolution:	1x10E-4 rad	Resolution ~0.0057deg	
2	PDOP M	ask			eld Size: 2 ield Size:		Request Param Command Para	neter Optional nmeter: Optional	
	DD055	DOP			geometry to is being intro	positioning error. A lo oduced. Reported as co	wer DOP value is omponents: HDOI	on of satellite configuration of satellite configuration preferred because less ereceived (Horizontal), VDOP (no error introduced).	
	DF69 When exce	Ratio, Relative measure, eeded, GNSS Receiver shall indica	int16 Ite No GN		+/-327.64 OR Mode in PGN 1	Resolution: 29029	1x10E-2	Unit-less number	
3	PDOP S	witch			eld Size: 2 ield Size:		Request Param Command Para	neter Optional nmeter: Optional	
	DD055	DOP			geometry to is being intro	positioning error. A lo oduced. Reported as co	wer DOP value is omponents: HDOF	on of satellite configuration of satellite configuration preferred because less ero (Horizontal), VDOP 0 (no error introduced).	
	DF69 When exce	Ratio, Relative measure, eeded GNSS Receiver shall switch	int16 from 3D	•	+/-327.64	Resolution:	1x10E-2	Unit-less number	
4	SNR Mas	sk		•	eld Size: 2 ield Size:		Request Param Command Para	neter Optional meter: Optional	
	DD057	SNR Value			SNR express	ed in C/No			
	DF31 Do not use	dB, relative measure satellites below this value.	int16	Range:	+/- 327.64 dB	Resolution:	1x10E-2 dB		
5	GNSS M	ode			eld Size: ield Size: 3		Request Param Command Para	neter <mark>Optional</mark> nmeter: <mark>Optional</mark>	
	DD058	Mode, GNSS			0 = 1D, 1 = 2D, 2 = 3D, 3 = Auto, 4-5 = Reserv 6 = Error, 7 = Null	red,			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to construct bit fie	elds

GNSS Control Status PGN: 129538 hex: 1FA02

6	DGNSS Mode				eld Size: ield Size: <mark>3</mark>		Request Parameter Command Parameter:	Optional Optional
	DD059	Mode, DGNSS			0 = Off 1 = Auto 2 = Code Differenti 3 = SBAS Corrections 4 = Phase Different 5 - PPP Corrections	ons tial Corrections		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
7	Position	/ Velocity Filter		•	eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Optional
	DD002	Generic status pair			MSB/LSB: 00 = [No, Off, Disa 01 = [Yes, On, Ena 10 = Error, 11 = [Unavailable, University of the content of	bled, Set, "1"],	'],	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
8	Max Cor	rection Age		•	eld Size: 2		Request Parameter Command Parameter:	Optional Optional
	DD060	Differential Age			Age of Differential	corrections		
	DF66	Time interval, .01sec	uint16	Range:	0 to 655.32s	Resolution:	1x10E-2sec	
9	Antenna	Altitude for 2D Mode		•	eld Size: 4 ield Size:		Request Parameter Command Parameter:	Optional Optional
	DD024	Altitude, WGS-84			Altitude referenced	to WGS-84		
	DF15	Distance, signed	int32	Range:	+/-~2.147x10E+7 m	Resolution:	1x10E-2 m	
10	Use Ante	enna Altitude for 2D Mode		•	eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Optional
	DD002	Generic status pair			MSB/LSB: 00 = [No, Off, Disa 01 = [Yes, On, Ena 10 = Error, 11 = [Unavailable, University of the control of	bled, Set, "1"],	·],	
	DF52 00 = Use la	Bit field ast good calculated Altitude for 2E	bit(n) mode.	Range:	Variable	Resolution:	1 Used to	construct bit fields
11	Reserve	d		•	eld Size: ield Size: resv 6		Request Parameter Command Parameter:	Optional Optional
	DD001	Reserved field			Variable number of	f reserved bits, a	ıll set to logic "1"	
	DF52	Bit field	hit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields

GNSS DOPs PGN: 129539

hex: 1FA03

This PGN provides a single transmission containing GNSS status and dilution of precision components (DOP) that indicate the contribution of satellite geometry to the overall positioning error. There are three DOP parameters reported, horizontal (HDOP), Vertical (VDOP) and time (TDOP).

Single Fr	ame: Yes	Priority Default: 6	Default	Update Ra	ate: 100	00 milliseconds	Frequenc	<i>y:</i> 1.	cycles per seco	nd
Destination	n: Global	Query Support: Optional	Co	mmand Supp	oort: Optional	ACK Rqr	nnts: None			
Field #	Field Na	ame								
1	Sequenc	e ID		Byte Fie Bit Fie	ld Size: 1			Parameter nd Parameter:	Optional Optional	
	DD056	Sequence ID			PGNs from different P related data	n a single source a GN transmission a set. For examp	address. Identical s identifies those le, identical SID	SID values with PGN transmissi values bind the		
					0 - 252 = b data set)	inding available	(when SID value	reaches 252, res	sume with 0 on nex	t
					253 - 254 =	= reserved for fut	ure use			
					255 = No b whenever p	oinding provided. practical.	. NMEA recomn	nends using bind	ling SID values	
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resc	olution: 1 bit	Unit-les	ss number	
2	Set Mode	e		Byte Fie Bit Fie	ld Size: eld Size: 3]	•	Parameter nd Parameter:	Optional Optional	
	DD058	Mode, GNSS			0 = 1D, 1 = 2D, 2 = 3D, 3 = Auto, 4-5 = Rese 6 = Error, 7 = Null	rved,				
	DF52	Bit field	bit(n)	Range:	Variable	Resc	olution: 1	Used to	construct bit fields	;
3	Op Mode	•		Byte Fie Bit Fie	ld Size: eld Size: 3]		Parameter nd Parameter:	Optional Optional	
	DD058	Mode, GNSS			0 = 1D, 1 = 2D, 2 = 3D, 3 = Auto, 4-5 = Rese 6 = Error, 7 = Null	rved,				
	DF52	Bit field	bit(n)	Range:	Variable	Resc	olution: 1	Used to	construct bit fields	;
4	NMEA R	eserved		Byte Fie Bit Fie	ld Size: eld Size: <mark>resv</mark>	2	•	Parameter nd Parameter:		
	DD001	Reserved field			Variable m	umber of reserved	d bits, all set to lo	ogic "1"		
	DF52 Used to alig	Bit field gn subsequent data on a byte bour	bit(n) ndary.	Range:	Variable	Reso	olution: 1	Used to	construct bit fields	;

PGN: 129539

hex: 1FA03 Byte Field Size: 2 **HDOP** Request Parameter 5 Optional Bit Field Size: Command Parameter: Optional DD055 DOP Dilution of Precision (DOP) indicates the contribution of satellite configuration geometry to positioning error. A lower DOP value is preferred because less error is being introduced. Reported as components: HDOP (Horizontal), VDOP (Vertical), TDOP (Time). Minimum DOP value is 1.0 (no error introduced). Range: +/-327.64 **DF69** Ratio, Relative measure, int16 Resolution: 1x10E-2 Unit-less number **VDOP** Byte Field Size: Request Parameter 6 Optional Bit Field Size: Command Parameter: Optional DD055 DOP Dilution of Precision (DOP) indicates the contribution of satellite configuration geometry to positioning error. A lower DOP value is preferred because less error is being introduced. Reported as components: HDOP (Horizontal), VDOP (Vertical), TDOP (Time). Minimum DOP value is 1.0 (no error introduced). **DF69** Ratio, Relative measure, int16 Range: +/-327.64 Resolution: 1x10E-2 Unit-less number **TDOP** Byte Field Size: Request Parameter 7 Optional Command Parameter: Optional Bit Field Size: DD055 DOP Dilution of Precision (DOP) indicates the contribution of satellite configuration geometry to positioning error. A lower DOP value is preferred because less error is being introduced. Reported as components: HDOP (Horizontal), VDOP (Vertical), TDOP (Time). Minimum DOP value is 1.0 (no error introduced). Range: +/-327.64 Resolution: 1x10E-2 Unit-less number **DF69** Ratio, Relative measure, int16

GNSS DOPs

GNSS Sats in View PGN: 129540 hex: 1FA04

GNSS information on current satellites in view tagged by sequence ID. Information includes PRN, elevation, azimuth, and SNR. Field 4 defines the number of satellites. Fields 5 thru 11 define the satellite number and the information. These fields sequentially repeated for each satellite to be transmitted as indicated by "n" in fields 12 thru 18.

Single Fra	me: No	Priority Default: (ault Update Ra	te: 100	0 milliseconds	Frequency	1.	cycles per second
	ion: Globa	al Query Support: C	Optional	Command Supp	oort: Optional		ACK Rqmnts		
Field #	Field N	ame						Origin	al Reference ID # 23
1	Sequenc	ee ID			ield Size: 1 ield Size:		Request F Command	Parameter Parameter:	Optional Optional
	DD056	Sequence ID			different PG SOG and RA	counting number use Ns . For example, t AIM values to a give 252 for valid positio	the SID would be position. 25	be used to tie	
	DF53	Integer, 8 bit unsigne	ed uint8	Range:	0 to 252	Resolution	on: 1 bit	Unit-le	ss number
2	Mode			•	ield Size:	1	Request F	Parameter Parameter:	Optional Optional
	DD072	Range Residual Mode	e		Range Resid after the pos 0=range resi	dual used in position ition. iduals were used to diduals were calculate	calculation or	range residua	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	on: 1	Used to	construct bit fields
3	NMEA R	eserved		Byte F	ield Size:		Request F	Parameter	
·				Bit F	ield Size: resv	6	•	Parameter:	
	DD001	Reserved field			Variable nur	mber of reserved bit	s, all set to logi	c "1"	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	_		construct bit fields
	Used to ali	gn subsequent data on a	byte boundary.						
4	Number	of SVs		-	ield Size: 1 ield Size:		Request F	Parameter Parameter:	Optional Optional
	DD006	Generic counter, short	t		Numeric co	unt, event counter, s	equence counte	er	
	DF53	Integer, 8 bit unsigne	ed uint8	Range:	0 to 252	Resolution	on: 1 bit	Unit-le	ss number
5	PRN "1"			-	ield Size: 1		Request F	Parameter Parameter:	Optional Optional
	DD074	Satellite ID Number			65-96 = GLONA numbers are gives a rang	, AS, Satellite, Based ONASS. ASS, satellites are id	entified by 64+ e full GLONAS The numbers 8	satellite slot r SS constellations of through 96	umber. The slot on of 24 satellites, this
	DF53	Integer, 8 bit unsigne	ed uint8	Range:	0 to 252	Resolution	on: 1 bit	Unit-le	ss number

PGN: 129540

hex: 1FA04 Byte Field Size: 2 Elevation "1" Request Parameter 6 Optional Bit Field Size: Command Parameter: Optional Angle above or below the horizon. -90° to +90°; negative below the horizon **DD054** Elevation Range: +/-Pi rad Resolution: 1x10E-4 rad Resolution ~0.0057deg DF04 Angle, signed int16 Byte Field Size: 2 Azimuth "1" Request Parameter 7 Optional Command Parameter: Optional Bit Field Size: Degrees clockwise relative to True North. **DD127** Generic Direction -True Range: 0 to 2Pi rad Resolution: 1x10E-4 rad DF02 Angle uint16 Resolution ~0.0057deg, 1 deg = .01745 radSNR "1" Byte Field Size: 2 Request Parameter 8 Optional Command Parameter: Optional Bit Field Size: DD057 SNR Value SNR expressed in C/No **DF31** dB, relative measure int16 Range: +/- 327.64 dB Resolution: 1x10E-2 dB 9 Range Residuals 1 Byte Field Size: 4 Request Parameter Optional Bit Field Size: Command Parameter: Optional **DD073** Range Residuals Range Residual value in meters Resolution: 1x10E-5 m Distance signed fine int32 Range: $+/-\sim 2.147 \times 10E + 4 \text{ m}$ 10 PRN Status "1" Byte Field Size: Request Parameter Optional Command Parameter: Optional Bit Field Size: 4 0 = Not Tracked, **DD124** PRN Usage Status 1 = Tracked but not used in solution, = Used in solution without Differential corrections, 3 = Differential Corrections available, 4 = Tracked with Differential Corrections, 5 = used with Differential Corrections, 6-13 = Reserved,= Error. 15 = No Selection DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields 11 Byte Field Size: Request Parameter **NMEA Reserved** Bit Field Size: resv 4 Command Parameter: **DD001** Reserved field Variable number of reserved bits, all set to logic "1" Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) Range: Variable Used to align subsequent data on a byte boundary.

GNSS Sats in View

GNSS Sats in View

PGN: 129540

PGN: 129540

hex: 1FA04 Byte Field Size: 1 Request Parameter 12 PRN "n" Optional Command Parameter: Optional Bit Field Size: 0 =value not used, **DD074** Satellite ID Number 1-32 = GPS, 33-64 = SBAS, Satellite, Based Augmentation System (ie WAAS) 65-96 = GLONASS.For GLONASS, satellites are identified by 64+satellite slot number. The slot numbers are 1 through 24 for the full GLONASS constellation of 24 satellites, this gives a range of 65 through 88. The numbers 89 through 96 are available if slot numbers above 24 are allocated to on-orbit spares. Range: 0 to 252 Resolution: 1 bit Unit-less number **DF53** Integer, 8 bit unsigned uint8 Variable Number of fields, Field number 5 repeated 13 Elevation "n" Byte Field Size: 2 Request Parameter Optional Bit Field Size: Command Parameter: Optional **DD054** Elevation Angle above or below the horizon. -90° to +90°; negative below the horizon Resolution: 1x10E-4 rad Resolution ~0.0057deg DF04 Angle, signed int16 Range: +/-Pi rad Variable Number of fields, Field number 6 repeated Azimuth "n" Byte Field Size: Request Parameter 14 Optional Command Parameter: Optional Bit Field Size: **DD127** Generic Direction -True Degrees clockwise relative to True North. DF02 Angle uint16 Range: 0 to 2Pi rad Resolution: 1x10E-4 rad Resolution ~0.0057deg, 1 deg = .01745 radVariable Number of fields, Field number 7 repeated SNR "n" Byte Field Size: 15 Request Parameter Optional Command Parameter: Optional Bit Field Size: DD057 SNR Value SNR expressed in C/No Range: +/- 327.64 dB Resolution: 1x10E-2 dB DF31 dB, relative measure int16 Variable Number of fields, Field number 8 repeated Range Residuals "n" Byte Field Size: 4 Request Parameter 16 Optional Bit Field Size: Command Parameter: **Optional** Range Residual value in meters **DD073** Range Residuals **DF79** Distance signed fine int32 Range: $+/-\sim 2.147 \times 10E + 4 \text{ m}$ Resolution: 1x10E-5 m Variable number of fields, Filed Number 9 repeated

GNSS Sats in View

PGN: 129540

Used to construct bit fields

hex: 1FA04 Byte Field Size: 17 PRN Status "n" Request Parameter Optional Bit Field Size: 4 Command Parameter: Optional **DD124** PRN Usage Status 0 = Not Tracked, 1 = Tracked but not used in solution, 2 = Used in solution without Differential corrections, 3 = Differential Corrections available, 4 = Tracked with Differential Corrections, 5 = used with Differential Corrections, 6-13 = Reserved,14 = Error,15 = No Selection Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) Range: Variable Variable Number of fields, Field number 10 repeated **NMEA Reserved** Request Parameter Byte Field Size: 18 Bit Field Size: resv 4 Command Parameter:

Range: Variable

Variable number of reserved bits, all set to logic "1"

Resolution: 1

Variable Number of fields, Field number 11 repeated

bit(n)

DD001 Reserved field

DF52 Bit field

GNSS Sats in View

GNSS Sats in View PGN: 129540 hex: 1FA04

12	PRN "n"	Byte Field Size: 1 Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD074 Satellite ID Number	For GPS: 1 - 99 1 -32 are reserved for 33 - 64 is reserved for 65 - 99 is undefined	For SBAS
		For GLONASS: 1 - 33 - 64 is reserved f 65 - 99 is reserved f	For SBAS
		For Galileo: 1 - 99 1 - 36 is reserved fo 37 - 64 is reserved f	r Galileo or Galileo SBAS 65 - 99 is undefined
		For BDS (BeiDou): 1-64 is reserved for 65 - 99 is undefined	BDS
		For QZSS: 1-99 1-10 is reserved for undefined	QZSS Satellites* 55-63 is reserved for QZSS SBAS* 64-99 is
		*Satellite ID shall b 193 is 1).	e 6 LSBs of the 8bit PRN Number (i.e. Satellite ID of PRN
		For NavIC (IRNSS) 1-15 are reserved fo 33 - 64 is reserved f 65-99 is undefined	or NavIC (IRNSS) 16-32 Undefined
	DF53 Integer, 8 bit unsigned uint8 See GNSS System ID "n" field 18 to determine what 0	Range: 0 to 252 GNSS the satellite ID belongs to.	Resolution: 1 bit Unit-less number
13	Elevation "n"	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter: Optional
	DD054 Elevation	Angle above or belo	ow the horizon90° to +90°; negative below the horizon
	DF04 Angle, signed int16 Variable Number of fields, Field number 6 repeated	Range: +/-Pi rad	Resolution: 1x10E-4 rad Resolution ~0.0057deg
14	Azimuth "n"	Byte Field Size: Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD127 Generic Direction -True	Degrees clockwise r	relative to True North.
	DF02 Angle uint16	Range: 0 to 2Pi rad	Resolution: 1x10E-4 rad Resolution ~0.0057deg, 1
	Variable Number of fields, Field number 7 repeated		deg = .01745 rad
15	SNR "n"	Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD057 SNR Value	SNR expressed in C	Z/No
	DF31 dB, relative measure int16	Range: +/- 327.64 dB	Resolution: 1x10E-2 dB

GNSS Sats in View PGN: 129540 hex: 1FA04

16	Range Residuals "n"		-	eld Size: 4	Request Parar Command Par	- p
	DD073 Range Residuals			Range Residual valu		ориона
	DF79 Distance signed fine Variable number of fields, Filed Number 9 re	int32 epeated	Range:	+/-~2.147x10E+4 m	Resolution: 1x10E-5 m	
17	PRN Status "n"		•	eld Size: iield Size: <mark>4</mark>	Request Parar Command Par	- ·
	DD124 PRN Usage Status			 2 = Used in solution 3 = Differential Constant 4 = Tracked with I 	ot used in solution, on without Differential correcti orrections available, Differential Corrections, erential Corrections,	ons,
	DF52 Bit field Variable Number of fields, Field number 10 i	bit(n) repeated	Range:	Variable	Resolution: 1	Used to construct bit fields
18	GNSS System ID "n"		•	eld Size: iield Size: <mark>4</mark>	Request Parar Command Par	
	DD503 GNSS System ID			0x1=GPS; 0x2=GLONASS; 0x3 = Galileo 0x4 = BDS (BeiDou) 0x5 = QZSS 0x6 = NavIC (IRNSS 0x7 to 0xD=Reserve 0XE=Error; 0XF=Null	5)	
	DF52 Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to construct bit fields

GPS Almanac Data PGN: 129541 hex: 1FA05

This PGN provides a single transmission that contains relevant almanac data for GPS products. The almanac contains satellite vehicle course orbital parameters. This information is not considered precise and is only valid for several months at a time. GPS products receive almanac data directly from the satellites.

This information would either be transmitted to and from GPS products for update, or system interrogation.

This information would generally be transmitted upon request, during calibration or installation, but not at regular intervals.

Single Fra		Priority Default: 6		ilt Update Ra		milliseconds	Frequency:		cycles per second
Destinat F ield #	ion: <mark>Globa</mark> Field Na	2 11 -	nal	Command Sup	oort: <mark>Optional</mark>		ACK Rqmnts:		al Reference ID # 24
1	PRN	ame		•	ield Size: 1		Request Pa	rameter	Optional
	DD074	Satellite ID Number			65-96 = GLO For GLONA numbers are gives a range	AS, Satellite, Based ADNASS. SS, satellites are ide	entified by 64+se full GLONASS The numbers 89	atellite slot n S constellation O through 96	umber. The slot on of 24 satellites, this
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolutio	n: 1 bit	Unit-le	ss number
2		ek number			Field Size: 2		Request Pa	Parameter:	-
	DD082	GPS Week Number				umber. Starting on 6 is value, i.e., it will c			number roll over will 023, 1024, 1025.
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resolutio	n: 1 bit	Unit-le	ss number
3	SV Healt	h Bits		•	ield Size:]	Request Pa		Optional Optional
	DD083	SV Health Bits				its 17-24 of each aln Table 20-VII and T		ference ICD-	GPS-200 paragraph
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: <mark>1</mark>	Used to	construct bit fields
4	Eccentric	city		•	ield Size:]	Request Pa		Optional Optional
	DD084	Eccentricity, e			Eccentricity,	, e. Reference ICD-0	GPS-200 Table	20-VI for sca	aling factors and units.
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	on: 1	Used to	construct bit fields
5	Almanac	Reference Time		•	ield Size: ield Size: 8]	Request Pa		Optional Optional
	DD085	Almanac Reference Time,	toa		Almanac refeand units.	erence time. Referen	nce ICD-GPS-2	00 Table 20-	VI for scaling factors
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	on: 1	Used to	construct bit fields

								nex: 1FAU5
6	Inclination	on Angle		•	Field Size:		Request Parameter	Optional
	DDaga		\T	Bit F	Field Size:		Command Parameter:	
	שאטעע	Almanac parameter, (sigma	1)1		units.	ation angle. Reference ICD-C	3PS-200 Table 20-VI for	scanng factors and
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
7	Rate of F	Right Ascension		Byte I	Field Size:		Request Parameter	Optional
				Bit F	Field Size:		Command Parameter:	
	DD087	Almanac parameter, OMEC	GADOT			f right ascension, OMEGADO g factors and units.	OT. Reference ICD-GPS	-200 Table 20-VI for
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	Used to	construct bit fields
8	Root of S	Semi-major Axis		Byte I	Field Size:		Request Parameter	Optional
		•		Bit F	Field Size:	24	Command Parameter:	•
	DD088	Almanac parameter, (A)1/2			Root o	of semi-major axis. Reference its.	e ICD-GPS-200 Table 20-	-VI for scaling factors
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
				District	Fi-1-1 0:		Dames of Dames of the	0 "
9	Argumer	nt of Perigee		-	Field Size: Field Size:		Request Parameter Command Parameter:	Optional Optional
	DD089	Almanac parameter, (omeg	a)		•	nent of Perigee. Reference IC		•
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
				5 (F: 110:			0 "
10	Longitud	de of Ascension Node		-	Field Size: Field Size:		Request Parameter Command Parameter:	Optional Optional
	DD090	Almanac parameter, (omeg	a)0			tude of ascension node. Refer and units.	rence ICD-GPS-200 Tabl	e 20-VI for scaling
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
11	Mean An	nomaly		Byte I	Field Size:		Request Parameter	Optional
		•		-	Field Size:		Command Parameter:	
	DD091	Almanac parameter, M0			Mean	anomaly. Reference ICD-GP	S-200 Table 20-VI for sc	aling factors and units.
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
12	Clock Pa	arameter 1		Byte I	Field Size:		Request Parameter	Optional
				Bit F	Field Size:		Command Parameter:	
	DD092	Almanac parameter, af0			Clock units.	Parameter 1. Reference ICD-	-GPS-200 Table 20-VI fo	r scaling factors and
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
13	Clack Da	arameter 2		Rvte l	Field Size:		Request Parameter	Optional
13	Older F			•	Field Size:		Command Parameter:	
	DD093	Almanac parameter, afl			Clock units.	Parameter 2. Reference ICD	-GPS-200 Table 20-VI fo	r scaling factors and
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields

bit(n)

Range: Variable

DF52 Bit field

GPS Almanac Data

GPS Almanac Data
PGN: 129541
hex: 1FA05

14 NMEA Reserved Byte Field Size: Request Parameter

Bit Field Size: resv 2 Command Parameter:

DD001 Reserved field Variable number of reserved bits, all set to logic "1"

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

Used to align subsequent data on a byte boundary.

PGN: 129541 hex: 1FA05

13	Clock Pa	rameter 2		•	eld Size: ield Size: <mark>11</mark>		Request Parameter Optional Command Parameter: Optional		
	DD093	Almanac parameter, afl			Clock Parar units.	Table 20-VI for	r scaling factors and		
	DF52	Bit field	bit(n)	Range:	Variable	Resolut	tion: 1	Used to	construct bit fields
14	4 NMEA Reserved			•	eld Size: ield Size: resv	2	•	Parameter d Parameter:	
	DD001	Reserved field			Variable nu	mber of reserved b	its, all set to log	gic "1"	
	DF52 Used to alig	Bit field gn subsequent data on a byte bo	bit(n) oundary.	Range:	Variable	Resolut	tion: 1	Used to	construct bit fields

GPS Almanac Data

Licensee: Maretron| Document ID: C0EE241|Purchased: February 21, 2023 4:00 GMT|

GNSS Pseudorange Noise Statistics

PGN: 129542 hex: 1FA06

GNSS pseudorange measurement noise statistics can be translated in the position domain in order to give statistical measures of the quality of the position solution. Intended for use with a Receiver Autonomous Integrity Monitoring (RAIM) application.

Single Fra	me: No	Priority Default: 6	Defau	ult Update R	ate:	1000 milli	iseconds /	Frequency:	1.	cycles per second
Destinat	ion: Globa	Query Support: Option	onal	Command Sup	port: Option	onal	,	ACK Rqmnts: No	ne	
Field #	Field N	ame							Origin	al Reference ID # 26
1	Sequenc	e ID			Field Size: Field Size:	1		Request Parar Command Par		Optional Optional
	DD056	Sequence ID			differ SOG	ent PGNs . For and RAIM va	or example, the	position. 255=no	ed to tie t	ogether between together the COG, sition fix to tie it to.
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number
2	RMS of F	Position Uncertainty		Byte I	Field Size:	2		Request Parar	neter	Optional
				Bit I	Field Size:			Command Par	ameter:	Optional
	DD075	Error Distances			Error	distances exp	ressed in meters	i.		
	DF13	Distance, short	uint16	Range:	0 to 655.	32 m	Resolution:	1x10E-2 m		
3	STD of N	lajor axis		Bvte I	Field Size:	2		Request Parar	neter	Optional
Ū				-	Field Size:			Command Par		
	DD075	Error Distances			Error	distances exp	ressed in meters			
	DF13	Distance, short	uint16	Range:	0 to 655.	32 m	Resolution:	1x10F-2 m		
	D1 10	Distance, short	umtro		0 10 033	32 III		TATOL 2 III		
4	STD of M	linor axis		Byte I	Field Size:	2		Request Parar	neter	Optional
-					Field Size:			Command Par	ameter:	Optional
	DD075	Error Distances			Error	distances exp	ressed in meters	i.		
	DF13	Distance, short	uint16	Range:	0 to 655.	32 m	Resolution:	1x10E-2 m		
	2110									
5	Orientati	on of Major axis		Byte I	Field Size:	2		Request Parar	neter	Optional
				Bit F	Field Size:			Command Par	ameter:	Optional
	DD127	Generic Direction -True			Degre	ees clockwise	relative to True	North.		
	DF02	Angle	uint16	Range:	0 to 2Pi r	ad	Resolution:	1x10E-4 rad		ion ~0.0057deg, 1 01745 rad
						-				
6	STD of L	at Error		-	Field Size:	2		Request Parar		Optional
				DILI	Field Size:			Command Par	arrieter.	Optional
	DD075	Error Distances				1	ressed in meters			
	DF13	Distance, short	uint16	Range:	0 to 655.	32 m	Resolution:	1x10E-2 m		
7	STD of L	on Error		Byte I	Field Size:	2		Request Parar		Optional
				Bit I	Field Size:			Command Par	ameter:	Optional
	DD075	Error Distances			Error	distances exp	ressed in meters	i.		
	DF13	Distance, short	uint16	Range:	0 to 655.	32 m	Resolution:	1x10E-2 m		

8 STD of Alt Error Byte Field Size: 2 Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD075 Error Distances

Error distances expressed in meters.

DF13 Distance, short

GNSS Pseudorange Noise Statistics

uint16

Range: 0 to 655.32 m

Resolution: 1x10E-2 m

GNSS RAIM Output PGN: 129545 hex: 1FA09

This PGN is used to provide the output from a GNSS Receiver's Receiver Autonomous Integrity Monitoring (RAIM) process. The Integrity field value is based upon the parameters set in PGN 130059 GNS RAIM Settings.

integrity	ncia vala	ic is basea apoir ii	ic parairi	Cicio	3011111 011	100000	140 10 1101 0	ottii igo.			
Single Fra		Priority Defaul			nult Update R			econds	Frequency:		cycles per second
Destinat	ion: Globa	al Query Suppor	t: Optiona	al	Command Sup	oport: Optio	nal		ACK Rqmnts:	None	
Field #	Field N	ame								Origin	al Reference ID # 84
1	Sequenc	e ID			Byte i	Field Size:	1		Request P	arameter	Optional
					Bit I	Field Size:			Command	Parameter:	Optional
	DD056	Sequence ID				differe SOG a	nt PGNs . For	r example, the ues to a given	e SID would be position. 25:	e used to tie t	ogether between together the COG, sition fix to tie it to.
	DF53	Integer, 8 bit unsig	gned	uint8	Range:	0 to 252		Resolution	¹ bit	Unit-les	ss number
2	Integrity	Flag			Byte i	Field Size:			Request P	arameter	Optional
					Bit I	Field Size:	2		Command	Parameter:	Optional
	DD209	GNSS Integrity				1 = Sa $2 = Ca$ $3 = Ur$	ution,		ve this capabi	lity	
	DF52	Bit field		bit(n)	Range:	Variable		Resolution	: 1	Used to	construct bit fields
3	NMEA R	eserved			Byte	Field Size:			Request P	arameter	
					Bit I	Field Size:	resv 6		Command	Parameter:	
	DD001	Reserved field				Variab	le number of 1	reserved bits,	all set to logic	e "1"	
	DF52	Bit field		bit(n)	Range:	Variable		Resolution	1	Used to	construct bit fields
	Used to ali	gn subsequent data or	n a byte bo	undary.							
4	Latitude	expected error			Byte i	Field Size:	2		Request P	arameter	Optional
					Bit I	Field Size:			Command	Parameter:	Optional
	DD220	Measure									
	DF14	Distance, short, si	gned	int16	Range:	+/-327.64	m	Resolution	1x10E-2 m	1	
5	Longitud	le expected error			Byte	Field Size:	2		Request P	arameter	Optional
					Bit I	Field Size:			Command	Parameter:	
	DD220	Measure									
		Distance, short, si	aned	int16	Range:	+/-327.64	m	Resolution	: 1x10E-2 m	,	
	DI 14	Distance, short, si	gneu	шию	range.	17-327.04	111	Redoration	TXTUE-2 II		
6	Altitude	expected error		-	Byte	Field Size:	2		Request P		Optional
					Bit I	Field Size:			Command	Parameter:	Optional
	DD220	Measure									
	DF14	Distance, short, si	gned	int16	Range:	+/-327.64	m	Resolution	1x10E-2 m	1	
	PIIT	_ 12.00.12.5, 51101.6, 51	0-1		. 3				VL 2 II		

GNSS RAIM Output

PGN: 129545

PGN: 129545

hex: 1FA09 Byte Field Size: 1 7 SV ID of most likely failed sat Request Parameter Optional Bit Field Size: Command Parameter: Optional **DD074** Satellite ID Number 0 =value not used, 1-32 = GPS, 33-64 = SBAS, Satellite, Based Augmentation System (ie WAAS) 65-96 = GLONASS.For GLONASS, satellites are identified by 64+satellite slot number. The slot numbers are 1 through 24 for the full GLONASS constellation of 24 satellites, this gives a range of 65 through 88. The numbers 89 through 96 are available if slot numbers above 24 are allocated to on-orbit spares. DF53 Integer, 8 bit unsigned Range: 0 to 252 Resolution: 1 bit Unit-less number uint8 Byte Field Size: Request Parameter Probability of missed detection Optional 8 Bit Field Size: Command Parameter: Optional **DD220** Measure Resolution: 1x10E-2 m Range: +/-327.64 m **DF14** Distance, short, signed int16 9 Estimate of pseudorange bias Byte Field Size: 2 Request Parameter Optional Command Parameter: Optional Bit Field Size: DD220 Measure Resolution: 1x10E-2 m DF14 Distance, short, signed int16 Range: +/-327.64 m 10 Std Deviation of bias Byte Field Size: 2 Request Parameter Optional Command Parameter: Optional Bit Field Size: DD220 Measure Resolution: 1x10E-2 m DF14 Distance, short, signed int16 Range: +/-327.64 m

GNSS RAIM Output

GNSS RAIM Output PGN: 129545
hex: 1FA09

Byte Field Size: 1 7 SV ID of most likely failed sat Request Parameter Optional Bit Field Size: Command Parameter: Optional **DD074** Satellite ID Number For GPS: 1 - 99 1-32 are reserved for GPS 33 - 64 is reserved for SBAS 65 - 99 is undefined For GLONASS: 1 - 99 33 - 64 is reserved for SBAS 65 - 99 is reserved for GLONASS For Galileo: 1 - 99 1 - 36 is reserved for Galileo 37 - 64 is reserved for Galileo SBAS 65 - 99 is undefined For BDS (BeiDou): 1 - 99 1-64 is reserved for BDS 65 - 99 is undefined For QZSS: 1-99 1-10 is reserved for QZSS Satellites* 55-63 is reserved for QZSS SBAS* 64-99 is undefined *Satellite ID shall be 6 LSBs of the 8bit PRN Number (i.e. Satellite ID of PRN 193 is 1). For NavIC (IRNSS): 1 – 99 1-15 are reserved for NavIC (IRNSS) 16-32 Undefined 33 - 64 is reserved for SBAS 65-99 is undefined Unit-less number Range: 0 to 252 Resolution: 1 bit DF53 Integer, 8 bit unsigned uint8 See GNSS System ID "1" field number TBD (either a new field at end of PGN or in place of reserved bits in field 3) to determine what GNSS the satellite ID belongs to. Byte Field Size: 2 8 Probability of missed detection Request Parameter Optional Bit Field Size: Command Parameter: Optional **DD220** Measure Distance, short, signed int16 Range: +/-327.64 m Resolution: 1x10E-2 m Byte Field Size: 9 Estimate of pseudorange bias Request Parameter Optional Command Parameter: Optional Bit Field Size: DD220 Measure Range: +/-327.64 m Resolution: 1x10E-2 m DF14 Distance, short, signed int16 Request Parameter Byte Field Size: 10 Std Deviation of bias Optional Bit Field Size: Command Parameter: Optional DD220 Measure Resolution: 1x10E-2 m DF14 Distance, short, signed int16 Range: +/-327.64 m

GNSS RAIM Settings

PGN: 129546 hex: 1FA0A

This PGN is used to report the control parameters for a GNSS Receiver Autonomous Integrity Monitoring (RAIM) process. The Command Group Function PGN 126208 provides the means to set these values over the network.

Single Fra	me: Yes	Priority Default: 6		Update Rate:		milliseconds	Frequency:	NA	cycles per second
	ion: Globa		<mark>ional</mark> Col	mmand Support:	Optional		ACK Rqmnts:		
ield #	Field N	ame						Origina	al Reference ID # 85
1	Radial P	osition Error Maximum tl	reshold	Byte Field Bit Field			Request Par Command P		Optional Optional
	DD075	Error Distances			Error distances	expressed in meter			
	DF13	Distance, short	uint16	Range: 0 to	655.32 m	Resolution	2: 1x10E-2 m		
2	Probabil	ity of False Alarm		Byte Field Bit Field			Request Par		Optional
	DD138	Generic percent of range		bil Field	S/2e.		Command P	arameter.	Optional
	DF30	Percent, Relative measure	int8	Range: +/-	124%	Resolution	1%		
3	Probabil	ity of Missed Detection		Byte Field			Request Par		Optional
		_		Bit Field	Size:		Command P	arameter:	Optional
	DD138	Generic percent of range							
	DF30	Percent, Relative measure	int8	Range: +/-	124%	Resolution	1%		
4	Pseudor	ange Residual Filtering T	ime Constant	t Byte Field Bit Field			Request Par Command P		Optional Optional
	DD210	Time Value, resolution 1	sec		Time in second	ls			
	DF80	Time, 1sec	uint16	Range: 0 to	65532 secon	ds Resolution	1 second		
5	NMEA R	eserved		Byte Field Bit Field	Size: resv	16	Request Par Command P		
	DD001	Reserved field			Variable numb	er of reserved bits,	all set to logic "	1"	
	DF52	Bit field	bit(n)	Range: Var	riable	Resolution	: 1	Used to	construct bit fields
	Used to ali	gn subsequent data on a byt	e boundary.						

GNSS RAIM Settings	PGN: 129546
	hex: 1FA0A

4	Pseudoran Constant	ge Residual Filtering Time	Byte Field Size: 2				Request Parame	eter	Optional
				Bit F	ield Size:		Command Paran	meter:	Required
	DD210 T	ime Value, resolution 1 sec	Time in seconds						
	DF80	Time, 1sec	uint16	Range:	0 to 65532 seconds	Resolution:	1 second		
-		EA Reserved					_		
5	NMEA Res	erved		•	eld Size: ield Size: resv 16		Request Parame Command Param		
5		erved eserved field		•		eserved bits, a	Command Paran		

GNSS Pseudorange Error Statistics

PGN: 129547 hex: 1FA0B

This parameter group is used to support Receiver Autononmous Integrity Monitoring (RAIM). Pseudorange measurement error statistics can be translated in the position domain in order to give statistical measures of the quality of the position solution.

Single Fra	ame: No	Priority Default: 6		It Update Rate		milliseconds	Frequency:	NA	cycles per second
Destina	tion: Globa	Query Support: Op	tional	Command Suppor	t: Optional		ACK Rqmnts: No	ne	
ield#	Field Na	ame						Origina	al Reference ID # 89
1	Sequenc	e ID		Byte Fie Bit Fiel	ld Size: 1 ld Size:		Request Paran Command Para		Optional Optional
	DD056	Sequence ID			An upward	counting number used	to tie related info	rmation to	gether between
		•			SOG and R.	Ns . For example, the AIM values to a given	position. 255=no		
					Range 0 to 2	252 for valid position f			
	DF53	Integer, 8 bit unsigned	uint8	Range: 0	to 252	Resolution	1 bit	Unit-les	s number
2	RMS Std	Dev of Range Inputs		Byte Fie	ld Size: 2		Request Paran	neter	Optional
_				•	d Size:		Command Para		
	DD219	Standard Deviation							-1
	DF13	Distance, short	uint16	Range: 0	to 655.32 m	Resolution	1x10E-2 m		
	RMS value & DGNSS	of the standard deviation of corrections.	the range inp	uts to the navig	ation process.	Range inputs include	pseudoranges		
3	Std Dev i	major error ellipse		Byte Fie	ld Size: 2		Request Paran	neter	Optional
				Bit Fiel	d Size:		Command Para		
	DD219	Standard Deviation							
	DF13	Distance, short	uint16	Range: 0	to 655.32 m	Resolution	1x10E-2 m		
	Standard d	eviation of the semi-major a	xis of error ell	ipse (meters)					
4	Std Dev i	minor error ellipse		Byte Fie	ld Size: 2		Request Paran	neter	Optional
				Bit Fiel	ld Size:		Command Para	ameter:	Optional
	DD219	Standard Deviation							
	DF13	Distance, short	uint16	Range: 0	to 655.32 m	Resolution	1x10E-2 m		
	Standard d	eviation of the semi-minor a	xis of error ell	ipse (meters).					
5	Orientati	on of error ellipse		Byte Fie	ld Size: 2		Request Paran	neter	Optional
				Bit Fiel	ld Size:		Command Para	ameter:	Optional
	DD127	Generic Direction -True			Degrees clo	ckwise relative to True	North.		
	DF02	Angle	uint16	Range: 0	to 2Pi rad	Resolution	1x10E-4 rad		ion ~0.0057deg, 1 1745 rad
	Orientation	of semi-major axis of error	ellipse (from t	rue north)					
6	Std Dev I	Latitude error		Byte Fie	ld Size: 2		Request Paran	neter	Optional
				Bit Fiel	ld Size:		Command Para	ameter:	Optional
	DD219	Standard Deviation							
	DF13	Distance, short	uint16	Range: 0	to 655.32 m	Resolution	1x10E-2 m		
	Standard d	eviation of Latitude error (m	eters)						

GNS	S Pseud	dorange Error Si	tatistics					PGN: 129 hex: 1F	_
7	Std Dev	Longitude error		•	Field Size: 2 Field Size:		Request Parameter Command Parameter	-	
	DD219	Standard Deviation							
	DF13	Distance, short	uint16	Range:	0 to 655.32 m	Resolution:	1x10E-2 m		
	Standard d	leviation of Longitude error (meters)						
8	Std Dev	Altitude error		Byte I	Field Size: 2		Request Parameter	r <mark>Optional</mark>	
				Bit I	Field Size:		Command Paramet	ter: Optional	
	DD219	Standard Deviation							
	DF13	Distance, short	uint16	Range:	0 to 655.32 m	Resolution:	1x10E-2 m		
	Standard d	leviation of altitude error (me	eters)						

DGNSS Corrections PGN: 129549 hex: 1FA0D

This PGN provides a means to pass differential GNSS corrections between NMEA devices. Passing DGNSS data this way allows for more flexibility than traditional methods. One differential correction receiver could supply multiple GNSS receivers. Multiple differential correction receivers or data streams could be connected to a GNSS receiver allowing for network DGNSS approaches. This PGN can accommodate DGPS and DGLONASS corrections. Future systems can be indicated by allocation of the reserved states in field 3. These corrections can be related to the position solution and to time through proper application of the sequence ID field.

·	ame: No	Priority Default:		ılt Update Ra		milliseconds	Frequency:		cycles per second
	tion: Glob		Optional	Command Supp	ort: <mark>Optional</mark>		ACK Rqmnts.		al Deference ID # 96
<u>ield #</u> 1	Field N Sequence			•	ield Size: 1		Request F		al Reference ID # 86 Optional Optional
	DD056	Sequence ID			different PGN SOG and RA	ounting number used As . For example, the IM values to a given 52 for valid position	SID would position. 25	be used to tie	together the COG,
	DF53	Integer, 8 bit unsigne	ed uint8	Range:	0 to 252	Resolution	1 bit	Unit-le	ss number
2	Referen	ce Station ID		•	ield Size: eld Size: 12		Request F	arameter Parameter:	Optional Optional
	DD071	Ref Station				ation ID. Reference Serence document req		er as provideo	l by the Service
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	: 1	Used to	construct bit fields
3	Referen	ce Station Type		•	ield Size: eld Size: 4		Request P	arameter Parameter:	Optional Optional
	DD070	Ref Station Type			Reference Sta 0x0=GPS; 0x1=GLONA 0x2 to 0xD=I 0XE=Error; 0XF=Null	SS;			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
4	Time of	corrections		-	ield Size: 2 eld Size:		Request F	Parameter Parameter:	Optional Optional
	DD211	Time Value, resolutio	n 0.1 sec		Time in secon	nds			
	DF81	Time, 0.1sec	uint16	Range:	0 to 6553.2 seco	nds Resolution	1x10E-1 s	ec	
5	Station I	Health		•	eld Size:		Request F	arameter Parameter:	Optional Optional
	DD212	Station Heath							
						st Mode - DO NOT U	JSE,		

)GN:	SS Cori	rections					F	PGN: 129549 hex: 1FA0D
6	NMEA R	eserved		Byte I	Field Size:		Request Parameter	
				Bit I	Field Size: resv 4		Command Paramete	r:
	DD001	Reserved field			Variable number	of reserved bits, a	all set to logic "1"	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	Used Used	to construct bit fields
	Used to alig	gn subsequent data on a byte bo	oundary.					
7	Satellite	ID		Byte I	Field Size: 1		Request Parameter	Optional
				Bit I	Field Size:		Command Paramete	r: Optional
	DD074	Satellite ID Number			65-96 = GLONA For GLONASS, s numbers are 1 thr	atellite, Based Au SS. satellites are ident rough 24 for the f 55 through 88. Th	ugmentation System (ie v tiffied by 64+satellite slot full GLONASS constella the numbers 89 through 9 on-orbit spares.	number. The slot tion of 24 satellites, this
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	: 1 bit Unit-	less number
8	PRC			Ryte	Field Size: 4		Request Parameter	Optional
0	PRC				Field Size: 4		Command Paramete	
	DD213	Distance, int 32 4dp						
	DF83	Distance, signed 4dp	int32	Range:	+/-~2.147x10E+5 n	n Resolution.	1x10E-4 m	
9	RRC			Byte I	Field Size: 2		Request Parameter	Optional
				Bit I	Field Size:		Command Paramete	r: Optional
	DD214	Generic Speed						
	DF82	Speed, signed 4dpt	int16	Range:	+/-3.2764 m/s	Resolution	1x10E-4 m/s	
10	UDRE			•	Field Size: 2		Request Parameter Command Paramete	Optional r: Optional
	DD195	Distance, short			Dependent upon	PG Field definition	on.	
	DF13	Distance, short	uint16	Range:	0 to 655.32 m	Resolution	1x10E-2 m	
	value 655 3	32 (all 1's) indicates satellite inva	alid do not u	ise or ston	using immediately			
11	IOD	5_ (1 0) maisatos satomo mive	40 1101 0	-	Field Size: 1		Request Parameter	Optional
••					Field Size:		Command Paramete	•
	DD005	Generic numeric ID, short			Number of route,	waypoint, event,		

Range: 0 to 252

uint8

DF53 Integer, 8 bit unsigned

DGNSS Corrections

Unit-less number

Resolution: 1 bit

DGNSS Corrections PGN: 129549 hex: 1FA0D

7	Satellite ID		Byte Field Size: 1			Request Parame		Optional	
7		Satellite ID Number			For GPS: 1 - 99 1 - 32 are reserved 33 - 64 is reserved 65 - 99 is undefine For GLONASS: 1 33 - 64 is reserved 65 - 99 is reserved For Galileo: 1 - 99 1 - 36 is reserved: 37 - 64 is reserved For BDS (BeiDou 1-64 is reserved for 65 - 99 is undefined For QZSS: 1-99 1-10 is reserved for undefined *Satellite ID shall 193 is 1). For NavIC (IRNS)	I for SBAS ed - 99 I for SBAS I for GLONASS for Galileo I for Galileo SBA Or QZSS Satellite be 6 LSBs of the S): 1 – 99 for NavIC (IRNS) I for SBAS	Command Parar	meter: ined ad for Q	Optional Ozss sbas* 64-99
	DF53	Integer, 8 bit unsigned	uint8		0 to 252	Resolution:	1 bit	Unit-le	ss number
		System ID field 6 to determine v	vnat GNSS						
8	PRC			-	ield Size: 4 Field Size:		Request Parame Command Param		Optional Optional
	DD213	Distance, int 32 4dp							
	DF83	Distance, signed 4dp	int32	Range:	+/-~2.147x10E+5 m	Resolution:	1x10E-4 m		
9	RRC			•	ield Size: 2		Request Parame Command Parar		Optional Optional
	DD214	Generic Speed							
	DF82	Speed, signed 4dpt	int16	Range:	+/-3.2764 m/s	Resolution:	1x10E-4 m/s		
10	UDRE				ield Size: 2		Request Parame		Optional Optional
	DD195	Distance, short			Dependent upon F	G Field definition	on.		
	DF13	Distance, short	uint16	Range:	0 to 655.32 m	Resolution:	1x10E-2 m		
		32 (all 1's) indicates satellite inva							

DGN:	SS Cor	rections		PGN: 129549 hex: 1FA0D		
11	IOD		Byte Field Size: Bit Field Size:	Request Parameter Command Parameter:	Optional Optional	
	DD005	Generic numeric ID, short	Number of route, waypoint, e		- F	

Resolution: 1 bit

Unit-less number

Range: 0 to 252

uint8

Integer, 8 bit unsigned

DF53

GNSS	S Differ	ential Correctio	n Recei	ver Intei	rface			P	GN: 129550 hex: 1FA0E
GNSS o	common o	lifferential correction re	ceiver par	ameter stati	us.				
-	ame: Yes	Priority Default: 6 Query Support: Op		ult Update R Command Sup	ate: Optional	milliseconds	Frequency: ACK Rqmnts:		cycles per second
Field #	Field N	ame						Origin	al Reference ID # 27
1	Channel			-	Field Size: 1 Field Size:		Request Pa Command	arameter Parameter:	Optional Optional
		Receiver channel numb	er		input chann	el, this value shall be	1; 0 is undefin	ed.	er only has one beacon
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolutio	on: 1 bit	Unit-le	ss number
2	Frequen			Bit I	Field Size: 4 Field Size:			Parameter:	Optional Optional
	DD077 DF21	Differential Correction Frequency	Receiver fro uint32	-		DE+10 Resolution		eiver.	
3	Serial In	terface Bit Rate		•	Field Size: Field Size: 5		Request Pa	arameter Parameter:	Optional Optional
	DD078	Differential Correction	Broadcast E	Bit Rate	This is the b 0 = 25bps, 1 = 50bps, 2 = 100bps 3 = 200bps 4 = 300bps 5 = 500bps 6 = 1200bp 7 = 2400bp 8 = 4800bp 9 = 9600bp 10 = 192001 11 = 384001 12 = 576001 13-29 = Res 30 = Error, 31 = Null	o, os, os, os, os, ops, ops, ops,	on receiver.		
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	on: 1	Used to	construct bit fields
4	Serial In	terface Detection Mode		•	Field Size: Field Size: 3]	Request Pa	arameter Parameter:	Optional Optional
	DD079	Mode, Bit Rate			This is the r 0 = Auto bit 1 = Manual 2-5 = Reser	bit rate set,	the correction	receiver.	

6 = Error, 7 = Null.

Range: Variable

bit(n)

DF52 Bit field

Used to construct bit fields

Resolution: 1

GNSS Differential Correction Receiver Interface PGN: 129550 hex: 1FA0E Byte Field Size: 5 **Differential Source** Request Parameter Optional Bit Field Size: 4 Command Parameter: Optional **DD125** Differential Source 0 = Auto Select,1 = Loran Communications 2 = MSK Beacon,3 = FM Subcarrier, 4 = AIS (Automatic Identification System), 5 = Other Ground-based Radio, 6 = SBAS (Satellite Based Augmentation System, 7 = Other Satellite, 8-13 = Reserved14 = Error, 15 = No Selection DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields 6 **Differential Operation Mode** Byte Field Size: Request Parameter Optional Bit Field Size: 4 Command Parameter: Optional **DD126** Differential Operating Mode 0 = Manual.= Auto Power, 2 = Auto Range, 3-13 = Reserved,14 = Error, 15 = No Selection Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) Range: Variable

Byte Field Size:

Range: Variable

bit(n)

Bit Field Size: resv

8

Variable number of reserved bits, all set to logic "1"

Resolution: 1

NMEA Reserved

DD001 Reserved fieldDF52 Bit field

Used to align subsequent data on a byte boundary.

Request Parameter

Command Parameter:

Used to construct bit fields

GNSS Differential Correction Receiver Interface

Differential Operation Mode

6

7

PGN: 129550 hex: 1FA0E

Request Parameter Optional Command Parameter: Optional

DD126 Differential Operating Mode 0 = Manual,

1 = Auto Power, 2 = Auto Range,

3-13 = Reserved, 14 = Error, 15 = No Selection

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

NMEA Reserved

Byte Field Size: Request Parameter

Bit Field Size: resv 8

Command Parameter:

Byte Field Size:

Bit Field Size: 4

DD001 Reserved field Variable number of reserved bits, all set to logic "1"

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

Used to align subsequent data on a byte boundary.

GNSS Differential Correction Receiver Signal

PGN: 129551 hex: 1FA0F

GNSS differential correction receiver status tagged by sequence ID. Status information includes frequency, SNR, and use as a correction source.

Single Fra			Priority Default:	-	Default Up					Frequency:		cycles per second
	ion: Glob		Query Support:	Optional	Comm	and Sup	oport: Option	nal		ACK Rqmnts:		al Reference ID # 2
F <u>ield #</u> 1	Field N Sequen						Field Size:	1		Request P		Optional
	DD056	Seque	ence ID			2	An upv differer SOG a	nt PGNs . For nd RAIM valu	r example, the	to tie related SID would b position. 255	information to be used to tie to	ogether between together the COG, sition fix to tie it to.
	DF53	Integ	ger, 8 bit unsig	ned ui	nt8 R	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number
2	Channe	I					Field Size: Field Size:	1		Request Pa	arameter Parameter:	Optional Optional
	DD076	Recei	ver channel nu	mber					of the correcti			er only has one beacon
	DF53	Integ	ger, 8 bit unsign	ned ui	nt8 R	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number
3	Signal S	Strengtl	n				Field Size: Field Size:	1		Request Pa Command	arameter Parameter:	Optional Optional
	DD080	Corre	ction Receiver	Signal Stro	ength		This is	the signal stre	ength expresse	d in dB with	respect to 1u	V/m.
	DF16	Elec	tric field	in	t32 R	Range:	+/-327.64	dB re: uV/m	Resolution:	1x10E-2 d re: uV/m	В	
4	Signal S	SNR				Byte Field Size: 2 Bit Field Size:				Request Pa	arameter Parameter:	Optional Optional
	DD081	SNR	Value				SNR ex	pressed in dE	3.			
	DF31	dB, 1	relative measur	re in	t16 R	Range:	+/- 327.64	dB	Resolution:	1x10E-2 d	В	
5	Frequer	ісу					Field Size: Field Size:	1		Request Pa		Optional Optional
	DD077	Diffe	rential Correcti	on Receive	er frequenc	су	This is	the input freq	uency of the c	orrection rec	eiver.	
	DF21	Freq	uency	ui	nt32 R	Range:	0 to ~4.29: Hz	5x10E+10	Resolution:	10 Hz		
6	Station	Type				-	Field Size: Field Size:	1		Request Pa Command	arameter Parameter:	Optional Optional
	DD070	Ref S	tation Type				0x0=G $0x1=G$	LONASS; 0xD=Reserve rror;	•			
	DF52	Bit f	ield	bi	t(n)	Range:	Variable		Resolution:	1	Used to	construct bit fields

PGN: 129551

hex: 1FA0F Byte Field Size: 7 Station ID Request Parameter Optional Bit Field Size: 12 Command Parameter: Optional Reference Station ID. Reference Station number as provided by the Service **DD071** Ref Station Provider.[Reference document required] Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) Range: Variable **Differential Signal Bit Rate** Byte Field Size: Request Parameter 8 Optional Bit Field Size: 5 Command Parameter: Optional **DD078** Differential Correction Broadcast Bit Rate This is the bit rate of the correction receiver. 0 = 25 bps,1 = 50bps, 2 = 100 bps, 3 = 200bps, 4 = 300 bps5 = 500 bps,6 = 1200 bps7 = 2400 bps,8 = 4800 bps,9 = 9600 bps10 = 19200bps, 11 = 38400bps, 12 = 57600bps, 13-29 = Reserved,30 = Error,31 = NullDF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields **Differential Signal Detection Mode** Byte Field Size: Request Parameter 9 Optional Bit Field Size: 3 Command Parameter: Optional **DD079** Mode, Bit Rate This is the mode of operation for the correction receiver. 0 =Auto bit rate set, 1 = Manual bit rate set. 2-5 = Reserved6 = Error, 7 = Null.Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) Range: Variable 10 **Used as Correction Source** Byte Field Size: Request Parameter Optional Bit Field Size: 2 Command Parameter: Optional MSB/LSB: **DD002** Generic status pair 00 = [No, Off, Disabled, Reset, "0"], 01 = [Yes, On, Enabled, Set, "1"], 10 = Error,11= [Unavailable, Unknown] Resolution: 1 DF52 Bit field bit(n) Range: Variable Used to construct bit fields **NMEA Reserved** Byte Field Size: Request Parameter 11 Bit Field Size: resv 2 Command Parameter: **DD001** Reserved field Variable number of reserved bits, all set to logic "1" Range: Variable Resolution: 1 Used to construct bit fields DF52 Bit field bit(n)

Used to align subsequent data on a byte boundary.

GNSS Differential Correction Receiver Signal

GNSS Differential Correction Receiver Signal PGN: 129551 hex: 1FA0F Byte Field Size: 12 **Differential Source** Request Parameter Optional Bit Field Size: 4 Command Parameter: Optional **DD125** Differential Source 0 = Auto Select,1 = Loran Communications 2 = MSK Beacon,3 = FM Subcarrier, 4 = AIS (Automatic Identification System), 5 = Other Ground-based Radio, 6 = SBAS (Satellite Based Augmentation System, 7 = Other Satellite, 8-13 = Reserved14 = Error, 15 = No Selection DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields 13 **Time Since Last Sat Differential Sync** Byte Field Size: Request Parameter Optional Bit Field Size: Command Parameter: Optional **DD060** Differential Age Age of Differential corrections Resolution: 1x10E-2sec **DF66** Time interval, .01sec Range: 0 to 655.32s uint16

Byte Field Size:

Range: Variable

bit(n)

Bit Field Size: 16

document required]

14

Satellite Service ID No.

DF52 Bit field

DD143 Satellite Service ID

Request Parameter

Satellite Service ID number as provided by the Service Provider. [Reference

Resolution: 1

Command Parameter: Optional

Optional

Used to construct bit fields

GNSS Differential Correction Receiver Signal

PGN: 129551 hex: 1FA0F

12	Different	ial Source		•	eld Size: iield Size: <mark>4</mark>		Request Parameter Command Paramet	Optional er: Optional
	DD125	Differential Source			0 = Auto Select, 1 = Loran Communi 2 = MSK Beacon, 3 = FM Subcarrier, 4 = AIS (Automatic 5 = Other Ground-bactories (Satellite 7 = Other Satellite, 8 = Satellite 9 = NTRP 10 -13 = Reserved, 14 = Error, 15 = No Selection	Identification ased Radio,	• /	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution.	1 Use	d to construct bit fields
13	Time Sir	ce Last Sat Differential Sync		•	eld Size: 2		Request Parameter Command Paramet	O P 1. O
	DD060	Differential Age			Age of Differential of	corrections		
	DF66	Time interval, .01sec	uint16	Range:	0 to 655.32s	Resolution.	1x10E-2sec	
14	Satellite	Service ID No.		Byte Field Size: Bit Field Size: 16			Request Parameter Command Paramet	-
	DD143	Satellite Service ID			Satellite Service ID adocument required]	number as pro	vided by the Service Pr	ovider.[Reference
	DF52	Bit field	bit(n)	Range:	Variable	Resolution.	1 Use	d to construct bit fields

PGN: 129556 hex: 1FA14

This PGN provides a single transmission that contains relevant almanac data for Glonass products. The almanac contains satellite vehicle course orbital parameters. This information is not considered precise and is only valid for several months at a time. Glonass products receive almanac data directly from the satellites.

This information would either be transmitted to and from Glonass products for update, or system interrogation.

This information would generally be transmitted upon request, during calibration or installation, but not at regular intervals.

Single Fra	ame: No	Priority Default: 6	Defa	ult Update R	ate:	milliseconds	Frequency:	NA	cycles per second		
	tion: Globa	7 77	nal	Command Sup	pport: Optional		ACK Rqmnts:		al Deference ID # 20		
F <u>ield #</u>	Field N	ame		Dista	Field Circ. 4		Danwart Da		al Reference ID # 30		
1	PRN				Field Size: 1 Field Size:		Request Pa Command		Optional Optional		
	DD074	Satellite ID Number			0 = value no	ot used.		a.a	Optional		
	DD014	Satellite 15 Number			1-32 = GPS	,					
					33-64 = SB 65-96 = GL	AS, Satellite, Based ONASS.	Augmentation S	ystem (ie W.	AAS)		
					For GLONASS, satellites are identified by 64+satellite slot number. The slot numbers are 1 through 24 for the full GLONASS constellation of 24 satellites, this						
					gives a range of 65 through 88. The numbers 89 through 96 are available if slot						
				_		ove 24 are allocated					
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	on: 1 bit	Unit-le	ss number		
2	NA			Rvte I	Field Size: 2		Request Pa	rameter	Optional		
2	NA.			-	Field Size:		Command		•		
	DD094	Almanac parameter, NA			Calendar da	y count within the fo	our year period b	eginning wi	th the previous leap		
		·			year						
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resolution	on: 1 bit	Unit-le	ss number		
		unsigned									
3	NMEA R	eserved		Byte I	Field Size:		Request Pa	arameter			
				Bit F	Field Size: resv	2	Parameter:				
	DD001	Reserved field			Variable nu	mber of reserved bit	s, all set to logic	"1"			
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	on: 1	Used to	construct bit fields		
	Llood to ali	an aubacquant data an a buta l									
4	CnA	gn subsequent data on a byte t	Journary.		Field Size:		Request Pa	rameter	Optional		
4	OIIA			•	Field Size: 1	1	Command I				
	DD095	Almanac parameter, CnA			Generalized	health of the Satelli					
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	on: 1	Used to	construct bit fields		
5	HnA			•	Field Size:	-	Request Pa		Optional		
				Bit F	Field Size: 5		Command				
	DD096	Almanac parameter, HnA			Carrier freq	uency number respe	ctively, reference	e GLONASS	S ICD.		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	on: 1	Used to	construct bit fields		

GLONASS Almanac Data PGN: 129556 hex: 1FA14 Byte Field Size: Request Parameter 6 (epsilon)nA Optional Bit Field Size: 16 Command Parameter: Optional Eccentricity, reference GLONASS ICD Section 4.5 Table 4.3 (fill unused bits with DD097 Almanac parameter, (epsilon)nA Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) Range: Variable 7 (deltaTnA)DOT Byte Field Size: Request Parameter Optional Command Parameter: Optional Bit Field Size: 8 **DD098** Almanac parameter, (deltaTnA)DOT Rate of change of the draconitic circling time, reference GLONASS ICD Section 4.5 Table 4.3 (fill unused bits with zeros). Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) Range: Variable Request Parameter 8 Byte Field Size: (omega)nA Optional Bit Field Size: 16 Command Parameter: Optional Almanac parameter, (omega)nA Argument of Perigee, reference GLONASS ICD Section 4.5 Table 4.3 (fill unused bits with zeros). DF52 Bit field Range: Variable Resolution: 1 Used to construct bit fields bit(n) (delta)TnA Byte Field Size: Request Parameter q Optional Bit Field Size: 24 Command Parameter: Optional DD100 Almanac parameter, (delta)TnA Correction to the average value of the draconitic circling time, reference GLONASS ICD Section 4.5 Table 4.3 (fill unused bits with zeros). DF52 Bit field Range: Variable Resolution: 1 Used to construct bit fields bit(n) Byte Field Size: 10 tnA Request Parameter Optional Bit Field Size: 24 Command Parameter: Optional Time of the ascension node, almanac reference time, reference GLONASS ICD DD101 Almanac parameter, tnA Section 4.5 Table 4.3 (fill unused bits with zeros). Resolution: 1 DF52 Bit field bit(n) Range: Variable Used to construct bit fields 11 Byte Field Size: Request Parameter (lambda)nA Optional Command Parameter: Optional Bit Field Size: 24 Greenwich longitude of the ascension node, reference GLONASS ICD Section 4.5 **DD102** Almanac parameter, (lambda)nA Table 4.3 (fill unused bits with zeros). Resolution: 1 DF52 Bit field bit(n) Range: Variable Used to construct bit fields

Byte Field Size:

Range: Variable

Byte Field Size:

Range: Variable

Bit Field Size: 28

unused bits with zeros).

bit(n)

bit(n)

Bit Field Size: 24

DD103 Almanac parameter, (delta)inA

DD104 Almanac parameter, (tau)cA

12

13

(delta)inA

tcA

DF52 Bit field

DF52 Bit field

Optional

Used to construct bit fields

Optional

Used to construct bit fields

Request Parameter

Request Parameter

Correction to the average value of the inclination angle, reference GLONASS ICD

System time scale correction, reference GLONASS ICD Section 4.5 Table 4.3 (fill

Section 4.5 Table 4.3 (fill unused bits with zeros).

Resolution: 1

Resolution: 1

Command Parameter: Optional

Command Parameter: Optional

GLONASS Almanac Data PGN: 129556 hex: 1FA14

14tnAByte Field Size:Request ParameterOptionalBit Field Size:12Command Parameter:Optional

DD105 Almanac parameter, (tau)nA Course value of the time scale shift, reference GLONASS ICD Section 4.5 Table

4.3 (fill unused bits with zeros).

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

PGN: 129556

Used to construct bit fields

hex: 1FA14 Byte Field Size: Request Parameter 13 tcA Optional Bit Field Size: 28 Command Parameter: Optional System time scale correction, reference GLONASS ICD Section 4.5 Table 4.3 (fill DD104 Almanac parameter, (tau)cA unused bits with zeros). Resolution: 1 Used to construct bit fields **DF52** Bit field bit(n) Range: Variable 14 tnA Byte Field Size: Request Parameter Optional Bit Field Size: 12 Command Parameter: Optional Course value of the time scale shift, reference GLONASS ICD Section 4.5 Table DD105 Almanac parameter, (tau)nA 4.3 (fill unused bits with zeros).

Range: Variable

bit(n)

Resolution: 1

GLONASS Almanac Data

DF52

Bit field

AIS DGNSS Broadcast Binary Message

PGN: 129792 hex: 1FB00

This parameter group provides data associated with the ITU-R M.1371 Message 17 GNSS Broadcast Binary Message containing DGNSS corrections from a base station. An AIS device may generate this parameter group either upon receiving a VHF data link message 17, or upon receipt of an ISO or NMEA request PGN (see ITU-R M.1371-1 for additional information). Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Single Fr	ame: No	Priority Default: 6	Default	Update R	ate:	milliseconds	Frequency:	NA cycles per second
Destination	n: Global	Query Support: Optional	Co	mmand Sup	port: Required	ACK Rqmnt	s: <mark>None</mark>	
Field #	Field Na	ame						
1	Message	ID		•	eld Size: ield Size: 6		Request Para Command Pa	ameter Optional arameter: Required
	DD188	AIS Message Identifier			Message Ide	entifier (range of 0	to 63).	
					See the lates	t version of ITU-R	M.1371 for more	information.
	DF52 17 = GNSS	Bit field Broadcast Binary Message	bit(n)	Range:	Variable	Resolut	tion: 1	Used to construct bit fields
2	Repeat Ir	ndicator		•	eld Size: ield Size: 2		Request Para Command Pa	ameter Optional arameter: Note 1
	DD185	AIS Repeater Indicator			(range of 0 t 0 = Default 1 = First reti	o 3).	e how many times	a message has been repeated
					3 = Final ret		R M.1371 for more	information
	DF52	Bit field	bit(n)	Range:	Variable	Resolut		Used to construct bit fields
3	Source II	ס		-	eld Size: 4		Request Para Command Pa	ameter Optional arameter: Required
	DD010	Generic numeric ID, large			Number of r	oute, waypoint, ev	ent, mark, etc.	
	DF55 MMSI numl	Integer, 32 bit unsigned ber of base station reporting DGN	uint32 SS inform		0 to 4,294,967,	292 Resolut	tion: 1 bit	Unit-less number
4	NMEA Re	eserved		-	eld Size: ield Size: resv	1	Request Para Command Pa	
	DD001	Reserved field			Variable nur	number of reserved bits, all set to logic "1"		1"
	DF52	Bit field	bit(n)	Range:	Variable	Resolut	tion: 1	Used to construct bit fields
	Used to alig	gn subsequent data on byte bound	dary.					

AIS DGNSS Broadcast Binary Message

PGN: 129792 hex: 1FB00

5	AIS Transceiver Information		Byte Fie Bit Fi	eld Size: eld Size: <mark>5</mark>		Request Param Command Para		Optional Note 2
	DD246 AIS Transceiver Information			1 = Channel B 2 = Channel A 3 = Channel B 4 = Own infor 5 = Channel C 7 = Channel C 8 = Channel C 9 = Channel C 10 - 30 = Rese 31 = AIS device The AIS transc channel of an PGN. This co sentence to rep The AIS transc transmission of the appropriate NMEA 0183 V The AIS transc was not transmisprovided by A	ceiver Information fi AIS message that wa rresponds to the same port a received AIS M ceiver Information fi channel of an AIS me e AIS PGN. This co VDO sentence to rep ceiver Information fi nitted and then place	reception, reception, transmission, transmission, tel for Transmissio eld (values 0, 1, 6 as received and pla te mechanism used Message. eld (values 2, 3, 8 ssage that was tra rresponds to the sa ort a transmitted A eld (value 4) ident d into the appropr t a 1hz rate to repo	, 7) iden aced into 1 in the I , 9) iden assmitted ame mec AIS Messi iifies an iate AIS	tifies the dand then placed into thanism used in the sage. AIS message that
					ceiver Information fi oup Function PGN 1		31) are o	only used with the
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
6	AIS Spare		•	eld Size: ield Size: resv 2	2	Request Param Command Para		Optional Required
	DD311 AIS Spare Field			bits in NMEA	ber of reserved bits, a network messages a sed or reserved bits a	re encoded with lo	ogic 1's,	however for AIS
	DF115 Bit field defaulting to zer This field mirrors the "Spare" bit field found wals message can also be accommodated ware encoded with logic 1's, however for AIS	vithin the corr thin this field	espondi Normal	ly, spare or reserve	d bits in NMEA Netw	ion within the ork Messages	applical must be NULL of when un spare fi	data format ble to AIS field that e set to zero for a data condition or nused - applies to AIS elds and AIS fields for future use
7	Longitude			eld Size: 4		Request Param Command Para		Optional Required
	DD023 Longitude, WGS-84			Longitude refe	erenced to WGS-84.			
	DF25 Longitude Longitude of base station reporting DGNSS		Range:	+/- 180 deg	Resolution:	1x10E-7 deg	"-" = W cm	est, resolution ∼1.1

AIS DGNSS Broadcast Binary Message **PGN: 129792** hex: 1FB00 Byte Field Size: 4 Request Parameter Latitude 8 Optional Bit Field Size: Command Parameter: Required DD022 Latitude, WGS-84 Latitude referenced to WGS-84. Resolution: 1x10E-7 deg Range: +/- 90 deg "-" = South, resolution ~ 1.1 DF23 Latitude int32 Latitude of base station reporting DGNSS information. **NMEA Reserved** Byte Field Size: Request Parameter Bit Field Size: resv 3 Command Parameter: **DD001** Reserved field Variable number of reserved bits, all set to logic "1" Bit field Resolution: 1 Used to construct bit fields DF52 Range: Variable bit(n) Used to align subsequent data on byte boundary. 10 **AIS Spare** Byte Field Size: Request Parameter Optional Bit Field Size: resv 5 Command Parameter: Required **DD311** AIS Spare Field Variable number of reserved bits, all set to logic "0". Normally, spare or reserved bits in NMEA network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. **DF115** Bit field defaulting to zer bit0(n) Range: N2KUnitless Resolution: 1 Special data format applicable to AIS field that This field mirrors the "Spare" bit field found within the corresponding AIS message such that future definition within the must be set to zero for a AIS message can also be accommodated within this field. Normally, spare or reserved bits in NMEA Network Messages NULL data condition or are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. when unused - applies to AIS spare fields and AIS fields that are for future use Byte Field Size: Number of Bits in Binary Data Field Request Parameter 11 Optional Command Parameter: Required Bit Field Size: Number of route, waypoint, event, mark, etc. **DD007** Generic numeric ID, medium uint16 Range: 0 to 65,532 Resolution: 1 bit Unit-less number Integer, 16 bit unsigned Indicates the number of binary data bits that are contained within the Binary Data field.

Byte Field Size:

Range: Variable

bit(n)

Bit Field Size: n

Binary data bit field.

Request Parameter

Resolution: 1

Command Parameter: Required

Optional

Used to construct bit fields

Binary Data

DD142 Binary Bit Field

DF52 Bit field

See ITU-R M.1371

12

AIS UTC and Date Report

PGN: 129793 hex: 1FB01

This parameter group provides data associated with the ITU-R M.1371 AIS Message 4 Base Station Report and AIS Message 11 UTC/Date Response.

An AIS device may generate this parameter group either upon a VHF Data Link reception of Message 4 or Message 11, upon receipt of an ISO or NMEA request PGN, in response to an accepted NMEA Command Group Function, or upon a device's own transmission of a Message 4 or 11.

The Sequence ID field (SID) is used to link this PGN to other related PGN's from the same source address. When no linkage exists, the value of the SID shall be set to 255.

Scheduling the transmission of an AIS Message 4 Base Station Report by an AIS Base Station is done with PGN (To be developed).

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Revisions:

June 2017 – New description, renamed fields 9 – Position Time to UTC Time and field 12 – Position Date to UTC Date, and redefined 1 of 10 AIS Spare bits into Field 16 – "Transmission Control for Long Range Broadcast Message" with new DD named "AIS Long Range Broadcast Control".

Single Fr	rame: No	Priority Default: 7	Defaul	t Update R	ate:	milliseconds	Frequency:	NA	cycles per secon		
Destinatio	n: Global	Query Support: Require	ed C	ommand Sup	port: Optional	ACK Rqmnts:	None				
ield#	Field Na	ame									
1	Message	ID		•	eld Size: ield Size: <mark>6</mark>		Request Par Command P		Required Optional		
	DD188	AIS Message Identifier				(0	fier (range of 0 to 63). ersion of ITU-R M.1371 for more information.				
		Bit field tation Report and Date Response	bit(n)	Range:	Variable	Resolution			Used to construct bit fields		
2	·			•	eld Size: ield Size: 2		Request Par Command P		Optional Optional		
	DD185	AIS Repeater Indicator			(range of 0 to 0 = Default 1 = First ret 2 = Second	to 3).	nsmission transmission				
					See the late	est version of ITU-R M	M.1371 for more	information	ı .		
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: 1	Used to	construct bit fields		
3	User ID			-	eld Size: 4 ield Size:		Request Par Command P		Optional Optional		
	DD010	Generic numeric ID, large			Number of route, waypoint, e			int, event, mark, etc.			
	DF55 MMSI numl	Integer, 32 bit unsigned ber of station reporting its UTC a	uint32 and date.	Range:	0 to 4,294,967	, <mark>292 Resolutio</mark>	n: <mark>1 bit</mark>	Unit-les	s number		

AIS UTC and Date Report

PGN: 129793 hex: 1FB01

4	Longitude	Byte Field Size: 4 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD023 Longitude, WGS-84	Longitude referenc	ed to WGS-84.
	DF25 Longitude int32 Longitude of station reporting its UTC and date.	Range: +/- 180 deg	Resolution: 1x10E-7 deg "-" = West, resolution ~1.1 cm
5	Latitude	Byte Field Size: 4 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD022 Latitude, WGS-84	Latitude referenced	to WGS-84.
	DF23 Latitude int32 Latitude of station reporting its UTC and date.	Range: +/- 90 deg	Resolution: 1x10E-7 deg "-" = South, resolution ~1.1 cm
6	Position accuracy	Byte Field Size: Bit Field Size: 1	Request Parameter Optional Command Parameter: Optional
	DD184 AIS Position Accuracy	1 = high accuracy	10m such as nondifferential GNSS (default), < 10m such as DGNSS
			on of ITU-R M.1371 for more information.
	DF52 Bit field bit(n)	Range: Variable	Resolution: 1 Used to construct bit fields
7	RAIM-flag	Byte Field Size: Bit Field Size: 1	Request Parameter Optional Command Parameter: Optional
	DD189 AIS RAIM-flag	0 = RAIM not in us 1 = RAIM in use	
	DE52 D'4 6 11		on of ITU-R M.1371 for more information. Resolution: 1 Used to construct bit fields
	DF52 Bit field bit(n)	Range: Variable	Resolution: 1 Used to construct bit fields
8	NMEA Reserved	Byte Field Size: Bit Field Size: resv 6	Request Parameter Optional Command Parameter: Optional
	DD001 Reserved field	Variable number of	f reserved bits, all set to logic "1"
	DF52 Bit field bit(n)	Range: <mark>Variable</mark>	Resolution: 1 Used to construct bit fields
	Used to align subsequent data on byte boundary.		
9	UTC Time	Byte Field Size: 4 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD158 Generic time of day	24 hour clock, $0 =$	midnight, time is in UTC
	DF06 Time of day uint3 .	2 Range: 0 to 86,401 s	Resolution: 1x10E-4 s ~24 hours, 0 = midnight, range allows for up to two leap seconds per day

AIS UTC and Date Report PGN: 129793 hex: 1FB01 Request Parameter Byte Field Size: 10 **Communication State** Optional Bit Field Size: 19 Command Parameter: Optional **DD187** AIS Communication State The Communication State contains information used by the various TDMA slot allocation algorithms and synchronization information See the latest version of ITU-R M.1371 for more information. DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields **AIS Transceiver Information** Byte Field Size: Request Parameter 11 Optional Bit Field Size: 5 Command Parameter: Optional 0 = Channel A VDL reception, **DD246** AIS Transceiver Information 1 = Channel B VDL reception, 2 = Channel A VDL transmission, 3 = Channel B VDL transmission, 4 = Own information not broadcast, 5 = Channels A & B VDL transmission 6 = Channel C (VHF Channel 75) reception, 7 = Channel D (VHF Channel 76) reception, 8 = Channel C (VHF Channel 75) transmission, 9 = Channel D (VHF Channel 76) transmission, 10 - 30 = Reserved31 = AIS device determines channel for Transmission The AIS transceiver Information field (values 0, 1, 6, 7) identifies the reception channel of an AIS message that was received and placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDM sentence to report a received AIS Message. The AIS transceiver Information field (values 2, 3, 8, 9) identifies the transmission channel of an AIS message that was transmitted and then placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDO sentence to report a transmitted AIS Message. The AIS transceiver Information field (value 4) identifies an AIS message that was not transmitted and then placed into the appropriate AIS PGN. This is provided by AIS Mobile Stations at a 1hz rate to report to other shipboard systems its current dynamic navigation data. The AIS transceiver Information field (values 5 and 31) are only used with the Command Group Function PGN 126208. DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields Byte Field Size: 12 **UTC Date** Request Parameter Optional Command Parameter: Optional Bit Field Size: Days since January 1, 1970, Date is relative to UTC Time. **DD039** Generic date uint16 Range: 0 to 65,532 days Resolution: 1 day 0 = January 1, 1970, max =**DF41** Date, day count ~179 years

Byte Field Size:

Range: Variable

bit(n)

Bit Field Size: resv 4

Request Parameter

Variable number of reserved bits, all set to logic "1"

Resolution: 1

Command Parameter:

Optional

Used to construct bit fields

13

NMEA Reserved

DD001 Reserved field

Bit field

Used to align subsequent data on byte boundary.

AIS UTC and Date Report PGN: 129793 hex: 1FB01 Request Parameter Type of Electronic Positioning Device Byte Field Size: 14 Optional Bit Field Size: 4 Command Parameter: Optional **DD191** AIS Electronic Positioning Device Type 0 =Undefined (default) 1 = GPS2 = GLONASS3 = Combined GPS/GLONASS 4 = Loran-C5 = Chayka6 = Integrated Navigation System 7 = Surveyed; For fixed AtoN and virtual AtoN, the charted position should be used. The accurate position enhances its function as a radar reference target 8 = Galilieo 9-14 =Reserved for future use 15 = Internal GNSS See the latest version of ITU-R M.1371 for more information. **DF52** Bit field Range: Variable Resolution: 1 Used to construct bit fields bit(n) Byte Field Size: 15 **AIS Spare** Request Parameter Bit Field Size: resv Command Parameter: **DD311** AIS Spare Field Variable number of reserved bits, all set to logic "0". Normally, spare or reserved bits in NMEA network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. bit0(n) Range: N2KUnitless Resolution: 1 Special data format **DF115** Bit field defaulting to zer applicable to AIS field that This field mirrors the "Spare" bit field found within the corresponding AIS message such that future definition within the must be set to zero for a AIS message can also be accommodated within this field. Normally, spare or reserved bits in NMEA Netowrk Messages NULL data condition or are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. when unused - applies to AIS spare fields and AIS fields that are for future use **Transmission Control for Long Range** Byte Field Size: Request Parameter Optional 16 **Broadcast Message** Bit Field Size: Command Parameter: Optional **DD443** AIS Long Range Broadcast Control 0 = default - Class-A AIS station stops transmission of Message 27 within an AIS base station coverage area. 1 = Request Class-A station to transmit Message 27 within an AIS base station coverage area. Base station coverage area should be defined by Message 23; If Message 23 is not

received, the AIS station which is allowed to transmit on CH75 and 76 (see ITU-R M.1371-5 3.2, Annex 4) should ignore this bit and transmit Message 27.

Request Parameter

Command Parameter:

Used to construct bit fields

Used to construct bit fields

Resolution: 1

Resolution: 1

Variable number of reserved bits, all set to logic "1"

bit(n)

bit(n)

Range: Variable

Byte Field Size:

Range: Variable

Bit Field Size: resv 6

DF52

DF52

NMEA Reserved

DD001 Reserved field

17

Bit field

Bit field

Used to align subsequent data on byte boundary.

PGN: 129793

hex: 1FB01 Byte Field Size: 1 Sequence ID Request Parameter 18 Optional Bit Field Size: Command Parameter: Optional An upward counting number that binds information transmitted in two or more **DD056** Sequence ID PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG values in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single data set. 0 - 252 = binding available (when SID value reaches 252, resume with 0 on next data set)

DF53 Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: 1 bit Unit-less number

253 - 254 = reserved for future use

whenever practical.

255 = No binding provided. NMEA recommends using binding SID values

AIS UTC and Date Report

PGN: 129794 hex: 1FB02

This parameter group provides data associated with the ITU-R M.1371 AIS Message 5 Ship Static and Voyage Related Data Message.

An AIS device may generate this parameter group either upon a VHF Data Link reception of Message 5, upon receipt of an ISO or NMEA request PGN, in response to an accepted NMEA Command Group Function, or upon a device's own transmission of a Message 5.

The Sequence ID field (SID) is used to link this PGN to other related PGN's from the same source address. When no linkage exists, the value of the SID shall be set to 255.

Request Support Requirement:

Reception of an ISO Request (PGN 059904) for this PGN shall respond by providing as many of these PGNs as necessary. The minimum response is at least one PGN providing the AIS device's own information. Additional response PGN(s) may be provided containing information from AIS Message 5(s) received over the VHF Data Link.

Reception of a Request Group Function (PGN 126208) with no request parameters shall result in the same response as the ISO Request. All providers of this PGN shall accept and process requests based upon the requested value of Field #3, User ID. This provides a means to request information about a single User ID, including your own.

If the User ID requested is not considered a valid User ID by the receiving device, then the appropriate response depends on how the request was transmitted:

A global request would result in no response.

An addressed request would result in the Acknowledge Group PGN (126208), containing the error state for the requested User ID field of "0x3 = Request or command parameter out-of-range.

General Command Support:

Command Support is required differently for each of two types of AIS Stations. AIS Base Stations require Command Support on all Fields for rebroadcast as indicated in the Command Parameters within the PGN below. AIS Class A Stations require Command Support for voyage related data configuration on five fields as listed below in this description.

Command Support Requirement for Rebroadcasting of Messages 5 by an AIS Base Station:

Only AIS Base Stations shall accept the Command Group Function PGN 126208 with this PGN for Message 5. All other types of AIS devices shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".

The AIS Station commanded to rebroadcast an AIS Message 5 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel.

Note 2: The AIS Transceiver Information Command Parameter is "Required". When commanding this PGN to cause the transmission of Message 5 from an AIS Base Station, the only values that can be commanded are: 2, 3, 5, or 31. All data fields (except for NMEA Reserved field(s), and Sequence ID) must be commanded when using the Command Group Function (PGN 126208) for rebroadcasting.

Note 1: The Repeat Indicator Command Parameter is "Required". The value should reflect the number of previous transmissions for this specific AIS Message. The AIS Base Station will increment this field accordingly prior to transmission.

Command Support Requirement for Configuring Voyage Related Data of an AIS Class A Station:

Only AIS Class A Stations shall accept the Command Group Function PGN 126208 with this PGN to configure Voyage related data settings for Message 5. All other types of AIS devices shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".

The following PGN fields may be command: 12 – "Estimated Date of Arrival", 13 – "Estimated Time of Arrival", 14 – "Draft", and 15 – "Destination". In addition, field 20 – "AIS Transceiver Information" must be set to a value of 4 when performing a configuration command of any of the above four fields.

PGN: 129794 hex: 1FB02

Note 2: Upon receiving this Command Group Function 126208, the AIS Station shall respond with this PGN reporting its current settings with field 20 – "AIS Transceiver Information" containing a value of 4.

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

June 2017 – New description, new notes in field 20, and new command support requirements.

Single Fr	rame: No	Priority Default: 6	Default	Update R	ate:	milliseconds	Frequency:	NA cycles per second				
Destinatio	n: Global	Query Support: Require	d Co	mmand Sup	port: Required	ACK Rqmnt	s: None					
ield#	Field Na	ame										
1	Message	ID		-	eld Size: ield Size: <mark>6</mark>		Request Para Command Pa	ameter Optional arameter: Required				
	DD188	AIS Message Identifier			Message Ide	ntifier (range of 0	to 63).					
					See the lates	t version of ITU-R	M.1371 for more	information.				
	DF52	Bit field	bit(n)	Range:	Variable	Resolut	Used to construct bit fields					
	5 = Ship St	atic and Voyage Related Data Me	essage.									
2	Repeat I	ndicator		•	eld Size: ield Size: <mark>2</mark>		Request Para Command Pa	ameter Optional arameter: Note 1				
	DD185	AIS Repeater Indicator			Used by the (range of 0 to		e how many times	a message has been repeated				
			0 = Default 1 = First retransmission 2 = Second retransmission 3 = Final retransmission See the latest version of ITU-R M.1371 for more information.									
	DF52	Bit field	bit(n)	Range:	Variable	Resolut	ion: 1	Used to construct bit fields				
3	User ID				eld Size: 4		Request Para Command Pa	ameter Required arameter: Required				
	DD010	Generic numeric ID, large			Number of r	oute, waypoint, ev	ent, mark, etc.					
	DF55 MMSI num	Integer, 32 bit unsigned ber of mobile station reporting its	uint32 static and		0 to 4,294,967, ated data.	292 Resolut	ion: 1 bit	Unit-less number				
4	IMO			-	eld Size: 4		Request Para Command Pa	ameter Optional arameter: Required				
	DD010	Generic numeric ID, large			Number of r	er of route, waypoint, event, mark, etc.						
	DF55	Integer, 32 bit unsigned	uint32		0 to 4,294,967,	292 Resolut	ion: 1 bit	Unit-less number				
	IMO numbe	er of mobile station reporting its s	tatic and v	oyage relat	ed data.							

PGN: 129794 hex: 1FB02

Byte Field Size: char Request Parameter Call Sign 5 Optional Bit Field Size: Command Parameter: Required DD192 Generic String, ASCII, Fixed length Length specified by PGN field definition. char8(n) Range: 0 to 1,785 characters Resolution: 1 char 0 to 1,785 bytes. Character **DF63** String, fixed count not included, length is This is a 7 character string, see ITU-R M.1371-1 for more information. specified by application in Data Dictionary. Unused characters shall be treated as not available, and filled with [0xFF] = Data not available.Byte Field Size: char Request Parameter 6 Optional Name Command Parameter: Required Bit Field Size: Length specified by PGN field definition. DD192 Generic String, ASCII, Fixed length char8(n) Range: 0 to 1,785 characters **DF63** String, fixed Resolution: 1 char 0 to 1,785 bytes. Character count not included, length is This is a 20 character string, see ITU-R M.1371-1 for more information. specified by application in Data Dictionary. Unused characters shall be treated as not available, and filled with [0xFF] = Data not available.Byte Field Size: Request Parameter 7 Ship/Cargo Type Optional Bit Field Size: 8 Command Parameter: Required DD193 Ship/Cargo Type 0=Not Available or no ship (default), 1-99= See the latest version of ITU-R M.1371. 100-199=Reserved for Regional (See the latest version of ITU-R M.1371), 200-255=Reserved for future (See the latest version of ITU-R M.1371). DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields 8 Ship Length Byte Field Size: Request Parameter Optional Bit Field Size: Command Parameter: Required **DD194** Distance, medium Dependent upon PG Field definition. uint16 Range: 0 to 6553.2 m Resolution: 1x10E-1 m Distance, Medium Length of mobile station reporting its static and voyage related data. A value of 65535 indicates that data is not available. Ship Beam Byte Field Size: 2 Request Parameter 9 Optional Bit Field Size: Command Parameter: Required **DD194** Distance, medium Dependent upon PG Field definition. uint16 Range: 0 to 6553.2 m Resolution: 1x10E-1 m Distance, Medium Beam of mobile station reporting its static and voyage related data. A value of 65535 indicates that data is not available. Byte Field Size: 2 10 Position Reference Point from Starboard Request Parameter Optional Bit Field Size: Command Parameter: Required Dependent upon PG Field definition. **DD194** Distance, medium Distance, Medium uint16 Range: 0 to 6553.2 m Resolution: 1x10E-1 m Position reference point from starboard side of mobile station reporting its static and voyage related data. A value of 65535 indicates that data is not available.

PGN: 129794 hex: 1FB02

11	Position	Reference Point aft of S	hip's Bow		eld Size: 2 ield Size:	2		Request Param Command Para		Optional Required
	DD194	Distance, medium			Depen	dent upon Po	G Field definition	on.		
	DF75	Distance, Medium	uint16		0 to 6553.			1x10E-1 m		
		ference point from aft of ship cates that data is not availab		station re	porting its st	atic and voy	age related data	a. A value of		
12	Estimate	ed Date of Arrival		-	eld Size: 2 ield Size:	2		Request Param Command Para		Optional Required
	DD039	Generic date			Days s	ince January	1, 1970, Date	is relative to UTO	C Time.	
	DF41 EDA of mo	Date, day count bile station reporting its stati	uint16 c and voyage re		0 to 65,53	2 days	Resolution:	1 day	0 = Jar ~179 y	nuary 1, 1970, max = rears
13	Estimate	ed Time of Arrival		•	eld Size: 4	ļ.		Request Param Command Para		Optional Required
	DD158	Generic time of day			24 hou	r clock, 0 =	midnight, time	is in UTC		
	DF06 ETA of mo	Time of day bile station reporting its stati	uint32 c and voyage re		0 to 86,40	1 s	Resolution:	1x10E-4 s	range a	ours, 0 = midnight, allows for up to two conds per day
					_				1	1 3
14	Draft			•	eld Size: 2 ield Size:	2		Request Param Command Para		Optional Required
	DD196	Draft			The de		in the water. T	he vertical distan	ce betw	een the waterline and
	DF13	Distance, short	uint16	Range:	0 to 655.3	2 m	Resolution:	1x10E-2 m		
15	Destinat	ion			eld Size: cield Size:	har		Request Param Command Para		Optional Required
	DD192	Generic String, ASCII, I	Fixed length		Length	specified by	y PGN field defi	nition.		
	DF63 This is a 20	String, fixed O character string, see ITU-R	` ,			characters	Resolution:	l char	count r specific Data D charact not ava	785 bytes. Character not included, length is ed by application in dictionary. Unused ters shall be treated a silable, and filled wit = Data not available
16	AIS Vers	ion		•	eld Size: ield Size: 2	2		Request Param Command Para		Optional Required
	DD304	AIS Version Indicator					ant with AIS edi liant with AIS e			
					See the	e latest versi	on of ITU-R M.	1371 for more inf	ormatio	n.
	DF52	Bit field	bit(n)	Range:	Variable		Resolution:	1	Used to	o construct bit fields

PGN: 129794 hex: 1FB02

Request Parameter Type of Electronic Positioning Device Byte Field Size: 17 Optional Bit Field Size: 4 Command Parameter: Required 0 =Undefined (default) **DD191** AIS Electronic Positioning Device Type 1 = GPS2 = GLONASS3 = Combined GPS/GLONASS 4 = Loran-C5 = Chayka6 = Integrated Navigation System 7 = Surveyed; For fixed AtoN and virtual AtoN, the charted position should be used. The accurate position enhances its function as a radar reference target 8 = Galilieo 9-14 =Reserved for future use 15 = Internal GNSS See the latest version of ITU-R M.1371 for more information. Resolution: 1 **DF52** Bit field Range: Variable Used to construct bit fields bit(n) Byte Field Size: 18 **Data Terminal Equipment (DTE)** Request Parameter Optional Bit Field Size: 1 Command Parameter: Required **DD242** Data Terminal Equipment (DTE) 0=Available, 1=not available. See the latest version of ITU-R M.1371 for more information. Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields DF52 19 **AIS Spare** Byte Field Size: Request Parameter Optional Bit Field Size: resv Command Parameter: Required DD311 AIS Spare Field Variable number of reserved bits, all set to logic "0". Normally, spare or reserved bits in NMEA network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. bit0(n) Range: N2KUnitless Resolution: 1 Special data format **DF115** Bit field defaulting to zer applicable to AIS field that This field mirrors the "Spare" bit field found within the corresponding AIS message such that future definition within the must be set to zero for a AIS message can also be accommodated within this field. Normally, spare or reserved bits in NMEA Network Messages NULL data condition or are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. when unused - applies to AIS spare fields and AIS fields that are for future use

PGN: 129794 hex: 1FB02

20	AIS Transceiver Information			•	ield Size: ield Size: 5		Request Parameter Command Parameter	O p 1.0.1.0.1
	DD246	AIS Transceiver Information	n	Ja	0 = Channel 1 = Channel 2 = Channel 3 = Channel 4 = Own info 5 = Channel 6 = Channel 7 = Channel 8 = Channel 9 = Channel 10 - 30 = Re	A VDL reception, B VDL reception, A VDL transmission, B VDL transmission, bornation not broadcas s A & B VDL transmi C (VHF Channel 75) D (VHF Channel 76) C (VHF Channel 75) D (VHF Channel 76) served vice determines chann	st, ssion reception, reception, transmission, transmission,	inote 2
					channel of a PGN. This of	n AIS message that wa	as received and placed ne mechanism used in	dentifies the reception into the appropriate AIS the NMEA 0183 VDM
					transmission the appropri	channel of an AIS me ate AIS PGN. This co		itted and then placed into mechanism used in the
					was not trans provided by its current dy	smitted and then place AIS Mobile Stations a ynamic navigation dat	a.	AIS PGN. This is other shipboard systems
						sceiver Information f Froup Function PGN 1	ield (values 5 and 31) a 26208.	are only used with the
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	Use Use	d to construct bit fields
21	NMEA R	eserved		•	ield Size: ield Size: resv	3	Request Parameter Command Parameter	
	DD001	Reserved field			Variable nur	mber of reserved bits,	all set to logic "1"	
	DF52 Used to alig	Bit field gn subsequent data on byte bou	bit(n) ndary.	Range:	Variable	Resolution	Use Use	d to construct bit fields
22	Sequenc	e ID			ield Size: 1		Request Parameter Command Parameter	
	DD056	Sequence ID			PGNs from a different PG related data	a single source address N transmissions ident set. For example, iden	s. Identical SID values ifies those PGN transnutical SID values bind	
					0 - 252 = bir data set)	nding available (when	SID value reaches 252	, resume with 0 on next
					253 - 254 =	reserved for future use	2	
					255 = No bin whenever pr		EA recommends using	binding SID values
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	1 bit Uni	t-less number

AIS Addressed Binary Message

PGN: 129795 hex: 1FB03

This parameter group provides data associated with the ITU-R M.1371 AIS Message 6 Addressed Binary Message supporting addressed communication of binary data.

An AIS device may generate this parameter group either upon receiving a VHF data link Message 6, upon receipt of an ISO or NMEA request PGN, or upon a device's own transmission of a Message 6.

Command Support Requirement:

The Command Group Function PGN 126208 shall be used with this PGN to initiate a transmission of this AIS Message.

Only AIS Class A, Class B-SO, Base Station, Aton Station, and future SAR Airborne stations shall accept the Command Group Function PGN 126208 with this PGN for Message 6. All other types of AIS devices not listed above shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".

Command Support Requirement for Transmission of Message 6 by all allowed AIS Stations as listed above:

The AIS Station commanded to transmit a Message 6 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel.

To verify that the remote addressed AIS Station has received this transmission of a Message 6, a Message 7 with the same AIS sequence number as used in the Message 6 and within a time span of 30 seconds or less, should be received in the AIS Acknowledge PGN 129816.

All data fields (except for NMEA Reserved field(s), Sequence ID, Repeat Indicator, and Source ID) must be commanded when using the Command Group Function (PGN 126208) for Transmission of Message 6.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Command Support Requirement for Rebroadcasting of Message 6 by an AIS Base Station:

The AIS Base Station commanded to rebroadcast a Message 6 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel.

All data fields (except for NMEA Reserved field(s), and Sequence ID) must be commanded when using the Command Group Function (PGN 126208) for rebroadcasting.

Note 1: The Repeat Indicator Command Parameter is "Required" only for rebroadcasting an Message 6 from an AIS Base Station. The value should reflect the number of previous transmissions for this specific AIS Message. The AIS Base Station will increment this field accordingly prior to transmission.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

June 2017 – New description, new notes in field 5, and new command support requirements.

Single Frame	e: No	Priority Default:	5	Dei	fault Update Rate:		milliseconds	Frequency:	NA	cycles per s	second
Destination: (Global	Query Support:	Optional		Command Support:	Required	ACK Rqmnts:	None			
Field# F	Field Name										

AIS Addressed Binary Message

PGN: 129795 hex: 1FB03

1	Message	ID	Byte Field Size:			•	Parameter Optional		
							d Parameter: Required		
	DD188	AIS Message Identifier			Message Identifier	r (range of 0 to 63).			
					See the latest vers	ion of ITU-R M.1371 for m	ore information.		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to construct bit fields		
	6 = Addres	sed Binary Message.							
2	Repeat I	ndicator		•	eld Size: ield Size: <mark>2</mark>	,	Parameter Optional d Parameter: Note 1		
	DD185	AIS Repeater Indicator			Used by the repea (range of 0 to 3).	ter to indicate how many tir	nes a message has been repeated		
					0 = Default 1 = First retransm 2 = Second retransm 3 = Final retransm				
					See the latest vers	sion of ITU-R M.1371 for m	nore information.		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to construct bit fields		
3	Source I	D		•	eld Size: 4	•	Parameter Optional d Parameter: Required		
	DD010	Generic numeric ID, large			Number of route,	waypoint, event, mark, etc.	, mark, etc.		
	DF55 MMSI num	Integer, 32 bit unsigned ber of source station.	uint32	Range:	0 to 4,294,967,292	Resolution: 1 bit	Unit-less number		
4	NMEA R	eserved		•	eld Size: ield Size: resv 1		Parameter d Parameter:		
	DD001	Reserved field			Variable number of	of reserved bits, all set to log	gic "1"		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to construct bit fields		
			()			•			

AIS Addressed Binary Message

PGN: 129795 hex: 1FB03

5	AIS Transceiver Information		Byte Field Size: Bit Field Size: 5			Request Parameter Command Parameter: Note 2		
	DD246 AIS Transceiver Information		0 = Channel A VDL reception 1 = Channel B VDL reception 2 = Channel A VDL transmiss 3 = Channel B VDL transmiss 4 = Own information not broa 5 = Channels A & B VDL trar 6 = Channel C (VHF Channel 7 = Channel D (VHF Channel 8 = Channel D (VHF Channel 9 = Channel D (VHF Channel 10 - 30 = Reserved 31 = AIS device determines cl The AIS transceiver Informatic channel of an AIS message the PGN. This corresponds to the sentence to report a received A The AIS transceiver Informatic transmission channel of an AI the appropriate AIS PGN. The NMEA 0183 VDO sentence to			n, n, n, sion, sion, adcast, nsmission 1 75) reception, 1 76) reception, 1 76) transmission, 1 76) transmission, 1 76) transmission, ton field (values 0, 1, 6, 7) identifies the reception at was received and placed into the appropriate AIS as same mechanism used in the NMEA 0183 VDM		
				The AIS transceiver Command Group Fu			are only used with the	
	DF52 Bit field	bit(n)	Range:	Variable Variable	Resolution.		sed to construct bit fields	
6	Sequence Number		•	eld Size: ield Size: <mark>2</mark>		Request Paramete	- - ·· · · · · · ·	
	DD243 AIS Sequence Number			Range 0-3				
						1371 for more inform		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution.	1 Us	sed to construct bit fields	
7	Destination ID		•	eld Size: 4 ield Size:		Request Paramete Command Parame	-	
	DD010 Generic numeric ID, large			Number of route, wa	aypoint, event,	mark, etc.		
	DF55 Integer, 32 bit unsigned MMSI Number of destination station.	uint32	Range:	0 to 4,294,967,292	Resolution.	1 bit U	nit-less number	
8	NMEA Reserved		-	eld Size:		Request Paramete		
	DD001 Reserved field			Variable number of	reserved bits,	all set to logic "1"		
	DF52 Bit field Used to align subsequent data on byte bour	bit(n) ndary.	Range:	Variable	Resolution.	1 Us	sed to construct bit fields	

PGN: 129795

Used to construct bit fields

hex: 1FB03 Byte Field Size: Request Parameter 9 Retransmit Flag Optional Bit Field Size: 1 Command Parameter: Required DD244 AIS Retransmit Flag 0=No retransmission, 1=retransmitted See the latest version of ITU-R M.1371 for more information. **DF52** Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields Byte Field Size: Request Parameter 10 **AIS Spare** Optional Bit Field Size: resv Command Parameter: Required **DD311** AIS Spare Field Variable number of reserved bits, all set to logic "0". Normally, spare or reserved bits in NMEA network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. **DF115** Bit field defaulting to zer bit0(n) Range: N2KUnitless Resolution: 1 Special data format applicable to AIS field that This field mirrors the "Spare" bit field found within the corresponding AIS message such that future definition within the must be set to zero for a AIS message can also be accommodated within this field. Normally, spare or reserved bits in NMEA Network Messages NULL data condition or are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. when unused - applies to AIS spare fields and AIS fields that are for future use Byte Field Size: 11 Number of Bits in Binary Data Field Request Parameter Optional Bit Field Size: Command Parameter: Required **DD007** Generic numeric ID, medium Number of route, waypoint, event, mark, etc. uint16 Range: 0 to 65,532 Integer, 16 bit unsigned Resolution: 1 bit Unit-less number Indicates the number of binary data bits that are contained within the Binary Data field. 12 **Binary Data** Byte Field Size: Request Parameter Optional Command Parameter: Required Bit Field Size: n

Binary data bit field.

Resolution: 1

bit(n)

Range: Variable

AIS Addressed Binary Message

DD142 Binary Bit Field

Application specific data.

Bit field

DF52

AIS Acknowledge - DEPRECATED

PGN: 129796 hex: 1FB04

This PGN has been deprecated (as of NMEA PGN Message Database version 2.100) and is not recommended for new designs. However, support of the deprecated PGN 129796 is strongly recommended to ensure compatibility with legacy equipment.

The PGN description at the time of deprecation was as follows: This parameter group provides data associated with the ITU-R M.1371 Messages 7 Binary Acknowledge Message and 13 Safety Related Acknowledge Message.

Message 7 acknowledges receipt of message 6 while message 13 acknowledges receipt of message 14.

An AIS device may generate this parameter group either upon receiving a VHF data link message 7 or 13, or upon receipt of an ISO or NMEA request PGN (see ITU-R M.1371-1 for additional information).

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Single Fr	rame: No	Priority Default: 7	Default	Update R	ate:	milliseconds	Frequency:	NA cycles per second
Destination	on: <mark>Global</mark>	Query Support: Required	Co	mmand Sup	port: Optional	ACK Rqmnts	: None	
ield#	Field Naı	me						
1	Message I	D		•	eld Size: ield Size: 6		Request Para Command Pa	ameter Required arameter: Optional
DD188 AIS I		AIS Message Identifier			Message Ide	entifier (range of 0	to 63).	
					See the lates	st version of ITU-R	M.1371 for more i	information.
	DF52	Bit field	bit(n)	Range:	Variable	Resoluti	ion: 1	Used to construct bit fields
		cknowledge Message, Related Acknowledge Message.						
2	Repeat Inc	dicator		•	eld Size: ield Size: 2		Request Para Command Pa	ameter Optional arameter: Optional
	DD185 A	AIS Repeater Indicator			Used by the (range of 0 t		e how many times	a message has been repeated
					3 = Final ret	retransmission	M.1371 for more	information.
	DF52	Bit field	bit(n)	Range:	Variable	Resoluti	ion: 1	Used to construct bit fields
3	Source ID			-	eld Size: 4 ield Size:		Request Para Command Pa	ameter Optional arameter: Optional
	DD010	Generic numeric ID, large			Number of r	oute, waypoint, eve	ent, mark, etc.	
	DF55 MMSI numbe	Integer, 32 bit unsigned er of source station for this acknown	uint32 owledge.	Range:	0 to 4,294,967,	<mark>292 Resolut</mark>	ion: 1 bit	Unit-less number
4	NMEA Res	served		•	eld Size: ield Size: resv	1	Request Para Command Pa	
	DD001 I	Reserved field		Variable numb		mber of reserved bi	1"	
	DF52	Bit field	bit(n)	Range:	Variable	Resoluti	ion: <mark>1</mark>	Used to construct bit fields
	Used to align	n subsequent data on byte bound	dary.					

AIS Acknowledge - DEPRECATED

PGN: 129796 hex: 1FB04

5	AIS Transceiver Information	Byte Field Size:	Request Parameter Optional
		Bit Field Size: 5	Command Parameter: Optional
	DD246 AIS Transceiver Information	channel of an AIS message PGN. This corresponds to t sentence to report a received. The AIS transceiver Informs transmission channel of an the appropriate AIS PGN. NMEA 0183 VDO sentence. The AIS transceiver Informs was not transmitted and the provided by AIS Mobile Statists current dynamic navigation.	ion, dission, dission
	DF52 Bit field	•	Olution: 1 Used to construct bit fields
6	AIS Spare	Byte Field Size: Bit Field Size: resv 2	Request Parameter Command Parameter:
	DD311 AIS Spare Field	bits in NMEA network mes	d bits, all set to logic "0". Normally, spare or reserved sages are encoded with logic 1's, however for AIS and bits are to be encoded as logic 0's.
	This field mirrors the "Spare" bit field found with AIS message can also be accommodated within	it0(n) Range: N2KUnitless Resc in the corresponding AIS message such that future in this field. Normally, spare or reserved bits in NME Ns the unused or reserved bits are to be encoded a	A Network Messages NULL data condition or
7	Destination ID"1"	Byte Field Size: Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD010 Generic numeric ID, large	Number of route, waypoint,	
		int32 Range: 0 to 4,294,967,292 Reso	Unit-less number

AIS Acknowledge - DEPRECATED

PGN: 129796 hex: 1FB04

8	NMEA Reserved		Byte Field Size: Bit Field Size: resv 6			Request Parameter Command Parameter:			
	DD001	Reserved field			Variable num	ber of reserved bits,	all set to logic "1"		
	DF52 Used to alig	Bit field gn subsequent data on byte bound	bit(n) lary.	Range:	Variable	Resolution	Used Used	to construct bit fields	
9	Sequenc	e Number for ID"1"		•	ield Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter	Optional Optional	
	DD243	AIS Sequence Number			Range 0-3				
					See the latest	version of ITU-R M.	1371 for more informati	on.	
	DF52	Bit field	bit(n)		Variable	Resolution	Used Used	to construct bit fields	
	Sequence	number of message to be acknowl	edged, ra	nge 0-3.					
10	Destinati	ion ID"n"			ield Size: 4 ield Size:		Request Parameter Command Parameter	Optional Coptional	
	DD010	Generic numeric ID, large			Number of ro	oute, waypoint, event,	mark, etc.		
	DF55 Variable No	Integer, 32 bit unsigned umber of fields, Field number 7 rep	uint32 beated.	Range:	0 to 4,294,967,2	292 Resolution	1 bit Unit-	ess number	
11	NMEA R	eserved		•	ield Size: ield Size: <mark>resv</mark>	6	Request Parameter Command Parameter	-	
	DD001	Reserved field		Variable number of reserved bit			its, all set to logic "1"		
	DF52 Variable No	Bit field umber of fields, Field number 8 rep	bit(n) beated.	Range:	Variable	Resolution	: 1 Used	to construct bit fields	
12	Sequenc	e Number for ID"n"		-	ield Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter	Optional Optional	
	DD243	AIS Sequence Number			Range 0-3	version of ITU-R M	.1371 for more informati	on	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution		to construct bit fields	
	Variable No	umber of fields, Field number 9 rep	` ,						
13	Sequenc	e ID			ield Size: 1		Request Parameter Command Parameter	Optional Optional	
	DD056	Sequence ID			PGNs from a different PGN related data s	single source address V transmissions ident et. For example, iden	binds information transm s. Identical SID values w ifies those PGN transmis ntical SID values bind the d Longitude values in PC	ithin two or more sions as a single c COG and SOG values	
					0 - 252 = bin data set)	ding available (when	SID value reaches 252, 1	resume with 0 on next	
					253 - 254 = r	eserved for future use	2		
					255 = No bin whenever pra	~ .	EA recommends using bi	nding SID values	
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	: 1 bit Unit-	ess number	

AIS Binary Broadcast Message

PGN: 129797 hex: 1FB05

This parameter group provides data associated with the ITU-R M.1371 AIS Message 8 Binary Broadcast Message supporting broadcast communication of binary data. An AIS device may generate this parameter group either upon VHF Data Link reception of a Message 8, upon receipt of an ISO or NMEA request PGN, or upon a device's own transmission of a Message 8.

Command Support Requirement:

The Command Group Function PGN 126208 shall be used with this PGN to initiate a transmission of this AIS Message. Only AIS Class A, Class B-SO, Base Station, Aton Station, and future SAR Airborne stations shall accept the Command Group Function PGN 126208 with this PGN for Message 8. All other types of AIS devices not listed above shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".

Command Support Requirement for Transmission of Message 8 by all allowed AIS Stations as listed above:

The AIS Station commanded to transmit an AIS Message transmission shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel.

All data fields (except for NMEA Reserved field(s), Sequence ID, Repeat Indicator, and Source ID) must be commanded when using the Command Group Function (PGN 126208) for Transmission of Message 8.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Command Support Requirement for Rebroadcasting of Message 8 by an AIS Base Station:

The AIS Station commanded to rebroadcast a Message 8 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel.

All data fields (except for NMEA Reserved field(s), and Sequence ID) must be commanded when using the Command Group Function (PGN 126208) for rebroadcasting.

Note 1: The Repeat Indicator Command Parameter is "Required" only for rebroadcasting an Message 8 from an AIS Base Station. The value should reflect the number of previous transmissions for this specific AIS Message. The AIS Base Station will increment this field accordingly prior to transmission.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

June 2017 - New description, new notes in field 5, and new command support requirements.

Single Frame: No	Priority Default: 5	De	fault Update Rate:		milliseconds	Frequency:	NA cycles per	second
Destination: Global	Query Support: Option	nal	Command Support:	Required	ACK Rqmnts:	None		
Field # Field Name)							

AIS Binary Broadcast Message

PGN: 129797 hex: 1FB05

1	Message ID		Byte Field Size: Bit Field Size: 6			Request Parameter Command Parameter:	Optional Required
	DD188 AIS Message Identifier			Message Identific	er (range of 0 to 63	3).	
				See the latest ver	rsion of ITU-R M.1	371 for more information	1.
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
	8 = Binary Broadcast Message.						
2	Repeat Indicator		•	eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Note: 1
	DD185 AIS Repeater Indicator			Used by the repe (range of 0 to 3).		w many times a message	has been repeated
			0 = Default 1 = First retransmission 2 = Second retransmission 3 = Final retransmission				
				See the latest ve	rsion of ITU-R M.	1371 for more information	n.
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
3	Source ID		-	eld Size: 4		Request Parameter Command Parameter:	Optional Required
	DD010 Generic numeric ID, large			Number of route	, waypoint, event,	mark, etc.	
	DF55 Integer, 32 bit unsigned MMSI number of source station.	uint32	Range:	0 to 4,294,967,292	Resolution:	1 bit Unit-le	ss number
4	NMEA Reserved		•	eld Size: iield Size: resv 1	-	Request Parameter Command Parameter:	
	DD001 Reserved field			Variable number	of reserved bits, a	ll set to logic "1"	
	DF52 Bit field Used to align subsequent data on byte box	bit(n) undary.	Range:	Variable	Resolution:	1 Used to	construct bit fields

AIS Binary Broadcast Message

PGN: 129797 hex: 1FB05

Request Parameter Byte Field Size: 5 **AIS Transceiver Information** Optional Bit Field Size: 5 Command Parameter: Note 2 **DD246** AIS Transceiver Information 0 = Channel A VDL reception, 1 = Channel B VDL reception, 2 = Channel A VDL transmission, 3 = Channel B VDL transmission, 4 = Own information not broadcast, 5 = Channels A & B VDL transmission 6 = Channel C (VHF Channel 75) reception, 7 = Channel D (VHF Channel 76) reception, 8 = Channel C (VHF Channel 75) transmission, 9 = Channel D (VHF Channel 76) transmission, 10 - 30 = Reserved31 = AIS device determines channel for Transmission The AIS transceiver Information field (values 0, 1, 6, 7) identifies the reception channel of an AIS message that was received and placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDM sentence to report a received AIS Message. The AIS transceiver Information field (values 2, 3, 8, 9) identifies the transmission channel of an AIS message that was transmitted and then placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDO sentence to report a transmitted AIS Message. The AIS transceiver Information field (value 4) identifies an AIS message that was not transmitted and then placed into the appropriate AIS PGN. This is provided by AIS Mobile Stations at a 1hz rate to report to other shipboard systems its current dynamic navigation data. The AIS transceiver Information field (values 5 and 31) are only used with the Command Group Function PGN 126208. Range: Variable Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) **AIS Spare** Byte Field Size: Request Parameter Optional 6 Bit Field Size: resv Command Parameter: Required **DD311** AIS Spare Field Variable number of reserved bits, all set to logic "0". Normally, spare or reserved bits in NMEA network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. **DF115** Bit field defaulting to zer bit0(n) Range: N2KUnitless Special data format applicable to AIS field that This field mirrors the "Spare" bit field found within the corresponding AIS message such that future definition within the must be set to zero for a AIS message can also be accommodated within this field. Normally, spare or reserved bits in NMEA Network Messages NULL data condition or are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. when unused - applies to AIS spare fields and AIS fields that are for future use Byte Field Size: 7 Number of Bits in Binary Data Field Request Parameter Optional Bit Field Size: Command Parameter: Required **DD007** Generic numeric ID, medium Number of route, waypoint, event, mark, etc.

uint16 Range: 0 to 65,532

Resolution: 1 bit

Unit-less number

Indicates the number of binary data bits that are contained within the Binary Data field.

Integer, 16 bit unsigned

AIS Binary Broadcast Message PGN: 129797 hex: 1FB05 **Binary Data** Byte Field Size: Request Parameter 8 Optional Bit Field Size: n Command Parameter: Required **DD142** Binary Bit Field Binary data bit field. Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields DF52

Application specific data.

PGN: 129798 hex: 1FB06

This parameter group provides data associated with the ITU-R M.1371 AIS Message 9 SAR Aircraft Position Report Message for Airborne AIS units conducting Search and Rescue operations.

An AIS device may generate this parameter group either upon VHF data link receptions of a Message 9, upon receipt of an ISO or NMEA request PGN, or upon a device's own transmission of a Message 9.

Command Support Requirement for Rebroadcasting of Messages 9 by an AIS Base Station:

Only AIS Base Stations shall accept the Command Group Function PGN 126208 with this PGN for Message 9. All other types of AIS devices shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Commandis not supported".

The AIS Station commanded to rebroadcast an Message 9 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AISmessage was transmitted on both channels, two PGNs shall be generated, one for each transmission channel.

All data fields (except for NMEA Reserved field(s), Communication State, and Sequence ID) must be commanded when using the Command Group Function (PGN 126208) for rebroadcasting.

Note 1: The Repeat Indicator Command Parameter is "Required". The value should reflect the number of previous transmissions for this specific AIS Message. The AIS Base Station will increment this field accordingly prior to transmission.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Revisions:

June 2017 – New description, new notes in field 12, renamed field 14 and reallocated unused bits to AIS Spare bits in field 15, reallocated AIS Spare bits in field 17 to create fields 18 and 19 per ITU-R M.1371-5, renumbered the last two fields, and new command support requirements.

Single Frame: No Priority Default: 4		Default	Update Rate:	milliseconds	Frequency:	NA cycles per second			
Destinatio	n: <mark>Global</mark>	Query Support: Opt	i <mark>onal</mark> Cor	nmand Support: Req	uired ACK Rqmnts	None			
ield#	Field Na	me							
1	Message	ID		Byte Field Size: Bit Field Size:	6	Request Parameter Optional Command Parameter: Required			
	DD188 AIS Message Identifier				age Identifier (range of 0 the latest version of ITU-R	,	iformation.		
	DF52 9 = SAR Airc	Bit field craft Position Report Mess	()	Range: Variable	Resoluti	on: 1	Used to construct bit fields		

PGN: 129798 hex: 1FB06

2	Repeat Indicator				eld Size: ield Size: 2		Request Parameter Command Parameter:	Optional Note 1	
	DD185	AIS Repeater Indicator			Used by the re (range of 0 to 2		w many times a message has been repeated		
					0 = Default 1 = First retrar 2 = Second ret 3 = Final retra	ransmission			
					See the latest	version of ITU-R M	.1371 for more information.		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution.	Used t	o construct bit fields	
3	User ID			•	eld Size: 4 ield Size:		Request Parameter Command Parameter:	Optional Required	
	DD010	Generic numeric ID, large			Number of rou	ite, waypoint, event,	mark, etc.		
	DF55 MMSI num	Integer, 32 bit unsigned ber of SAR aircraft reporting posit	uint32 ion.	Range:	0 to 4,294,967,29	Resolution.	1 bit Unit-le	ess number	
4	Longitud	le			eld Size: 4 ield Size:		Request Parameter Command Parameter:	Optional Required	
	DD023	Longitude, WGS-84			Longitude refe	erenced to WGS-84.			
	DF25 Longitude of	Longitude of SAR aircraft reporting position.	int32	Range:	+/- 180 deg	Resolution.	"-" = V cm	Vest, resolution ∼1.1	
5	Latitude				eld Size: 4		Request Parameter Command Parameter:	Optional Required	
	DD022	Latitude, WGS-84			Latitude refere	enced to WGS-84.			
	DF23	Latitude	int32	Range:	+/- 90 deg	Resolution.		outh, resolution ~1.1	
	Latitude of	SAR aircraft reporting position.					cm		
6	Position	Accuracy		•	eld Size: ield Size: 1		Request Parameter Command Parameter:	Optional Required	
	DD184	AIS Position Accuracy				acy > 10m such as neacy < 10m such as I	ondifferential GNSS (defa OGNSS	nult),	
	See the latest version of ITU-R M.1371 for more information.								
	DF52	Bit field	bit(n)	Range:	Variable	Resolution.	Used t	o construct bit fields	
7	RAIM-Fla	ag			eld Size: ield Size: 1		Request Parameter Command Parameter:	Optional Required	
	DD189	AIS RAIM-flag		0 = RAIM not in use (default), 1 = RAIM in use					
				See the latest version of ITU-R M			1371 for more informatio	n.	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution.	Used t	o construct bit fields	

PGN: 129798 hex: 1FB06

8	Time Stamp		•	ield Size: Field Size: <mark>6</mark>	Request Parameter Optional Command Parameter: Required			
	DD186 AIS Time Stamp			60 = time stamp 61 = positioning 62 = Electronic mode, 63 = positioning	nal input mode, tem operates in est	timated (dead reckoning)		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	1	Used to construct bit fields	
9	COG		-	ield Size: 2]	Request Param Command Para	eter <mark>Optional</mark> meter: Required	
	DD165 Course-Over-Ground (COC	i)		The direction of	f the path over grou	und actually followed by a vessel.		
	DF02 Angle COG of SAR aircraft reporting position.	uint16	Range:	0 to 2Pi rad	Resolution		Resolution \sim 0.0057deg, 1 deg = .01745 rad	
10	SOG		-	ield Size: 2]	Request Param Command Para	eter <mark>Optional</mark> meter: <mark>Required</mark>	
	DD044 Generic Speed							
	DF35 Speed SOG of SAR aircraft reporting position.	uint16	Range:	0 to 655.32 m/s	Resolution	1x10E-2 m/s	1 Knot = 0.5144 m/s	
11	Communication State		•	ield Size: Field Size: 19		Request Parameter Command Parameter: Prohibited		
	DD187 AIS Communication State				ation State contain ithms and synchron		by the various TDMA slot	
				See the latest ve	ersion of ITU-R M.	R M.1371 for more information.		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	1	Used to construct bit fields	

PGN: 129798 hex: 1FB06

12	AIS Transceiver Information		•	eld Size: iield Size: <mark>5</mark>		Request Paramete	- p	
	DD246 AIS Transceiver Information	1	Bit I	0 = Channel A VDL 1 = Channel B VDL 2 = Channel A VDL 3 = Channel B VDL 4 = Own information 5 = Channels A & B 6 = Channel C (VHF 7 = Channel D (VHF 8 = Channel C (VHF 9 = Channel D (VHF 10 - 30 = Reserved 31 = AIS device dete The AIS transceiver channel of an AIS me	reception, transmission, transmission, a not broadcas: VDL transmiss 5 Channel 75) 5 6 Channel 75) 6 7 Channel 75) 7 7 Channel 76) 6 Channel 76) 9 Channel 76) 9 Channel 76) 9 Channel 76) 9 Channel 76)	t, ssion reception, reception, transmission, transmission, el for Transmission eld (values 0, 1, 6, 7) is received and place	identifies the recepti d into the appropriate to the NMEA 0183 VE	AIS
				The AIS transceiver transmission channel the appropriate AIS I	received AIS M Information fir I of an AIS me PGN. This con entence to reposit	Message. eld (values 2, 3, 8, 9) essage that was transmeresponds to the same ort a transmitted AIS eld (value 4) identified	identifies the mitted and then placed mechanism used in Message.	d into the
					bile Stations a	t a 1hz rate to report	to other shipboard sy	stems
				The AIS transceiver Command Group Fu			are only used with th	ıe
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1 Us	sed to construct bit fie	lds
13	Altitude		•	eld Size: 4 iield Size:		Request Paramete Command Parame	- p	
	DD115 Distance							
	DF15 Distance, signed Altitude of SAR aircraft reporting position.	int32	Range:	+/-~2.147x10E+7 m	Resolution:	1x10E-2 m		
14	Altitude Sensor		•	eld Size: ield Size: <mark>1</mark>		Request Paramete	- 1	
	DD439 Altitude Sensor	0 = GNSS 1 = barometric source						
	DF52 Bit field	hit(n)	Range:	Variable	Resolution:	1 Us	sed to construct bit fie	elds

PGN: 129798 hex: 1FB06

Used to construct bit fields

15	AIS Spare		Byte Fie	eld Size:		Request Param	eter	Optional	
			Bit Fi	ield Size: resv	7	Command Para	meter:	Required	
	DD311 AIS Spare Field			bits in NME.	nber of reserved bits, a A network messages a used or reserved bits a	re encoded with lo	ogic 1's,	however for AIS	ed
	DF115 Bit field defaulting to zer	r bit0(n)	Range:	N2KUnitless	Resolution.	I	applica must b NULL when u spare f	l data format able to AIS field that e set to zero for a data condition or unused - applies to fields and AIS fields e for future use	AIS
16	Data Terminal Equipment (DTE)		•	eld Size: ield Size: 1		Request Param Command Para		Optional Required	
	DD242 Data Terminal Equipment	(DTE)		0=Available, 1=not availa	•				
				See the lates	t version of ITU-R M.	1371 for more info	ormatio	n.	
	DF52 Bit field	bit(n)	Range:	Variable	Resolution.	1	Used to	o construct bit field	ls
17	AIS Spare		•	eld Size: ield Size: resv	3	Request Param Command Para		Optional Required	
	DD311 AIS Spare Field			bits in NME.	nber of reserved bits, a A network messages a used or reserved bits a	re encoded with lo	ogic 1's,	however for AIS	ed
	DF115 Bit field defaulting to zer	bit0(n)	Range:	N2KUnitless	Resolution.	1	Specia	l data format	
	This field mirrors the "Spare" bit field four AIS message can also be accommodated are encoded with logic 1's, however for A	I within this fie	eld. Normal	lly, spare or reserv	ed bits in NMEA Netw	ork Messages	must b NULL when u spare f	able to AIS field that e set to zero for a data condition or nused - applies to fields and AIS fields e for future use	AIS
18	Assigned mode Flag		•	eld Size: ield Size: 1		Request Param Command Para		Optional Required	
	DD440 Assigned mode Flag				perating in autonomo perating in assigned r		mode =	default	
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	o construct bit field	ls
19	Communication state selector flag		•	eld Size: ield Size: 1		Request Param Command Para		Optional Required	
	DD441 Communication state selec	ctor Flag			A communication state to				

bit(n) Range: Variable

Resolution: 1

DF52 Bit field

AIS SAR Aircraft Position Report

PGN: 129798 hex: 1FB06

NMEA Reserved Byte Field Size: Request Parameter 20 Bit Field Size: resv Command Parameter: **DD001** Reserved field Variable number of reserved bits, all set to logic "1" Bit field Range: Variable Resolution: 1 Used to construct bit fields DF52 bit(n) Used to align subsequent data on byte boundary. 21 Sequence ID Byte Field Size: Request Parameter Optional Command Parameter: Optional Bit Field Size: **DD056** Sequence ID An upward counting number that binds information transmitted in two or more PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG values in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single 0 - 252 =binding available (when SID value reaches 252, resume with 0 on next data set) 253 - 254 = reserved for future use 255 = No binding provided. NMEA recommends using binding SID values whenever practical. **DF53** Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: 1 bit Unit-less number

Radio Frequency/Mode/Power

PGN: 129799 hex: 1FB07

This PGN provides status and control for a Radiotelephone, connected to a NMEA network. The Radiotelephone will transmit and receive status along with remote control and repeater products.

This information will either need to be transmitted on change, by request or on a low duty cycle.

	ame: No	Priority Default: 3		Update Rate		millised		Frequency:	NA	cycles per second
Destinatio	n: <mark>Global</mark>	Query Support: Optional	Cor	nmand Support	Optional	A	CK Rqmnts: <mark>N</mark> o	one		
F <u>ield</u> # 1	Field Nam			Byte Field Bit Field				Request Param		Optional Optional
	DD016 R	Radio Tx or Rx Frequency Frequency	uint32		to ~4.295x10)E+10	Resolution:		, motor.	Ориона
2	Tx Freque	•		Byte Field Bit Field	-			Request Param Command Para		Optional Optional
	DD016 R	Radio Tx or Rx Frequency Frequency	uint32	Range: 0 1	to ~4.295x10 z)E+10	Resolution:	10 Hz		
3	Radio Cha	nnel		Byte Field Bit Field		6]	Request Param Command Para		Optional Optional
	DD017 R	tadio Tx or Rx Channel			with leading second and channel nun first digit 9 transmit free indicating the channel free	g zeros as third digit nbers; eac followed l quency is he coast st quency, "O	required. MF give the freq h with leading by zero. The being used as tation's transr	we first digit 3 followed by ITU channel num MF/HF teletype channels to have first digit 4; requency bands; and the fourth to sixth digits ling zeros as required. VHF channels to have ne next number is "1" indicating the ship stati as a simplex channel frequency, or "2" nsmit frequency is being used as a simplex e. The remaining three numbers are the VHF eros as required.		
	DF63 It is not necessof mismatch.	String, fixed ssary to supply both RX/TX free	()		to 1,785 char f both are pres				count no specifie Data Di characte not avai	85 bytes. Character ot included, length is d by application in ictionary. Unused ers shall be treated as ilable, and filled with = Data not available.
4	Tx Power			Byte Field Bit Field	-			Request Param Command Para		Optional Optional
	DD018 R	Radio Tx Power								
	DF28	Power	uint16	_	to 65,532 W		Resolution:			
	If equipment I used.	has insufficient resolution to ap	ply a comm	nanded power	, the next lowe	er availabl	e power settii	ng should be		

Radio Frequency/Mode/Power

PGN: 129799 hex: 1FB07

Byte Field Size: 5 Mode Request Parameter Optional Bit Field Size: 8 Command Parameter: Optional **DD019** Mode, Radiotelephone Radiotelephone mode settings: 0 = F3E/G3E simplex, telephone; 1 = F3E/G3E duplex, telephone; 2 = J3E, telephone; 3 = H3E, telephone; 4 = F1B/J2B FEC NBDP, telex/teleprinter; 5 = F1B/J2B ARQ NBDP, telex/teleprinter; 6 = F1B/J2B receive only, teleprinter/DSC; 7 = F1B/J2B, teleprinter/DSC; 8 = A1A Morse, tape recorder; 9 = A1A Morse, Morse key/head set; 10 =F1C/F2C/F3C, FAX-machine; 11-253 = reserved;254 = error;255 = unavailable/do not change Range: Variable Resolution: 1 **DF52** Bit field bit(n) Used to construct bit fields Byte Field Size: 2 Request Parameter 6 **Channel Bandwidth** Optional Bit Field Size: Command Parameter: Optional DD020 Radio Channel Bandwidth **DF26** Frequency, mid uint16 Range: 0 to 65,532 Hz Resolution: 1 Hz If equipment has insufficient resolution to apply a commanded bandwidth, the closest available setting should be used.

AIS UTC/Date Inquiry

PGN: 129800 hex: 1FB08

This parameter group provides data associated with the ITU-R M.1371 Message 10 UTC and Date Inquiry Message used to request current UTC and date. An AIS device may generate this parameter group either upon receiving a VHF data link message 10, or upon receipt of an ISO or NMEA request PGN. The Command Group Function PGN 126208 may be used with this PGN to configure parameters such as the Destination ID (see ITU-R M.1371-1 for additional information). Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Single F	rame: No	Priority Default: 7	Default	Update F	?ate:	milliseconds	Frequency:	N/	cycles per second	
Destinati	on: <mark>Global</mark>	Query Support: Optional	Со	mmand Su _l	pport: Required	ACK Rqmnts	: None			
Field#	Field Na	me								
1	Message I	ID		-	eld Size: ield Size: <mark>6</mark>		Request Para Command Pa		Optional Required	
	DD188	AIS Message Identifier			Message Ide	entifier (range of 0 t	to 63).			
			1.							
	DF52 10 = AIS UT	Bit field C and Date Inquiry Message	bit(n)	Range:	Variable	Resoluti	ion: <mark>1</mark>	Used to	construct bit fields	
2	Repeat Inc	dicator		-	eld Size: ield Size: 2		Request Para Command Pa		Optional Note 1	
	DD185 AIS Repeater Indicator				(range of 0 t 0 = Default 1 = First retr 2 = Second 3 = Final ret	ransmission retransmission	·	Ü	•	
	DF52	Bit field	bit(n)	Range:	Variable	Resoluti			construct bit fields	
3	Source ID			-	eld Size: 4		Request Para Command Pa		Optional Required	
	DD010	Generic numeric ID, large			Number of r	oute, waypoint, eve	ent, mark, etc.			
	DF55 MMSI numbe	Integer, 32 bit unsigned er of station which inquires UTC.	uint32	Range:	0 to 4,294,967,	<mark>292 Resoluti</mark>	ion: 1 bit	Unit-les	ss number	
4	NMEA Res	served		-	eld Size: ield Size: resv	1	Request Para Command Pa			
	DD001	Reserved field			Variable nur	mber of reserved bi	per of reserved bits, all set to logic "1"			
	DF52	Bit field	bit(n)	Range:	Variable	Resoluti	ion: 1	Used to	construct bit fields	
	Used to align	n subsequent data on byte bound	dary.							

AIS UTC/Date Inquiry PGN: 129800 hex: 1FB08

Request Parameter Byte Field Size: 5 **AIS Transceiver Information** Optional Bit Field Size: 5 Command Parameter: Note 2 **DD246** AIS Transceiver Information 0 = Channel A VDL reception, 1 = Channel B VDL reception, 2 = Channel A VDL transmission, 3 = Channel B VDL transmission, 4 = Own information not broadcast, 5 = Channels A & B VDL transmission 6 = Channel C (VHF Channel 75) reception, 7 = Channel D (VHF Channel 76) reception, 8 = Channel C (VHF Channel 75) transmission, 9 = Channel D (VHF Channel 76) transmission, 10 - 30 = Reserved31 = AIS device determines channel for Transmission The AIS transceiver Information field (values 0, 1, 6, 7) identifies the reception channel of an AIS message that was received and placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDM sentence to report a received AIS Message. The AIS transceiver Information field (values 2, 3, 8, 9) identifies the transmission channel of an AIS message that was transmitted and then placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDO sentence to report a transmitted AIS Message. The AIS transceiver Information field (value 4) identifies an AIS message that was not transmitted and then placed into the appropriate AIS PGN. This is provided by AIS Mobile Stations at a 1hz rate to report to other shipboard systems its current dynamic navigation data. The AIS transceiver Information field (values 5 and 31) are only used with the Command Group Function PGN 126208. Range: Variable Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) **AIS Spare** Byte Field Size: Request Parameter 6 Bit Field Size: resv Command Parameter: Required **DD311** AIS Spare Field Variable number of reserved bits, all set to logic "0". Normally, spare or reserved bits in NMEA network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. **DF115** Bit field defaulting to zer bit0(n) Range: N2KUnitless Special data format applicable to AIS field that This field mirrors the "Spare" bit field found within the corresponding AIS message such that future definition within the must be set to zero for a AIS message can also be accommodated within this field. Normally, spare or reserved bits in NMEA Network Messages NULL data condition or are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. when unused - applies to AIS spare fields and AIS fields that are for future use 7 **Destination ID** Byte Field Size: 4 Request Parameter Optional Bit Field Size: Command Parameter: Required

uint32 Range: 0 to 4,294,967,292

Number of route, waypoint, event, mark, etc.

Resolution: 1 bit

Unit-less number

DD010 Generic numeric ID, large

MMSI number of station which is inquired.

Integer, 32 bit unsigned

AIS UTC/Date Inquiry PGN: 129800 hex: 1FB08

8 AlS Spare Byte Field Size: Request Parameter
Bit Field Size: resv 2 Command Parameter: Required

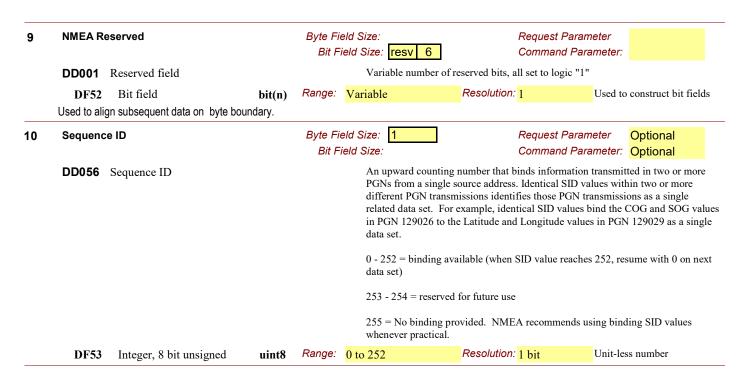
DD311 AIS Spare Field

Variable number of reserved bits, all set to logic "0". Normally, spare or reserved bits in NMEA network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's.

DF115 Bit field defaulting to zer **bit0(n)** Range: N2KUnitless Resolution: 1

This field mirrors the "Spare" bit field found within the corresponding AIS message such that future definition within the AIS message can also be accommodated within this field. Normally, spare or reserved bits in NMEA Network Messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's.

Special data format applicable to AIS field that must be set to zero for a NULL data condition or when unused - applies to AIS spare fields and AIS fields that are for future use



PGN: 129801 hex: 1FB09

This parameter group provides data associated with the ITU-R M.1371 AIS Message 12 Addressed Safety Related Message supporting addressed communication of safety related data.

An AIS device may generate this parameter group either upon VHF Data Link receptions of a Message 12, upon receipt of an ISO or NMEA request PGN, or upon a device's own transmission of a Message 12.

Command Support Requirement:

The Command Group Function PGN 126208 shall be used with this PGN to initiate a transmission of Message 12. Only AIS Class A, Base Station, Aton Stations, and future SAR Airborne stations shall accept the Command Group Function PGN 126208 with this PGN for Message 12. All other types of AIS devices not listed above shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".

Command Support Requirement for Transmission of Message 12 by all allowed AIS Stations as listed above:

The AIS Station commanded to transmit a Message 12 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel.

To verify that the remote addressed AIS Station has received this transmission of Message 12, a Message 13 with the same AIS sequence number as used in the Message 12 and within a time span of 30 seconds or less, should be received in the AIS Acknowledge PGN 129816.

All data fields (except for NMEA Reserved field(s), Sequence ID, Repeat Indicator, and Source ID) must be commanded when using the Command Group Function (PGN 126208) for Transmission of Message 12.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Command Support Requirement for Rebroadcasting of Message 12 by an AIS Base Station:

The AIS Station commanded to rebroadcast a Message 12 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel. All data fields (except for NMEA Reserved field(s) and Sequence ID) must be commanded when using the Command Group Function (PGN 126208) for rebroadcasting.

Note 1: The Repeat Indicator Command Parameter is "Required" only for rebroadcasting a Message 12 from an AIS Base Station. The value should reflect the number of previous transmissions for this specific AIS Message. The AIS Base Station will increment this field accordingly prior to transmission.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Revisions:

June 2017 - New description, new notes in field 5, and new command support requirements.

Single Frame: No Priority Default: 5 Default Update Rate: milliseconds Frequency: NA cycles per second

Destination: Global Query Support: Optional Command Support: Required ACK Ramnts: None

Field # Field Name

PGN: 129801 hex: 1FB09

1	Message ID			eld Size: ield Size: 6	Ī	Request Parameter Optional Command Parameter: Required		
	DD188 AIS Message Identifier		Dit 1		I entifier (range of 0 to 6		Required	
				See the late:	st version of ITU-R M	.1371 for more informa	tion.	
	DF52 Bit field I 12 = Addressed Safety Related Message	oit(n)	Range:	Variable	Resolution	: 1 Used	d to construct bit fields	
2	Repeat Indicator		•	eld Size: ield Size: 2		Request Parameter Command Paramete	- p	
	DD185 AIS Repeater Indicator			Used by the (range of 0		ow many times a messa	ge has been repeated	
		 0 = Default 1 = First retransmission 2 = Second retransmission 3 = Final retransmission 						
						1.1371 for more informa		
	DF52 Bit field	oit(n)	Range:	Variable	Resolution	Used	d to construct bit fields	
3	Source ID		•	eld Size: 4 ield Size:		Request Parameter Command Paramete	-	
	DD010 Generic numeric ID, large			Number of	route, waypoint, event	, mark, etc.		
	DF55 Integer, 32 bit unsigned u	int32 the mes	_	0 to 4,294,967	,292 Resolution	: 1 bit Unit	i-less number	
4	NMEA Reserved		•	eld Size: ield Size: resv	1	Request Parameter Command Paramete		
	DD001 Reserved field			Variable nu	mber of reserved bits,	all set to logic "1"		
		oit(n)	Range:	Variable	Resolution	Used Used	d to construct bit fields	
	Used to align subsequent data on byte bounda	ſy.						

PGN: 129801 hex: 1FB09

5	AIS Tran	sceiver Information		-	eld Size:		Request Parameter	Optional
				Bit F	ield Size: 5		Command Parameter	Note 2
	DD246	AIS Transceiver Information			The AIS transceiv channel of an AIS PGN. This corres sentence to report The AIS transceiv transmission chan the appropriate AI NMEA 0183 VDC The AIS transceiv was not transmitte	DL reception, DL transmission, DL transmission, DL transmission, tion not broadcas B VDL transmis HF Channel 75) HF Channel 76) HF Channel 76) HF Channel 76) HG channel 76 HG channel 7	reception, reception, transmission, transmission, tel for Transmission eld (values 0, 1, 6, 7) ide s received and placed int e mechanism used in the Message. eld (values 2, 3, 8, 9) ide ssage that was transmitte tresponds to the same me ort a transmitted AIS Me eld (value 4) identifies ar d into the appropriate AI t a 1hz rate to report to o	to the appropriate AIS NMEA 0183 VDM Intifies the ed and then placed into exchanism used in the ssage. In AIS message that S PGN. This is
					The AIS transceiv Command Group		eld (values 5 and 31) are 26208.	only used with the
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1 Used t	o construct bit fields
6	Sequenc	e Number		•	eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter	Optional Required
	DD243	AIS Sequence Number			Range 0-3			
					See the latest vers	sion of ITU-R M.	1371 for more information	on.
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used t	o construct bit fields
7	Destinati	ion ID			eld Size: 4		Request Parameter Command Parameter	Optional Required
	DD010	Generic numeric ID, large			Number of route,	waypoint, event,	mark, etc.	
	DF55 MMSI num	Integer, 32 bit unsigned ber of station which is the destination	uint32 ation of this		0 to 4,294,967,292	Resolution	1 bit Unit-le	ess number
8	NMEA R	eserved		•	eld Size: ield Size: resv 6		Request Parameter Command Parameter	
	DD001	Reserved field			Variable number of	of reserved bits, a	ıll set to logic "1"	
	DF52	Bit field gn subsequent data on byte bour	bit(n)	Range:	Variable	Resolution:	1 Used t	o construct bit fields
	OSEG TO BII	yn subsequent data on byte bour	iuai y.					

PGN: 129801 hex: 1FB09

characters (Char8) or Unicode characters (Char16). Control byte = 0 => Unicode

Control byte = 1 => ASCII

A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

characters

characters

Byte Field Size: Request Parameter 9 Retransmit Flag Optional Bit Field Size: 1 Command Parameter: Required DD244 AIS Retransmit Flag 0=No retransmission, 1=retransmitted See the latest version of ITU-R M.1371 for more information. **DF52** Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields Byte Field Size: Request Parameter 10 **AIS Spare** Optional Bit Field Size: resv Command Parameter: Required **DD311** AIS Spare Field Variable number of reserved bits, all set to logic "0". Normally, spare or reserved bits in NMEA network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. **DF115** Bit field defaulting to zer bit0(n) Range: N2KUnitless Resolution: 1 Special data format applicable to AIS field that This field mirrors the "Spare" bit field found within the corresponding AIS message such that future definition within the must be set to zero for a AIS message can also be accommodated within this field. Normally, spare or reserved bits in NMEA Network Messages NULL data condition or are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. when unused - applies to AIS spare fields and AIS fields that are for future use Byte Field Size: 8 or 16 n 11 Safety Related Text Request Parameter Optional Command Parameter: Required Bit Field Size: **DD004** Generic name string, short Name of place, route, waypoint, destination, vessel, vehicle, etc. **DF50** String, variable, short ch8or16(n) Range: 0 to 250 ASCII or Resolution: 1 ASCII or 2 to 252 bytes. First byte in string (uint8) is the Count 0 to 125 Unicode 1 Unicode byte indicating the number Characters Character of bytes in the string, Maximum size is 156 8-bit ASCII characters. including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII

PGN: 129801 hex: 1FB09

12 Sequence ID Byte Field Size: 1 Bit Field Size:

data set)

Request Parameter Command Parameter: Optional

Optional

Unit-less number

DD056 Sequence ID

An upward counting number that binds information transmitted in two or more PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG values in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single data set.

0 - 252 = binding available (when SID value reaches 252, resume with 0 on next

253 - 254 = reserved for future use

255 = No binding provided. NMEA recommends using binding SID values whenever practical.

Resolution: 1 bit Integer, 8 bit unsigned uint8 Range: 0 to 252

PGN: 129802 hex: 1FB0A

This parameter group provides data associated with the ITU-R M.1371 AIS Message 14 Safety Related Broadcast Message supporting broadcast communication of safety related data.

An AIS device may generate this parameter group either upon a VHF Data Link reception of Message 14, upon receipt of an ISO or NMEA request PGN, or upon a device's own transmission of a Message 14.

Command Support Requirement:

The Command Group Function PGN 126208 shall be used with this PGN to initiate a transmission of this AIS Message. Only AIS Class A, Base Station, Aton Stations, and future SAR Airborne stations shall accept the Command Group Function PGN 126208 with this PGN for Message 14. All other types of AIS devices not listed above shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".

Command Support Requirement for Transmission of Message 14 by all allowed AIS Stations as listed above:

The AIS Station commanded to transmit a Message 14 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel.

All data fields (except for NMEA Reserved field(s), Sequence ID, Repeat Indicator, and Source ID) must be commanded when using the Command Group Function (PGN 126208) for Transmission of Message 14.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Command Support Requirement for Rebroadcasting of Message 14 by an AIS Base Station:

The AIS Station commanded to rebroadcast a Message 14 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel.

All data fields (except for NMEA Reserved field(s) and Sequence ID) must be commanded when using the Command Group Function (PGN 126208) for rebroadcasting.

Note 1: The Repeat Indicator Command Parameter is "Required" only for rebroadcasting a Message 14 from an AIS Base Station. The value should reflect the number of previous transmissions for this specific AIS Message. The AIS Base Station will increment this field accordingly prior to transmission.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Command Support Requirement for Relay of "Man Over Board" information by an AIS Class A Station:

This Command Support is required for AIS Class A Stations and is an additional requirement beyond the minimum requirements of IEC 61993-2.

This supports external shipboard Man Over Board systems with the capability to utilize the own ship AIS Class A Station to relay an appropriate Message 14 indicating Man Over Board, for both Active and Test conditions. The MOB relays should be commanded no more than once per minute while the MOB is active.

Performing the MOB relay requires an additional Message 14 with each MOB AIS Message 1. Both messages shall be used under active and test conditions.

See the AIS Class A Position Report (PGN 129038).All data fields (except for NMEA Reserved field(s), Sequence ID) must be commanded when using the Command Group Function (PGN 126208) for Message 14.

The following fields shall be commanded: Message ID shall be set to a value of 14

PGN: 129802 hex: 1FB0A

Note 1: The Repeat Indicator Command Parameter is "Required". Repeat Indicator shall be set to a value of 1

Source ID shall be set to a value of 97099xxxx, where xxxx has a range from 0000 to 9999 and is intended to identify individual MOBs being reported.

Safety Related Text shall be set as follows:

For the active MOB, the text should be "MOB ACTIVE".

For the MOB test mode, the text should be "MOB TEST".

Note 2: The AIS Transceiver Information Command Parameter is "Required". AIS Transceiver Information shall be set to a value of 31.

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Revisions: June 2017 – New description, new notes in field 5, and new command support requirements.

Single Fi	ame: No	Priority Default: 5	Default	Update R	late:	milliseconds	Frequency:	NA cycles per second				
Destination	n: Global	Query Support: Optional	Co	mmand Sup	port: Required	ACK Rqmnts:	None					
ield#	Field Na	me										
1	Message	ID		•	eld Size: ield Size: 6		Request Paran Command Para	o p				
	DD188	AIS Message Identifier		БКТ		ntifier (range of 0 to		Required				
					See the lates	t version of ITU-R N	M.1371 for more int	formation.				
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	on: 1	Used to construct bit fields				
	14 = Safety	Related Broadcast Message.										
2	2 Repeat Indicator			Byte Fi	eld Size:	Request Parameter Optional						
				Bit F	ield Size: 2		Command Parameter: Note 1					
	DD185 AIS Repeater Indicator				Used by the repeater to indicate how many times a message has been repeated (range of 0 to 3).							
					0 = Default 1 = First retr 2 = Second r 3 = Final ret	etransmission						
					See the lates	st version of ITU-R	M.1371 for more in	formation.				
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	on: 1	Used to construct bit fields				
3	Source ID			•	eld Size: 4	Request Parameter Command Parameter: Required						
	DD010	Generic numeric ID, large			Number of re	of route, waypoint, event, mark, etc.						
	DF55	Integer, 32 bit unsigned	uint32	Range:	0 to 4,294,967,	292 Resolutio	on: 1 bit	Unit-less number				
MMSI number of station which is the source o				ssage.								

PGN: 129802 hex: 1FB0A

4	4 NMEA Reserved			•	eld Size: ield Size: resv	1	Request Parameter Command Parameter:		
	DD001	Reserved field			Variable num	ber of reserved bits, a	all set to logic "1"		
	DF52 Used to ali	Bit field gn subsequent data on byte bour	bit(n) ndary.	Range:	Variable	Resolution:	1 Used	to construct bit fields	
5	AIS Tran	sceiver Information		•	eld Size:		Request Parameter	Optional	
				Bit F	ield Size: 5		Command Parameter	Note 2	
	DD246	AIS Transceiver Information	bit(n)	Range:	1 = Channel I 2 = Channel I 3 = Channel I 4 = Own info 5 = Channel I 6 = Channel I 8 = Channel I 10 - 30 = Res 31 = AIS devi The AIS trans channel of an PGN. This cosentence to re The AIS trans transmission of the appropriat NMEA 0183 The AIS trans was not transi provided by A its current dyn The AIS trans	sceiver Information for AIS message that was presponds to the same port a received AIS Mesceiver Information for channel of an AIS meste AIS PGN. This con VDO sentence to repose sceiver Information for mitted and then place AIS Mobile Stations a namic navigation data	ssion reception, reception, transmission, transmission, tel for Transmission eld (values 0, 1, 6, 7) ideas received and placed in the mechanism used in the Message. eld (values 2, 3, 8, 9) ideassage that was transmitterresponds to the same moort a transmitted AIS Meldi (value 4) identifies and into the appropriate Al at a 1hz rate to report to ca. eld (values 5 and 31) are 26208.	to the appropriate AIS NMEA 0183 VDM entifies the ed and then placed into echanism used in the essage. n AIS message that IS PGN. This is other shipboard systems	
6	AIS Spar	е		Byte Fi	eld Size:		Request Parameter	Optional	
				Bit F	ield Size: resv	2	Command Parameter	Required	
	DD311	AIS Spare Field			bits in NMEA	network messages a	all set to logic "0". Norm are encoded with logic 1's are to be encoded as logic	s, however for AIS	
	This field n	5 Bit field defaulting to zer nirrors the "Spare" bit field found ge can also be accommodated with logic 1's, however for AIS	within the o	orrespond eld. Norma	lly, spare or reserve	ed bits in NMEA Netw	ion within the vork Messages 0's. applic must I NULI when spare	al data format hable to AIS field that he set to zero for a had data condition or hunused - applies to AIS helds and AIS fields her for future use	

PGN: 129802

hex: 1FB0A

7 **Safety Related Text** Byte Field Size: 8 or 16 n Bit Field Size:

Request Parameter Command Parameter: Required

Optional

DD004 Generic name string, short

Name of place, route, waypoint, destination, vessel, vehicle, etc.

String, variable, short DF50

Maximum size is 163 8-bit ASCII characters.

ch8or16(n)Range: 0 to 250 ASCII or 0 to 125 Unicode Characters

Resolution: 1 ASCII or 1 Unicode Character

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII

characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters

Control byte = 1 => ASCII characters

A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

Sequence ID

8

Byte Field Size: Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD056 Sequence ID

An upward counting number that binds information transmitted in two or more PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG values in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single

0 - 252 = binding available (when SID value reaches 252, resume with 0 on next data set)

253 - 254 =reserved for future use

255 = No binding provided. NMEA recommends using binding SID values

whenever practical.

DF53 Integer, 8 bit unsigned uint8

Range: 0 to 252

Resolution: 1 bit

Unit-less number

AlS Interrogation PGN: 129803 hex: 1FB0B

This parameter group provides data associated with the ITU-R M.1371 AIS Message 15 Interrogation Message used to request a specific ITU-R M.1371 message resulting in responses from one or more AIS mobile units.

An AlS device may generate this parameter group either upon a VHF Data Link reception of Message 15, upon receipt of an ISO or NMEA request PGN, or upon a device's own transmission of a Message 15. Command Support Requirement:

The Command Group Function PGN 126208 shall be used with this PGN to initiate a transmission of this Message 15. Only AIS Class A, Base Station, and future SAR Airborne stations shall accept the Command Group Function PGN 126208 with this PGN for Message 15. All other types of AIS devices not listed above shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".

Command Support Requirement for Transmission of Message 15 by AIS Class A and future SAR Airborne Stations:

The AIS Station commanded to transmit a Message 15 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel. The following data fields are not commanded with the Command Group Function: NMEA Reserved field(s), Sequence ID, Repeat Indicator, Source ID, "Reply Slot 1.1, 1.2, 2.1" for Transmission of Message 15.

There are multiple interrogation fields. At a minimum, the first set (Destination ID 1 and Message ID 1.1) shall be commanded. The Remaining interrogation fields may also be commanded with the Command Group Function for transmission of Message 15.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

All the remaining fields not listed above must be commanded with the Command Group Function for Transmission of Message 15.

Command Support Requirement for Transmission of Message 15 by AIS Base Stations:

The AIS Station commanded to transmit a Message 15 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel. The following data fields are not commanded with the Command Group Function: NMEA Reserved field(s), Sequence ID, Repeat Indicator, and Source ID for Transmission of Message 15.

There are multiple interrogation fields. At a minimum, the first set (Destination ID 1 and Message ID 1.1) shall be commanded. The Remaining interrogation fields may also be commanded with the Command Group Function for transmission of Message 15.

The following data fields are may be commanded with the Command Group Function: "Reply Slot 1.1", Message ID 1.2", "Reply Slot 1.2", "Destination ID 2", "Message ID 2.1", and "Reply Slot 2.1" for Transmission of Message 15.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2.3.5 or 31.

Note 3: The Reply Slot fields Command Parameter is "Required". When commanding this PGN to a Base Station, the values provided in the Reply Slot fields 10, 13, and 19, shall represent the actual Start Slot number for the responses. The Base Station will use the commanded Reply Slot number to compute the actual Slot Offset field contents used in the Message 15 transmission, based upon when the Base Station is able to schedule the transmission.

All the remaining fields not listed above must be commanded with the Command Group Function for Transmission of Message 15.

Command Support Requirement for Rebroadcasting of Message 15 by an AIS Base Station:

The AIS Base Station commanded to rebroadcast a Message 15 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel. All data fields (except for NMEA Reserved field(s), Sequence ID, and Reply Slot 1.1, 1.2, 2.1) must be commanded when using the Command Group Function (PGN 126208) for rebroadcasting.

Note 1: The Repeat Indicator Command Parameter is "Required" only for rebroadcasting a Message 15 from an AIS Base Station. The value should reflect the number of previous transmissions for this specific AIS Message. The AIS Base Station will increment this field accordingly prior to transmission.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Revisions:

June 2017 – New description, new notes in field 5, 10, 13, 19, renamed fields 10, 13, 19, and new command support requirements.

AIS Interrogation PGN: 129803 hex: 1FB0B

·	ame: No	Priority Default: 7		Update Ra		milliseconds	Frequency:	NA cycles	per second
Destination	n: Global	Query Support: Optional	Со	mmand Sup	oort: Required	ACK Rqmnts	s: <mark>None</mark>		
ield#	Field Na	ame							
1	Message	• ID		Byte Fie Bit Fi	eld Size: eld Size: <mark>6</mark>]	Request Par Command P	rameter Optional arameter: Require	
	DD188	AIS Message Identifier			Message Id	entifier (range of 0	to 63).		
					See the late	st version of ITU-R	M.1371 for more	information.	
	DF52 15 = Interro	Bit field ogation Message	bit(n)	Range:	Variable	Resolut	ion: <mark>1</mark>	Used to construct	bit fields
2	Repeat Ir	ndicator		Byte Fie Bit Fi	eld Size: eld Size: 2		Request Par Command P	rameter Optional	al
	DD185	AIS Repeater Indicator			Used by the (range of 0		e how many times	a message has been re	epeated
					2 = Second 3 = Final re	transmission retransmission etransmission est version of ITU-R	R.M.1371 for more	information.	
	DF52	Bit field	bit(n)	Range:	Variable	Resolut	ion: 1	Used to construct	bit fields
3	Source II	D		Byte Fie Bit Fi	eld Size: 4 eld Size:		Request Par Command P	rameter Optional	
	DD010	Generic numeric ID, large			Number of	route, waypoint, ev	ent, mark, etc.		
	DF55 MMSI numl	Integer, 32 bit unsigned ber of interrogating station.	uint32	Range:	0 to 4,294,967	Resolut	ion: <mark>1 bit</mark>	Unit-less number	
4	NMEA R	eserved		Byte Fie Bit Fi	eld Size: eld Size: resv	1	Request Par Command P		
	DD001	Reserved field			Variable nu	imber of reserved bi	eserved bits, all set to logic "1"		
	DF52 Used to alig	Bit field gn subsequent data on byte bound	bit(n) dary.	Range:	Variable	Resolut	ion: <mark>1</mark>	Used to construct	bit fields

Command Parameter: Required

Unit-less number

AIS Interrogation PGN: 129803

hex: 1FB0B Request Parameter Byte Field Size: 5 **AIS Transceiver Information** Optional Bit Field Size: 5 Command Parameter: Note 2 **DD246** AIS Transceiver Information 0 = Channel A VDL reception, 1 = Channel B VDL reception, 2 = Channel A VDL transmission, 3 = Channel B VDL transmission, 4 = Own information not broadcast, 5 = Channels A & B VDL transmission 6 = Channel C (VHF Channel 75) reception, 7 = Channel D (VHF Channel 76) reception, 8 = Channel C (VHF Channel 75) transmission, 9 = Channel D (VHF Channel 76) transmission, 10 - 30 = Reserved31 = AIS device determines channel for Transmission The AIS transceiver Information field (values 0, 1, 6, 7) identifies the reception channel of an AIS message that was received and placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDM sentence to report a received AIS Message. The AIS transceiver Information field (values 2, 3, 8, 9) identifies the transmission channel of an AIS message that was transmitted and then placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDO sentence to report a transmitted AIS Message. The AIS transceiver Information field (value 4) identifies an AIS message that was not transmitted and then placed into the appropriate AIS PGN. This is provided by AIS Mobile Stations at a 1hz rate to report to other shipboard systems its current dynamic navigation data. The AIS transceiver Information field (values 5 and 31) are only used with the Command Group Function PGN 126208. Range: Variable Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) **AIS Spare** Byte Field Size: Request Parameter Optional 6 Bit Field Size: resv Command Parameter: Required **DD311** AIS Spare Field Variable number of reserved bits, all set to logic "0". Normally, spare or reserved bits in NMEA network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. **DF115** Bit field defaulting to zer bit0(n) Range: N2KUnitless Special data format applicable to AIS field that This field mirrors the "Spare" bit field found within the corresponding AIS message such that future definition within the must be set to zero for a AIS message can also be accommodated within this field. Normally, spare or reserved bits in NMEA Network Messages NULL data condition or are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. when unused - applies to AIS spare fields and AIS fields that are for future use 7 **Destination ID 1** Byte Field Size: 4 Request Parameter Optional

Bit Field Size:

uint32 Range: 0 to 4,294,967,292

Number of route, waypoint, event, mark, etc.

Resolution: 1 bit

DD010 Generic numeric ID, large

MMSI number of first interrogated station.

Integer, 32 bit unsigned

PGN: 129803 hex: 1FB0B

8	NMEA Reserved	Byte Field Size:	Request Parame	ter
		Bit Field Size: resv 2	Command Paran	neter:
	DD001 Reserved field	Variable number	of reserved bits, all set to logic "1"	
	DF52 Bit field bit(n)	Range: Variable	Resolution: 1	Jsed to construct bit fields
	Used to align subsequent data on byte boundary.			
9	Message ID 1.1	Byte Field Size:	Request Parame	
		Bit Field Size: 6	Command Paran	neter: Required
	DD188 AIS Message Identifier	Message Identifi	er (range of 0 to 63).	
		See the latest ver	rsion of ITU-R M.1371 for more infor	mation.
	DF52 Bit field bit(n)	Range: Variable	Resolution: 1	Jsed to construct bit fields
	First Requested message type from first interrogated			
10	Reply Slot 1.1	Byte Field Size: 2 Bit Field Size:	Request Parame	- p
	DD007 Commission of ID and them		Command Paran , waypoint, event, mark, etc.	Note 3
	DD007 Generic numeric ID, medium		• • • • • • • • • • • • • • • • • • • •	Jnit-less number
	DF54 Integer, 16 bit unsigned uint16 This field contains the absolute VHF data link slot num			Jint-less number
	value, received or transmitted in ITU-R M.1371 Messa			
11	AIS Spare	Byte Field Size:	Request Parame	ter Optional
		Bit Field Size: resv 2	Command Paran	neter: Required
	DD311 AIS Spare Field		of reserved bits, all set to logic "0". Network messages are encoded with log	
			d or reserved bits are to be encoded as	
	DF115 Bit field defaulting to zer bit0(n)	Range: N2KUnitless		Special data format
	This field mirrors the "Spare" bit field found within the AIS message can also be accommodated within this f		that future definition within the	applicable to AIS field that must be set to zero for a
	are encoded with logic 1's, however for AIS PGNs the		anadad aa lagia O'a	NULL data condition or when unused - applies to AIS
			s	pare fields and AIS fields
			tı	hat are for future use
	M ID 4.0	Dida Field O'co.	Down of Down	45.5
12	Message ID 1.2	Byte Field Size: Bit Field Size: 6	Request Parame Command Paran	•
	DD188 AIS Message Identifier		er (range of 0 to 63).	. 10 quii 0 u
	Ç	See the latest year	rsion of ITU-R M.1371 for more infor	rmation
	DF52 Bit field bit(n)	Range: Variable		Jsed to construct bit fields
	Second requested message type from first interrogate		1	
13	Reply Slot 1.2	Byte Field Size: 2	Request Parame	ter Optional
. •	., ,	Bit Field Size:	Command Paran	
	DD007 Generic numeric ID, medium	Number of route	, waypoint, event, mark, etc.	
	DF54 Integer, 16 bit unsigned uint16	Range: 0 to 65,532	Resolution: 1 bit	Jnit-less number
	This field contains the absolute VHF data link slot nun	nber. The AIS device translates th	nis slot number to the Slot Offset	

value, received or transmitted in ITU-R M.1371 Message 15.

AIS Interrogation

AIS I	interrogation					PGN: 129803 hex: 1FB0B
14	NMEA Reserved		•	ield Size: resv 6	Request Par Command P	
	DD001 Reserved field			Variable number	of reserved bits, all set to logic	"1"
	DF52 Bit field Used to align subsequent data on byte bour	bit(n) ndary.	Range:	Variable	Resolution: 1	Used to construct bit fields
15	AIS Spare		•	ield Size: ield Size: resv 2	Request Par Command P	Parameter: Optional Required
	DD311 AIS Spare Field			bits in NMEA ne	of reserved bits, all set to logic twork messages are encoded with or reserved bits are to be encoded.	
	DF115 Bit field defaulting to zer This field mirrors the "Spare" bit field found AIS message can also be accommodated ware encoded with logic 1's, however for AIS	ithin this fi	correspond eld. Norma	illy, spare or reserved b	its in NMEA Network Messages	Special data format applicable to AIS field that must be set to zero for a NULL data condition or when unused - applies to AIS spare fields and AIS fields that are for future use
16	Destination ID 2		•	ield Size: 4	Request Par Command P	rameter <mark>Optional</mark> Parameter: <mark>Required</mark>
	DD010 Generic numeric ID, large			Number of route,	waypoint, event, mark, etc.	
	DF55 Integer, 32 bit unsigned MMSI number of second interrogated statio	uint32 n.	Range:	0 to 4,294,967,292	Resolution: 1 bit	Unit-less number
17	NMEA Reserved		•	ield Size: ield Size: resv 2	Request Par Command P	
	DD001 Reserved field			Variable number	of reserved bits, all set to logic	"1"
	DF52 Bit field Used to align subsequent data on byte bour	bit(n) ndary.	Range:	Variable	Resolution: 1	Used to construct bit fields
18	Message ID 2.1		-	ield Size: ield Size: <mark>6</mark>	Request Par Command P	rameter Optional Parameter: Required
	DD188 AIS Message Identifier			Message Identifie	er (range of 0 to 63).	
				See the latest vers	sion of ITU-R M.1371 for more	information.
	DF52 Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to construct bit fields
	Requested message type from second inter	rogated sta	ation.			

Byte Field Size: 2

Bit Field Size:

uint16 Range: 0 to 65,532

This field contains the absolute VHF data link slot number. The AIS device translates this slot number to the Slot Offset

Request Parameter

Number of route, waypoint, event, mark, etc.

Resolution: 1 bit

Command Parameter: Note 3

Optional

Unit-less number

Reply Slot 2.1

DD007 Generic numeric ID, medium

Integer, 16 bit unsigned

value, received or transmitted in ITU-R M.1371 Message 15.

19

AIS Interrogation	PGN: 129803
	hex: 1FB0B

20 AIS Spare Byte Field Size: Request Parameter Optional
Bit Field Size: resv 2 Command Parameter: Required

DD311 AIS Spare Field

Variable number of reserved bits, all set to logic "0". Normally, spare or reserved bits in NMEA network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's.

DF115 Bit field defaulting to zer **bit0(n)** Range: N2KUnitless Resolution: 1

This field mirrors the "Spare" bit field found within the corresponding AIS message such that future definition within the AIS message can also be accommodated within this field. Normally, spare or reserved bits in NMEA Network Messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's.

Special data format applicable to AIS field that must be set to zero for a NULL data condition or when unused - applies to AIS spare fields and AIS fields that are for future use

21	NMEA R	eserved		•	eld Size: ield Size: resv 6	3	Request Parameter Command Parameter:		
	DD001	Reserved field			Variable number	of reserved bits, all	set to logic "1"		
	DF52 Used to alig	Bit field gn subsequent data on byte bour	bit(n) ndary.	Range:	Variable	Resolution: 1	Use	ed to construct bit field	ls
22	Sequenc	e ID		•	eld Size: 1		Request Parameter Command Paramet	- 1	
	DD056	Sequence ID		An upward counting number that binds information transmitted in two or PGNs from a single source address. Identical SID values within two or m different PGN transmissions identifies those PGN transmissions as a sing related data set. For example, identical SID values bind the COG and SC in PGN 129026 to the Latitude and Longitude values in PGN 129029 as data set.				within two or more nissions as a single the COG and SOG val	lues
					0 - 252 = binding available (when SID value reaches 252, resume with 0 odata set)				xt
						C 1	recommends using	binding SID values	
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution: 1	bit Uni	it-less number	

AIS Assignment Mode Command

PGN: 129804 hex: 1FB0C

This parameter group provides data associated with the ITU-R M.1371 AIS Message 16 Assigned Mode Command Message for assigning specific behavior by a competent authority.

An AIS device may generate this parameter group either upon a VHF Data Link reception of a Message 16, or upon receipt of an ISO or NMEA request PGN, or upon a device's own transmission of a Message 16.

Command Support Requirement:

The Command Group Function PGN 126208 shall be used with this PGN to initiate a transmission of this Message 16. Only Base Stations shall accept the Command Group Function PGN 126208 with this PGN for Message 16. All other types of AIS devices not listed above shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".

Command Support Requirement for Transmission of Message 16 by AIS Base Stations:

The AIS Base Station commanded to transmit a Message 16 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel.

The following data fields are not commanded with the Command Group Function: NMEA Reserved field(s), Sequence ID, Repeat Indicator, and Source ID for Transmission of Message 16.

The following data fields are may be commanded with the Command Group Function: Destination ID B, Offset B, Increment B, and Reporting Rate B for Transmission of Message 16.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Note 3: When commanding this PGN to a Base Station, the values provided in the Start Slot fields 8, 11 shall represent the actual Start Slot of the assigned reporting rate. The Base Station will use the commanded Start Slot number to compute the actual Offset field contents for the Message 16 transmission, based upon when the Base Station is able to schedule the transmission.

All the remaining fields not listed above must be commanded with the Command Group Function for Transmission of Message 16.

Command Support Requirement for Rebroadcasting of Message 16 by an AIS Base Station:

The AIS Base Station commanded to rebroadcast a Message 16 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel.

All data fields (except for NMEA Reserved field(s), Sequence ID, Start Slot A, and Start Slot B) must be commanded when using the Command Group Function (PGN 126208) for rebroadcasting.

Note 1: The Repeat Indicator Command Parameter is "Required". The value should reflect the number of previous

Note 1: The Repeat Indicator Command Parameter is "Required". The value should reflect the number of previous transmissions for this specific AIS Message. The AIS Base Station will increment this field accordingly prior to transmission. Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Revisions:

June 2017 – New description, new notes in field 5, 8, 9, 11, 12, New fields 16 and 17, and new command support requirements.

Single Fra	me: No	Priority Default:	7	Default	Update Ra	te:	milliseconds	Frequency:	NA	cycles per s	second
Destination	Global	Query Support	Optional	Cor	mmand Supp	ort: Required	ACK Rqmr	nts: None			
F <u>ield</u> #	Field N	ame									
1	Message	e ID			Byte Fiel			Request Pa		Optional	
					BIT FIE	ld Size: 6		Command I	arameter:	Required	
	DD188	AIS Message Ident	ifier			Message Ide	entifier (range of () to 63).			
						See the lates	st version of ITU-	R M.1371 for more	e information.		
	DF52	Bit field		bit(n)	Range:	Variable	Resolu	ıtion: 1	Used to	construct bit f	ïelds
1	6 = Assig	ned Mode Command N	/lessage								

PGN: 129804 hex: 1FB0C Byte Field Size: 2 Repeat Indicator Request Parameter Optional Bit Field Size: 2 Command Parameter: Note 1 **DD185** AIS Repeater Indicator Used by the repeater to indicate how many times a message has been repeated (range of 0 to $\overline{3}$). 0 = Default1 = First retransmission 2 = Second retransmission 3 = Final retransmissionSee the latest version of ITU-R M.1371 for more information. Resolution: 1 DF52 Bit field bit(n) Range: Variable Used to construct bit fields 3 Source ID Byte Field Size: Request Parameter Optional Bit Field Size: Command Parameter: Required **DD010** Generic numeric ID, large Number of route, waypoint, event, mark, etc. uint32 Range: 0 to 4,294,967,292 Resolution: 1 bit Integer, 32 bit unsigned Unit-less number MMSI number of assigning station.

Byte Field Size:

Range: Variable

bit(n)

Bit Field Size: resv

Request Parameter

Variable number of reserved bits, all set to logic "1"

Resolution: 1

Command Parameter:

Used to construct bit fields

AIS Assignment Mode Command

NMEA Reserved

DF52

DD001 Reserved field

Bit field

Used to align subsequent data on byte boundary.

AIS Assignment Mode Command

PGN: 129804 hex: 1FB0C

5	AIS Trans	sceiver Information		•	eld Size: ield Size: <mark>5</mark>		Request Paramete				
	DD246	AIS Transceiver Information			3 = Channel B VI 4 = Own informat 5 = Channels A & 6 = Channel C (V 7 = Channel D (V 8 = Channel C (V 9 = Channel D (V 10 - 30 = Reserve	VDL reception, VDL transmission, VDL transmission, NDL transmission, Nation not broadcast, & B VDL transmission VHF Channel 75) reception, (VHF Channel 76) reception, VHF Channel 75) transmission, (VHF Channel 76) transmission,					
					channel of an AIS	S message that was sponds to the same	as received and place ne mechanism used in	d into the appropriate AIS the NMEA 0183 VDM			
					transmission chan the appropriate A	0	mitted and then placed into e mechanism used in the				
					was not transmitte	ed and then place Mobile Stations a	ed into the appropriate at a 1hz rate to report	es an AIS message that e AIS PGN. This is to other shipboard systems			
					The AIS transceiv Command Group			are only used with the			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution.	1 Us	sed to construct bit fields			
6	AIS Spare	e		•	eld Size: ield Size: resv 2		Request Paramete	- p			
	DD311	AIS Spare Field			bits in NMEA net	twork messages a	all set to logic "0". No	ormally, spare or reserved c 1's, however for AIS			
	This field mi	Bit field defaulting to zer irrors the "Spare" bit field found was can also be accommodated with logic 1's, however for AIS I	vithin the c thin this fie	orrespond eld. Norma	lly, spare or reserved bi	its in NMEA Netw	ion within the wrong within the vork Messages o's.	pecial data format plicable to AIS field that ust be set to zero for a ULL data condition or nen unused - applies to AIS are fields and AIS fields at are for future use			
7	Destination	on ID A		•	eld Size: 4		Request Paramete				
	DD010	Generic numeric ID, large		טונד	Number of route,	waypoint, event.		nor. Nequiled			
	DF55	Integer, 32 bit unsigned per of destination station A.	uint32	Range:	0 to 4,294,967,292	Resolution.		nit-less number			

AIS	Assignment Mode Command		PGN: 129804 hex: 1FB0C
8	Start Slot A	Byte Field Size: Bit Field Size:	Request Parameter Optional Command Parameter: Note 3
	DD007 Generic numeric ID, medium	Number of route, w	vaypoint, event, mark, etc.
	DF54 Integer, 16 bit unsigned uint1 This field contains the absolute VHF data link slot no value, received or transmitted in ITU-R M.1371 Mes	umber. The AIS device translates this	Resolution: 1 bit Unit-less number slot number to the Slot Offset
9	Increment A	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter: Required
	DD442 AIS Slot Increment	Valid Values: 0, 45	5, 75, 125, 225, 375, and 1125
	DF54 Integer, 16 bit unsigned uint1	6 Range: 0 to 65,532	Resolution: 1 bit Unit-less number
10	When Increment A has a valid value greater than 0 Start Slot A (when commanded or received) and fiel available" and should be ignored (when commanded Destination ID B	d 16 Reporting Rate A should be set to	
	DD010 Generic numeric ID, large		vaypoint, event, mark, etc.
	DF55 Integer, 32 bit unsigned uint3 MMSI number of destination station B.		Resolution: 1 bit Unit-less number
11	Start Slot B	Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Note 3
	DD007 Generic numeric ID, medium	Number of route, w	vaypoint, event, mark, etc.
	DF54 Integer, 16 bit unsigned uint1	6 Range: 0 to 65,532	Resolution: 1 bit Unit-less number
	This field contains the absolute VHF data link slot no value, received or transmitted in ITU-R M.1371 Mes		slot number to the Slot Offset
12	Increment B	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter: Required
	DD442 AIS Slot Increment	Valid Values: 0, 45	5, 75, 125, 225, 375, and 1125
	DF54 Integer, 16 bit unsigned uint1	6 Range: 0 to 65,532	Resolution: 1 bit Unit-less number
	When Increment B has a value of 0 (when command Rate B (when commanded or received) and field 11		

When Increment B has a valid value greater than 0 (when commanded or received) the Start Slot is provided in field 11 Start Slot B (when commanded or received) and field 17 Reporting Rate B should be set to a value indicating "Data not

and should be ignored (when commanded or received).

available" and should be ignored (when commanded or received).

AIS Assignment Mode Command

13

AIS Spare

PGN: 129804 hex: 1FB0C

Optional

Request Parameter

Bit Field Size: resv Command Parameter: Required **DD311** AIS Spare Field Variable number of reserved bits, all set to logic "0". Normally, spare or reserved bits in NMEA network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. **DF115** Bit field defaulting to zer **bit0(n)** Range: N2KUnitless Resolution: 1 Special data format applicable to AIS field that This field mirrors the "Spare" bit field found within the corresponding AIS message such that future definition within the must be set to zero for a AIS message can also be accommodated within this field. Normally, spare or reserved bits in NMEA Network Messages NULL data condition or are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. when unused - applies to AIS spare fields and AIS fields that are for future use Request Parameter 14 **NMEA Reserved** Byte Field Size: Bit Field Size: resv 4 Command Parameter: **DD001** Reserved field Variable number of reserved bits, all set to logic "1" Resolution: 1 Bit field Range: Variable Used to construct bit fields **DF52** bit(n) Used to align subsequent data on byte boundary. Byte Field Size: 15 Sequence ID Request Parameter Optional Bit Field Size: Command Parameter: Optional **DD056** Sequence ID An upward counting number that binds information transmitted in two or more PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG values in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single data set. 0 - 252 = binding available (when SID value reaches 252, resume with 0 on next 253 - 254 = reserved for future use 255 = No binding provided. NMEA recommends using binding SID values whenever practical. Range: 0 to 252 Resolution: 1 bit Unit-less number **DF53** Integer, 8 bit unsigned uint8 Reporting Rate A Byte Field Size: Request Parameter 16 Optional

Byte Field Size:

Integer, 16 bit unsigned

DD007 Generic numeric ID, medium

Number of route, waypoint, event, mark, etc.

uint16 Range: 0 to 65,532 Resolution: 1 bit Unit-less number

This contains the number of reports scheduled for a 10 minute period. The value shall only be in multiples of 20, with a range between 20 and 600. If a mobile station received a value which is not a multiple of 20 but below 600, it should use the next higher multiple of 20. If a mobile station receives a value greater than 600 it should use 600.

17 Reporting Rate B Byte Field Size: 2 Bit Field Size:

Bit Field Size:

Request Parameter Command Parameter: Required

Command Parameter: Required

Optional

DD007 Generic numeric ID, medium

Number of route, waypoint, event, mark, etc.

uint16 Range: 0 to 65,532 Resolution: 1 bit Unit-less number Integer, 16 bit unsigned

This contains the number of reports scheduled for a 10 minute period. The value shall only be in multiples of 20, with a range between 20 and 600. If a mobile station received a value which is not a multiple of 20 but below 600, it should use the next higher multiple of 20. If a mobile station receives a value greater than 600 it should use 600.

AIS Data Link Management Message

PGN: 129805 hex: 1FB0D

This parameter group provides data associated with the ITU-R M.1371 Message 20 Data Link Management Message for reserving slots for base stations. An AIS device may generate this parameter group either upon receiving a VHF data link message 20, or upon receipt of an ISO or NMEA request PGN. The Command Group Function PGN 126208 shall be used with this PGN to configure base station data link management parameters (see ITU-R M.1371-1 for additional information). Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Single Fr	ame: No	Priority Default: 7	Default	Update Ra	te:	milliseconds	Frequency:	NA cycles per second
Destinatio	n: <mark>Global</mark>	Query Support: Required	Co.	mmand Supp	ort: Required	ACK Rqmnts:	None	
ield#	Field Na	ame						
1	Message	ID		Byte Fiel Bit Fie	ld Size:		Request Para	meter Optional rameter: Required
	DD188	AIS Message Identifier				ntifier (range of 0 to		
					See the lates	t version of ITU-R N	1.1371 for more in	nformation.
	DF52 20 = Data L	Bit field ink Management Message	bit(n)	Range:	Variable	Resolutio	n: <mark>1</mark>	Used to construct bit fields
2	Repeat Ir	ndicator		Byte Fiel Bit Fie	ld Size: eld Size: 2		Request Para Command Pa	meter Optional optional
	DD185	AIS Repeater Indicator			Used by the (range of 0 to		now many times a	message has been repeated
					3 = Final ret	retransmission	M 1371 for more i	nformation
	DF52	Bit field	bit(n)	Range:		Resolutio		Used to construct bit fields
3	Source S	station ID	~()	-	ld Size: 4		Request Para Command Pa	meter Optional rameter: Required
	DD010	Generic numeric ID, large			Number of r	oute, waypoint, even	t, mark, etc.	
	DF55 MMSI numl	Integer, 32 bit unsigned ber of base station transmitting ma	uint32 nagemen		0 to 4,294,967,	<mark>292 Resolutio</mark>	n: 1 bit	Unit-less number
4	NMEA Re	eserved		Byte Fiel Bit Fie	ld Size: eld Size: resv	1	Request Para Command Pa	
	DD001	Reserved field			Variable nur	nber of reserved bits	, all set to logic "1	."
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: 1	Used to construct bit fields
	Used to alig	gn subsequent data on byte bound	ary.					

AIS Data Link Management Message

PGN: 129805 hex: 1FB0D

5	AIS Transceiver Information		•	eld Size: ield Size: <mark>5</mark>	Request Para Command Pa	meter Optional rameter: Note 2
	DD246 AIS Transceiver Information			7 = Channel D (VHF 8 = Channel C (VHF 9 = Channel D (VHF 10 - 30 = Reserved 31 = AIS device deter The AIS transceiver In the AIS transceiver In the AIS transceiver In transmission channel the appropriate AIS P NMEA 0183 VDO see The AIS transceiver In transmitted a provided by AIS Mobits current dynamic name	reception, transmission, transmission, not broadcast, VDL transmission Channel 75) reception, Channel 76) reception, Channel 75) transmission, Channel 76) transmission, Channel 76) transmission, tra	6, 7) identifies the reception blaced into the appropriate AIS ed in the NMEA 0183 VDM 8, 9) identifies the ransmitted and then placed into same mechanism used in the IAIS Message. Intifies an AIS message that priate AIS PGN. This is port to other shipboard systems
	DF52 Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to construct bit fields
6	AIS Spare		•	eld Size: ield Size: resv 2	Request Para Command Pa	meter <mark>Optional</mark> rameter: <mark>Optional</mark>
	DD311 AIS Spare Field			bits in NMEA networ	eserved bits, all set to logic "0 k messages are encoded with eserved bits are to be encoded	
	DF115 Bit field defaulting to zer This field mirrors the "Spare" bit field found v AIS message can also be accommodated wi are encoded with logic 1's, however for AIS I	vithin the c	orrespond eld. Norma	lly, spare or reserved bits ir	NMEA Network Messages	Special data format applicable to AIS field that must be set to zero for a NULL data condition or when unused - applies to AIS spare fields and AIS fields that are for future use
7	Offset Number 1		•	eld Size: 2	Request Para	meter Optional rameter: Required
	DD007 Generic numeric ID, medium	Į.	Dit 1		point, event, mark, etc.	Troquilou Troquilou
	DF54 Integer, 16 bit unsigned 1-4095=respective reserved offset number. See ITU-R M.1371 for more information.	uint16	Range:	0 to 65,532	Resolution: 1 bit	Unit-less number

AIS Data Link Management Message PGN: 129805 hex: 1FB0D

8	Number of Slots 1	Byte Field Size: 1 Bit Field Size:	Request Parameter Optional Command Parameter: Required
	DD005 Generic numeric ID, short	Number of route, waypoint, event,	mark, etc.
	DF53 Integer, 8 bit unsigned uint8	Range: 0 to 252 Resolution:	1 bit Unit-less number
	1-15=respective number of reserved consecutive slots. See ITU-R M.1371 for more information.		
9	Time Out 1	Byte Field Size: 1 Bit Field Size:	Request Parameter Command Parameter: Required
	DD005 Generic numeric ID, short	Number of route, waypoint, event,	mark, etc.
	DF53 Integer, 8 bit unsigned uint8	Range: 0 to 252 Resolution:	1 bit Unit-less number
	1-7=respective time-out value in minutes. See ITU-R M.1371 for more information.		
10	Increment 1	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter: Required
	DD007 Generic numeric ID, medium	Number of route, waypoint, event,	mark, etc.
	DF54 Integer, 16 bit unsigned uint16	Range: 0 to 65,532 Resolution:	1 bit Unit-less number
	1-2047=respective increment to repeat reservation bloc See ITU-R M.1371 for more information.	ck.	
11	Offset Number 2	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter: Required Optional Required
	DD007 Generic numeric ID, medium	Number of route, waypoint, event,	mark, etc.
	DF54 Integer, 16 bit unsigned uint16 1-4095=respective reserved offset number. See ITU-R M.1371 for more information.	Range: 0 to 65,532 Resolution:	1 bit Unit-less number
12	Number of Slots 2	Byte Field Size: 1 Bit Field Size:	Request Parameter Optional Command Parameter: Required
	DD005 Generic numeric ID, short	Number of route, waypoint, event,	mark, etc.
	DF53 Integer, 8 bit unsigned uint8	Range: 0 to 252 Resolution:	1 bit Unit-less number
	1-15=respective number of reserved consecutive slots. See ITU-R M.1371 for more information.		
13	Time Out 2	Byte Field Size: 1 Bit Field Size:	Request Parameter Command Parameter: Required Optional Required
	DD005 Generic numeric ID, short	Number of route, waypoint, event,	mark, etc.
	DF53 Integer, 8 bit unsigned uint8	Range: 0 to 252 Resolution:	1 bit Unit-less number
	1-7=respective time-out value in minutes. See ITU-R M.1371 for more information.		
14	Increment 2	Byte Field Size: 2	Request Parameter Optional
		Bit Field Size:	Command Parameter: Required
	DD007 Generic numeric ID, medium	Number of route, waypoint, event,	mark, etc.
	DF54 Integer, 16 bit unsigned uint16	Range: 0 to 65,532 Resolution:	1 bit Unit-less number
	1-2047=respective increment to repeat reservation block See ITU-R M.1371 for more information.	k.	

AIS Data Link Management Message PGN: 129805

hex: 1FB0D

15	Offset Number 3			eld Size: 2 ield Size:]	Request Parameter Command Parameter	
	DD007 Generic numeric ID, medium			Number of route	e, waypoint, event,	mark, etc.	
	DF54 Integer, 16 bit unsigned 1-4095=respective reserved offset number. See ITU-R M.1371 for more information.	uint16	Range:	0 to 65,532	Resolution	1 bit Unit	e-less number
16	Number of Slots 3			eld Size: 1]	Request Parameter Command Paramete	
	DD005 Generic numeric ID, short			Number of route	e, waypoint, event,	mark, etc.	
	DF53 Integer, 8 bit unsigned 1-15=respective number of reserved consect See ITU-R M.1371 for more information.	uint8 utive slots.	Range:	0 to 252	Resolution	1 bit Unit	-less number
17	Time Out 3			eld Size: 1 ield Size:]	Request Parameter Command Parameter	
	DD005 Generic numeric ID, short			Number of route	e, waypoint, event,	mark, etc.	
	DF53 Integer, 8 bit unsigned 1-7=respective time-out value in minutes. See ITU-R M.1371 for more information.	uint8	Range:	0 to 252	Resolution:	1 bit Unit	t-less number
18	Increment 3		•	eld Size: 2		Request Parameter Command Paramete	
	DD007 Generic numeric ID, medium			Number of route	e, waypoint, event,	mark, etc.	
	DF54 Integer, 16 bit unsigned 1-2047=respective increment to repeat reser See ITU-R M.1371 for more information.	uint16 vation bloc		0 to 65,532	Resolution:	1 bit Unit	t-less number
19	Offset Number 4			eld Size: 2]	Request Parameter Command Parameter	the state of the s
	DD007 Generic numeric ID, medium			Number of route	e, waypoint, event,	mark, etc.	
	DF54 Integer, 16 bit unsigned 1-4095=respective reserved offset number. See ITU-R M.1371 for more information.	uint16	Range:	0 to 65,532	Resolution:	1 bit Unit	t-less number
20	Number of Slots 4		-	eld Size: 1		Request Parameter Command Parameter	
	DD005 Generic numeric ID, short			Number of route	e, waypoint, event,	mark, etc.	
	DF53 Integer, 8 bit unsigned 1-15=respective number of reserved consect See ITU-R M.1371 for more information.	uint8 utive slots.	Range:	0 to 252	Resolution	1 bit Unit	t-less number
21	Time Out 4			eld Size: 1]	Request Parameter Command Paramete	
	DD005 Generic numeric ID, short			Number of route	e, waypoint, event,	mark, etc.	
	DF53 Integer, 8 bit unsigned 1-7=respective time-out value in minutes. See ITU-R M.1371 for more information.	uint8	Range:	0 to 252	Resolution:	1 bit Unit	t-less number

AIS Data Link Management Message PGN: 129805 hex: 1FB0D Byte Field Size: 2 Request Parameter 22 Increment 4 Optional Bit Field Size: Command Parameter: Required **DD007** Generic numeric ID, medium Number of route, waypoint, event, mark, etc. Integer, 16 bit unsigned uint16 Range: 0 to 65,532 Resolution: 1 bit Unit-less number 1-2047=respective increment to repeat reservation block. See ITU-R M.1371 for more information. Byte Field Size: Request Parameter 23 AIS Spare Optional Bit Field Size: resv 6 Command Parameter: Optional **DD311** AIS Spare Field Variable number of reserved bits, all set to logic "0". Normally, spare or reserved bits in NMEA network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. **DF115** Bit field defaulting to zer **bit0(n)** Range: N2KUnitless Resolution: 1 Special data format applicable to AIS field that This field mirrors the "Spare" bit field found within the corresponding AIS message such that future definition within the must be set to zero for a AIS message can also be accommodated within this field. Normally, spare or reserved bits in NMEA Network Messages NULL data condition or are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. when unused - applies to AIS spare fields and AIS fields that are for future use Byte Field Size: Request Parameter **NMEA Reserved** 24 Bit Field Size: resv Command Parameter: Variable number of reserved bits, all set to logic "1" **DD001** Reserved field Resolution: 1 DF52 Bit field Range: Variable Used to construct bit fields bit(n) Used to align subsequent data on byte boundary. Sequence ID Byte Field Size: 1 Request Parameter 25 Optional Bit Field Size: Command Parameter: Optional An upward counting number that binds information transmitted in two or more **DD056** Sequence ID PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG values in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single data set. 0 - 252 = binding available (when SID value reaches 252, resume with 0 on next

253 - 254 =reserved for future use

whenever practical.

Range: 0 to 252

255 = No binding provided. NMEA recommends using binding SID values

Unit-less number

Resolution: 1 bit

Integer, 8 bit unsigned

uint8

DF53

AIS Channel Management

PGN: 129806 hex: 1FB0E

This parameter group provides data associated with the ITU-R M.1371 Message 22 Channel Management Message supporting management of transceiver modes and channels by a base station. An AIS device may generate this parameter group either upon receiving a VHF data link message 5, or upon receipt of an ISO or NMEA request PGN. The Command Group Function PGN126208 shall be used with this PGN to configure channel management parameters (see ITU-R M.1371 for additional information). Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Response to Request:

The response to either an ISO request PGN 059904 or NMEA Request Group Function 126208 for this PGN 129806 shall be the same. The AIS unit shall provide this PGN 129806 for each and every channel management geographical region currently stored in memory.

The latitude and longitude fields 11, 12, 13, 14 in this PGN are only used at a truncated precision to 1/10 of a minute.

The Sequence ID field (SID) is used to link this PGN to other related PGN's from the same source address. When no linkage exists, the value of the SID shall be set to 255.

Single Fr	ame: No	Priority Default: 7	Defau	It Update R	Pate:	milliseconds	Frequency:	NA cycles pe	r second
Destination	n: <mark>Global</mark>	Query Support: Required	C	Command Sup	port: Required	ACK Rqmnts:	None		
Field #	Field Na	me							
1	Message I	ID		Byte Fi	eld Size:		Request Parar	meter Optional	
				Bit F	ield Size: 6		Command Par	ameter: Required	
	DD188	AIS Message Identifier			Message Ide	ntifier (range of 0 to	63).		
					See the lates	t version of ITU-R M	M.1371 for more in	formation.	
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	on: 1	Used to construct bit	t fields
	22 = Channe	el Management Message.							
2	Repeat Inc	dicator		Byte Fi	eld Size:		Request Parar	neter Optional	
				Bit F	ield Size: 2		Command Par	ameter: Note 1	
	DD185	AIS Repeater Indicator			Used by the (range of 0 to	1	how many times a i	message has been repe	eated
					0 = Default				
					1 = First retr	ransmission			
						etransmission			
					3 = Final ret	ransmission			
					See the lates	st version of ITU-R	M.1371 for more in	formation.	
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	on: 1	Used to construct bit	t fields
3	Station ID			Byte Fi	eld Size: 4		Request Parar	neter Required	
				Bit F	ield Size:		Command Par	ameter: Required	
	DD010	Generic numeric ID, large			Number of r	oute, waypoint, ever	nt, mark, etc.		
	DF55	Integer, 32 bit unsigned	uint32	Range:	0 to 4,294,967,	292 Resolutio	on: 1 bit	Unit-less number	
	MMSI numbe	er of base station.							
4	NMEA Res	served		Byte Fi	eld Size:		Request Parar	neter	
				Bit F	ield Size: resv	1	Command Par	ameter:	
	DD001	Reserved field			Variable nur	nber of reserved bits	s, all set to logic "1'	1	
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	on: 1	Used to construct bit	t fields
	Used to align	n subsequent data on byte bound	lary.						

AIS Channel Management

PGN: 129806

								- 11	ex. II DUL
5	AIS Transcei	iver Information		•	eld Size:		Request Paramet		Optional
	DD246 AIS Transceiver Information DF52 Bit field		bit(n)	Bit F	1 = Channel E 2 = Channel A 3 = Channel E 4 = Own infor 5 = Channels 6 = Channel C 7 = Channel I 8 = Channel I 10 - 30 = Ress 31 = AIS devi The AIS trans channel of an PGN. This co- sentence to rej The AIS trans transmission of the appropriat NMEA 0183 \(\) The AIS trans was not trans provided by A its current dyr The AIS trans Command Gro	ce determines channel ceiver Information for AIS message that we be presponded to the samport a received AIS Inceiver Information for the AIS PGN. This country are the AIS PGN. This country is considered to the properties of the AIS PGN. The country is a country in the AIS PGN. This country is a country in the AIS PGN. This country is a country in the AIS PGN. The country is a country in the AIS PGN. Th	st, ssion reception, reception, transmission, transmission, transmission, tel for Transmission ield (values 0, 1, 6, 7 as received and place mechanism used i Message. ield (values 2, 3, 8, 9 essage that was transmiresponds to the samport a transmitted Alfield (value 4) identified into the appropria at a 1hz rate to reportation ield (values 5 and 31 26208.	(7) iden ed into n the (3))) iden smitted se mec S Mes ses an te AIS t to ot	tifies the reception of the appropriate AIS message that BPGN. This is her shipboard system
6	AIS Spare			Byte Fi	eld Size:		Request Paramet	ter	Optional
				•		2	Command Param		
	This field mirrors the "Spare" bit field found within AIS message can also be accommodated within				bits in NMEA	network messages a	all set to logic "0". Nare encoded with logare to be encoded as	ic 1's,	however for AIS
			vithin the co	(n) Range: N2KUnitless Resolution: 1 the corresponding AIS message such that future definition within the his field. Normally, spare or reserved bits in NMEA Network Message the unused or reserved bits are to be encoded as logic 0's.				Special data format applicable to AIS field that must be set to zero for a NULL data condition or when unused - applies to A spare fields and AIS fields that are for future use	
7	Channel A				eld Size: 2		Request Paramet		Optional Required

uint16 Range: 0 to 65,532

Number of route, waypoint, event, mark, etc.

Resolution: 1 bit

Unit-less number

Channel number according to recommendation ITU-R M.1084, Annex 4.

DD007 Generic numeric ID, medium

DF54 Integer, 16 bit unsigned

AIS Channel Management PGN: 129806 hex: 1FB0E

8	Channel	В		•	eld Size: 2		Request Param Command Para		Optional Required
	DD007	Generic numeric ID, medium			Number of route, wa	ypoint, event,	mark, etc.		
	DF54 Channel nu	Integer, 16 bit unsigned umber according to recommendation	uint16 on ITU-R		0 to 65,532 nnex 4.	Resolution	1 bit	Unit-le	ess number
9	Source I	dentifier		Byte Fi	eld Size:		Request Param	eter	Optional
				Bit F	ield Size: 3		Command Para	meter:	Optional
	DD353	AIS Channel Management So	ource		Source identifiers: 1 = ITU-R M.1371 2 = ITU-R M.1371 area message 3 = NMEA 0183 AC 4 = DSC Channel 70 5 = Operator manua 6 thru 7 = Reserved	1 message 22: CA Sentence of Telecommand input	Channel Manager or NMEA Network nd	nent bro	padcast geographical
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	o construct bit fields
10	Power			•	eld Size: ield Size: <mark>1</mark>		Request Param Command Para		Optional Required
	DD252	252 AIS Power			0=High (default), 1=low.	CYTYL D. M.			
	DE53	D'4 C 11	1.47.3	Panga:	See the latest version	n of ITU-R M. Resolution			n. o construct bit fields
	DF52	Bit field	bit(n)		Variable	Resolution			
11	Tx/Rx Mo	ode		•	eld Size: ield Size: <mark>4</mark>		Request Param Command Para		Optional Required
	DD253	AIS Tx/Rx Mode			0=Tx A/Tx B, Rx A/ 1=Tx A, Rx A/Rx B, 2=Tx B, Rx A/Rx B, 3-15=not used.	,			
					See the latest version	n of ITU-R M.	1371 for more info	ormatio	n.
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	o construct bit fields
12	North Ea	st Longitude Corner 1		•	eld Size: 4 ield Size:		Request Param Command Para		Optional Required
	DD023	Longitude, WGS-84			Longitude referenced	d to WGS-84.			
	fields shall	Longitude longitude corner of geographic ar be limited to 1 decimal place of m ng AIS unit shall truncate the value	inutes (1/	ated in this 10 of a min	ute). If a higher precision	of the latitude		"-" = V cm	Vest, resolution ∼1.1
13	North Ea	st Latitude Corner 1			eld Size: 4		Request Param Command Para		Optional Required
	DD022	Latitude, WGS-84			Latitude referenced t	to WGS-84.			
	DF23	Latitude	int32	Range:	+/- 90 deg	Resolution	1x10E-7 deg		outh, resolution ~1.1
	fields shall	latitude corner of geographic area be limited to 1 decimal place of m ng AIS unit shall truncate the value	inutes (1/	10 of a min	ute). If a higher precision			cm	

AIS Channel Management PGN: 129806 hex: 1FB0E Byte Field Size: 4 Request Parameter South West Longitude Corner 2 14 Optional Bit Field Size: Command Parameter: Required DD023 Longitude, WGS-84 Longitude referenced to WGS-84. Range: +/- 180 deg Resolution: 1x10E-7 deg "-" = West, resolution ~ 1.1 DF25 Longitude int32 South West longitude corner of geographic area designated in this message. The precision of the latitude and longitude fields shall be limited to 1 decimal place of minutes (1/10 of a minute). If a higher precision is provided to an AIS unit, the receiving AIS unit shall truncate the value to a precision of 1/10 of a minute. **South West Latitude Corner 2** Byte Field Size: Request Parameter Optional 15 Bit Field Size: Command Parameter: Required **DD022** Latitude, WGS-84 Latitude referenced to WGS-84. DF23 Latitude int32 Range: +/- 90 deg Resolution: 1x10E-7 deg "-" = South, resolution ~ 1.1 South West latitude cornerof geographic area designated in this message. The precision of the latitude and longitude fields shall be limited to 1 decimal place of minutes (1/10 of a minute). If a higher precision is provided to an AIS unit, the receiving AIS unit shall truncate the value to a precision of 1/10 of a minute. Byte Field Size: Request Parameter 16 **NMEA Reserved** Bit Field Size: resv Command Parameter: **DD001** Reserved field Variable number of reserved bits, all set to logic "1" Resolution: 1 DF52 Bit field bit(n) Range: Variable Used to construct bit fields Used to align subsequent data on byte boundary. Addressed or Broadcast Message Indicator Byte Field Size: Request Parameter Optional 17 Bit Field Size: Command Parameter: Required DD254 AIS Addressed or Broadcast Message Indicator 0=Broadcast geographical area message (default), 1=addressed message (to individual station(s)). See the latest version of ITU-R M.1371 for more information. DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields 18 **Channel A Bandwidth** Byte Field Size: Request Parameter Optional Bit Field Size: 1 Command Parameter: Required

0=default (as specified by channel number),

See the latest version of ITU-R M.1371 for more information.

Used to construct bit fields

Resolution: 1

1=12.5 kHz bandwidth.

Range: Variable

A value of 0 indicates that bandwidth is specified by channel number, see ITU-R M.1084, Annex 4 For AIS equipment

bit(n)

designed to ITU-R M.1371-1 and 1371-2, a value of 1, bandwidth is 12.5 kHz. For AIS equipment designed to ITU-R M.1371-3 and later, this value is always set to 0.

DD255 AIS Channel Bandwidth

DF52 Bit field

When sent from an AIS unit:

Used to construct bit fields

AIS	Channel Management					F		I: 129806 ex: 1FB0E
19	Channel B Bandwidth		•	eld Size: ield Size: <mark>1</mark>		Request Parame Command Param		Optional Required
	DD255 AIS Channel Bandwidth			0=default (a 1=12.5 kHz	s specified by channel bandwidth.	number),		
				See the late	st version of ITU-R M.	1371 for more info	rmation	1.
	DF52 Bit field It When sent to an AIS unit: A value of 0 corresponds to the bandwidth as sequipment designed to ITU-R M.1371-1 and 13 For AIS equipment designed to ITU-R M.1371-1 When sent from an AIS unit: A value of 0 indicates that bandwidth is specified designed to ITU-R M.1371-1 and 1371-2, a value For AIS equipment designed to ITU-R M.1371-1	71-2, a 3 and 13 d by ch ue of 1,	value of 1, 371-4, this annel num bandwidth	el number, see ITI bandwidth is 12.4 value is ignored. ber, see ITU-R M is 12.5 kHz .	5 kHz . .1084, Annex 4 For Al	For AIS	Used to	construct bit fields
20	NMEA Reserved	Juna 10	Byte Fi	eld Size: resv	1	Request Parame		
	DD001 Reserved field				mber of reserved bits,	all set to logic "1"		
	DF52 Bit field Itself to align subsequent data on byte boundar	oit(n) y.	Range: Variable Resolution: 1				Used to	construct bit fields
21	Transitional Zone Size		•	eld Size: ield Size: 3		Request Parame Command Param		Optional Required
	DD256 AIS Transitional Zone Size			See the lates	st version of ITU-R M.	1371 for more info	rmation	1.
	DF52 Bit field	oit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
22	AIS Spare		•	eld Size: ield Size: resv	23	Request Parame Command Param		Optional Required
	DD311 AIS Spare Field			bits in NMI	mber of reserved bits, and an armonic mber of reserved bits and a mused or reserved bits and armonic mber of the second bits and armonic mber of the second bits and armonic mber of the second bits are second bits.	re encoded with lo	gic 1's,	however for AIS
	DF115 Bit field defaulting to zer b This field mirrors the "Spare" bit field found with AIS message can also be accommodated within are encoded with logic 1's, however for AIS PG	in the c n this fie	orrespondi eld. Norma	lly, spare or reser	ved bits in NMEA Netv	ion within the vork Messages 0's.	applica must be NULL when u spare fi	data format ble to AIS field that e set to zero for a data condition or nused - applies to AIS elds and AIS fields for future use
23	NMEA Reserved		•	eld Size:	1	Request Parame		

bit(n) Range: Variable

Variable number of reserved bits, all set to logic "1" Resolution: 1

DD001 Reserved field

Used to align subsequent data on byte boundary.

DF52 Bit field

AIS Channel Management PGN: 129806 hex: 1FB0E Request Parameter Byte Field Size: 24 In-Use Flag Optional Bit Field Size: 2 Command Parameter: Optional 0 = "Not in use" when this PGN is sent from an AIS unit or when commanded **DD354** AIS Channel Management Parameters Usage with PGN 126208 to a AIS Base Station 1 = "In use" when this PGN is sent from an AIS unit or when commanded with PGN 126208 to an AIS Base Station 2 - 3 =Reserved for future use AIS Mobile units shall not accept commands on this field with PGN 126208. Resolution: 1 DF52 Bit field bit(n) Range: Variable Used to construct bit fields This value is set to indicate that the other parameters in this PGN are "in-use" by an AIS unit at the time that the AIS unit sends this PGN. Byte Field Size: Request Parameter **NMEA Reserved** 25 Bit Field Size: resv 6 Command Parameter: **DD001** Reserved field Variable number of reserved bits, all set to logic "1" DF52 Bit field Range: Variable Resolution: 1 Used to construct bit fields Used to align subsequent data on byte boundary. Time of in-use Flag Change Byte Field Size: 4 Request Parameter 26 Optional Bit Field Size: Command Parameter: Optional **DD158** Generic time of day 24 hour clock, 0 = midnight, time is in UTC uint32 Range: 0 to 86,401 s Resolution: 1x10E-4 s \sim 24 hours, 0 = midnight, DF06 Time of day range allows for up to two This is the UTC time that the "in-use-flag" field changed to the indicated state. AIS units shall not accept commands on leap seconds per day this field with PGN 126208. Sequence ID Byte Field Size: Request Parameter 27 Optional Bit Field Size: Command Parameter: Optional An upward counting number that binds information transmitted in two or more **DD056** Sequence ID PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG values in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single data set. 0 - 252 = binding available (when SID value reaches 252, resume with 0 on next 253 - 254 =reserved for future use 255 = No binding provided. NMEA recommends using binding SID values whenever practical.

Resolution: 1 bit

Resolution: 1 bit

Number of route, waypoint, event, mark, etc.

Request Parameter

Command Parameter: Required

Unit-less number

Unit-less number

Optional

Integer, 8 bit unsigned

Integer, 32 bit unsigned

DD010 Generic numeric ID, large

MMSI number of addressed station.

uint8

Range: 0 to 252

Byte Field Size:

Bit Field Size:

uint32 Range: 0 to 4,294,967,292

DF53

DF55

28

Destination ID 1

AIS Channel Management PGN: 129806 hex: 1FB0E

29	Destinat	ion ID 2	•		eld Size: 4		Request Para Command Pa		Optional Required
	DD010	Generic numeric ID, large			Number of route, v	vaypoint, event,	mark, etc.		
	DF55 MMSI num	Integer, 32 bit unsigned uber of addressed station.	iint32 Ran	ige:	0 to 4,294,967,292	Resolution.	1 bit	Unit-le	ss number
30	Base Sta	tion Region Management	•		eld Size: ield Size:		Request Para Command Pa		Optional Required
	DD444	DD444 AIS Region Management Control DF52 Bit field bit(n)			0 = Delete Matching Region (Only used with Command Group Base Stations) 1 = Create Region (Only used with Command Group Function) 2 = No Action (Not used with Command Group Function, Used reporting Region information) 3 = Reserved When deleting a region, the Latitude / Longitude values provide exact match of the values in the stored region.				on) sed in PGN when
	DF52	Bit field	bit(n) Ran	ige:	Variable	Resolution.	1	Used to	construct bit fields
31	Channel	Management Reception Time	•		eld Size: 4		Request Para Command Pa		Optional Required
	DD158	Generic time of day			24 hour clock, $0 =$	midnight, time	e is in UTC		
	DF06	Time of day u	iint32 Ran	ige:	0 to 86,401 s	Resolution.	1x10E-4 s	range a	urs, 0 = midnight, llows for up to two conds per day
32	Channel	Management Reception Date	•		eld Size: 2		Request Para Command Pa		Optional Required
	DD039	Generic date			Days since January	, 1, 1970, Date	is relative to U	ΓC Time.	
	DF41	Date, day count u	int16 Ran	ige:	0 to 65,532 days	Resolution.	1 day	0 = Jan	uary 1, 1970, max =

AIS Group Assignment

PGN: 129807 hex: 1FB0F

The Group Assignment Command is transmitted by a base station when operating as a controlling entity for AIS Stations. ITU-R M.1371 Message 23 contains three criteria (position, ship and cargo type, and station type) that are used by each station that receives the message to determine if the message content applies to that station.

Application of all data fields is dependent upon the latest version of ITU-R M.1371.

Use of the NMEA Command Group Function (PGN 126208) with this PGN is only applicable to AIS base stations.

Destination	rame: No on: Global	Priority Default: 7 Query Support: Optional		Update R mmand Sup	Rate: pport: Required	milliseconds ACK Rqmnts	Frequency: s: None	NA	cycles per second
<u>ield #</u> 1	Field Na Message	ID		•	eld Size:	out:Fau (rou oo of 0	Request Paral Command Pai		Optional Required
	DD188	AIS Message Identifier Bit field	bit(n)	Range:		entifier (range of 0 st version of ITU-R Resolut	M.1371 for more in		n. construct bit fields
	_	Assignment Command for AIS	DIL(II)		Variable		1		
2	Repeat In	ndicator		•	eld Size: ield Size: 2		Request Paral Command Pal		Optional Note 1
	DD185	AIS Repeater Indicator			Used by the (range of 0 t		e how many times a	message l	has been repeated
					3 = Final ret	retransmission transmission	R M.1371 for more in	w formantin	_
	DF52	Bit field	bit(n)	Range:	Variable Variable	Resolut			n. construct bit fields
3	Source II)			eld Size: 4		Request Paral Command Pal		Optional Required
	DD010	Generic numeric ID, large			Number of r	route, waypoint, ev	ent, mark, etc.		
	DF55 MMSI numb	Integer, 32 bit unsigned per of base station	uint32	Range:	0 to 4,294,967,	, <mark>292 Resolut</mark>	ion: <mark>1 bit</mark>	Unit-les	ss number
4	AIS Spare	9		•	eld Size: ield Size: resv	2	Request Paral Command Pal		Optional Required
	DD311	AIS Spare Field			bits in NME	EA network messag	its, all set to logic "0 ses are encoded with its are to be encoded	logic 1's,	
	This field m theAIS mes	Bit field defaulting to zer irrors the "Spare" bit field found w sage can also be accommodated are encoded with logic 1's, howev	vithin the c I within this	orrespond s field. Nor	mally, spare or res	served bits in NME	finition within A Network	applica must be NULL when us spare fi	data format ble to AIS field that e set to zero for a data condition or nused - applies to AIS elds and AIS fields for future use

PGN: 129807

					h	ex: 1FB0F
5	Tx/Rx Mode	•	Field Size:	Co	quest Parameter mmand Parameter:	Optional Required
	DD253 AIS Tx/Rx Mode		1=Tx A, Rx A/R 2=Tx B, Rx A/R 3-15=not used.	x B,	1 for more information	
	DF52 Bit field	bit(n) Range	Variable	Resolution: 1	Used to	construct bit fields
6	NMEA Reserved		Field Size: resv 2	-	quest Parameter mmand Parameter:	
	DD001 Reserved field		Variable number	r of reserved bits, all se	et to logic "1"	
	DF52 Bit field Used to align subsequent data on byte bo		Variable	Resolution: 1	Used to	construct bit fields
7	North East Longitude Corner 1	•	Field Size: 4		quest Parameter mmand Parameter:	Optional Required
	DD023 Longitude, WGS-84		Longitude refere	enced to WGS-84.		
	DF25 Longitude North East Longitude corner of geographic resolution of the latitude and longitude fiel resolution is provided to an AIS unit, the re	c area designated in the	decimal place of minutes	s (1/10 of a minute). If	. The cm	est, resolution ~1.1
8	North East Latitude Corner 1	Byte F	Field Size: 4	Re	quest Parameter mmand Parameter:	Optional Required
	DD022 Latitude, WGS-84		Latitude reference	ced to WGS-84.		
	DF23 Latitude	int32 Range	+/- 90 deg	Resolution: 1x	U	uth, resolution ~1.1
	North East Latitude corner of geographic a resolution of the latitude and longitude fiel resolution is provided to an AIS unit, the re	ds shall be fixed at 1 o	decimal place of minutes	s (1/10 of a minute). If		
9	South West Longitude Corner 2	•	Field Size: 4 Field Size:		quest Parameter mmand Parameter:	Optional Required
	DD023 Longitude, WGS-84		Longitude refere	enced to WGS-84.		
	DF25 Longitude South West Longitude corner of geograph resolution of the latitude and longitude fiel resolution is provided to an AIS unit, the re	ic area designated in t ds shall be fixed at 1 d	decimal place of minutes	e referenced to WGS- s (1/10 of a minute). If	84. The	est, resolution ~1.1
10	South West Latitude Corner 2	-	Field Size: 4		quest Parameter	Optional
10	Coath West Lantage Collies 2	•	Field Size:		mmand Parameter:	•
	DD022 Latitude, WGS-84		Latitude reference	ced to WGS-84.		
	DF23 Latitude	int32 Range	: +/- 90 deg	Resolution: 1x	10E-7 deg "-" = So	uth, resolution ~1.1

South West Latitude corner of geographic area designated in this message. Longitude referenced to WGS-84. The resolution of the latitude and longitude fields shall be fixed at 1 decimal place of minutes (1/10 of a minute). If a higher

resolution is provided to an AIS unit, the receiving AIS unit shall truncate to 1/10's of minute.

AIS Group Assignment

AIS Group Assignment PGN: 129807 hex: 1FB0F

11	Station Type		•	eld Size: iield Size: <mark>4</mark>	rameter Optional Parameter: Required			
	DD301 AIS Station Type		0 = All types of mobiles (default) 1 = Reserved for future use 2 = All types of Class B mobile stations 3 = SAR airborne mobile station 4 = AtoN station 5 = Class B "CS" shipborne mobile station only 6 = Inland waterways 7 to 9 = Reserved for regional use 10 = This sentence defines a Base Station coverage area with respect Message 27 broadcasts for Class A and Class B "SO" mobile station 1371 Message 4 and Message 27) 11 to 15 = Reserved for future use See the latest version of ITU-R M.1371 for more information.					
			_					
	DF52 Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to construct bit fields		
	Specifies type of AIS Station this is intended	d for.						
12	NMEA Reserved		Byte Fi	eld Size:	Request Par	rameter		
			Bit F	ield Size: resv 4	Command P	arameter:		
	DD001 Reserved field			Variable number of	f reserved bits, all set to logic '	"1"		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to construct bit fields		
	Used to align subsequent data on byte bour	()						
13	Ship and Cargo Filter		•	eld Size: iield Size: <mark>8</mark>	Request Par Command P	rameter Optional Parameter: Required		
					14)			
	DD300 Ship/Cargo Filter			type" 100 - 199 = Reserv 200 - 255 = Reserv	M.1371 Table "Identifiers to be defor regional use	be used by ships to report their information.		
	DD300 Ship/Cargo Filter DF52 Bit field	bit(n)	Range:	1 - 99 - See ITU-R type" 100 - 199 = Reserv 200 - 255 = Reserv	M.1371 Table "Identifiers to be defor regional use ed for future use			
14		bit(n)	Byte Fi	1 - 99 - See ITU-R type" 100 - 199 = Reserv 200 - 255 = Reserv See the latest version	M.1371 Table "Identifiers to be ded for regional use ed for future use on of ITU-R M.1371 for more Resolution: 1 Request Par	information. Used to construct bit fields		
14	DF52 Bit field	bit(n)	Byte Fi	1 - 99 - See ITU-R type" 100 - 199 = Reserv 200 - 255 = Reserv See the latest version Variable Variable Variable resv 22 Variable number of bits in NMEA netw	M.1371 Table "Identifiers to be defor regional use ed for future use on of ITU-R M.1371 for more Resolution: 1 Request Par Command P	information. Used to construct bit fields rameter Optional Parameter: Required "O". Normally, spare or reserved the logic 1's, however for AIS		
14	DF52 Bit field AlS Spare DD311 AIS Spare Field		Byte Fi Bit F	1 - 99 - See ITU-R type" 100 - 199 = Reserv 200 - 255 = Reserv See the latest version Variable Variable Variable resv 22 Variable number of bits in NMEA netw	M.1371 Table "Identifiers to be ed for regional use ed for future use on of ITU-R M.1371 for more Resolution: Request Par Command P f reserved bits, all set to logic 'vork messages are encoded with	information. Used to construct bit fields rameter Optional Parameter: Required "O". Normally, spare or reserved the logic 1's, however for AIS		

AIS Group Assignment PGN: 129807 hex: 1FB0F Byte Field Size: Request Parameter 15 **NMEA Reserved** Bit Field Size: resv Command Parameter: **DD001** Reserved field Variable number of reserved bits, all set to logic "1" Bit field Range: Variable Resolution: 1 Used to construct bit fields DF52 bit(n)

 16
 Reporting Interval
 Byte Field Size:
 Request Parameter
 Optional

 Bit Field Size:
 4
 Command Parameter:
 Required

DD302 AIS Reporting Interval for Class B 0 = As given by the autonomous mode 1 = 10 min

Used to align subsequent data on byte boundary

2 = 6 min 3 = 3 min 4 = 1 min

4 = 1 min 5 = 30 sec6 = 15 sec

7 = 10 sec8 = 5 sec

9 = Next shorter reporting interval (only applicable if in autonomous mode) 10 = Next longer reporting interval (only applicable if in autonomous mode)

11 = 2 sec (not applicable to the Class B "CS" and Class B "SO

12 - 15 =Reserved for future use

See the latest version of ITU-R M.1371 for more information.

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields
Specifies how often the position report is transmitted. When in dual channel mode (see field 5) the transmission rate is

maintained by alternating transmissions between channels, each channel transmitting half the required reports. When in single channel mode the single selected channel transmits all the required reports.

17Quiet TimeByte Field Size:Request ParameterOptionalBit Field Size:4Command Parameter:Required

DD303 AIS Quiet Time 0 = No quiet time commanded 1-15 = Quiet time of 1 to 15 min

See the latest version of ITU-R M.1371 for more information.

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

 18 AIS Spare
 Byte Field Size:
 Request Parameter
 Optional

 Bit Field Size:
 resv 6
 Command Parameter:
 Required

Variable number of reserved bits, all set to logic "0". Normally, spare or reserved bits in NMEA network messages are encoded with logic 1's, however for AIS

PGNs the unused or reserved bits are to be encoded as logic 0's.

DF115 Bit field defaulting to zer bit0(n) Range: N2KUnitless Resolution: 1 Special data format

This field mirrors the "Spare" bit field found within the corresponding AIS message such that future definition within the AIS message can also be accommodated within this field. Normally, spare or reserved bits in NMEA Network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's

applicable to AIS field that must be set to zero for a NULL data condition or when unused - applies to AIS spare fields and AIS fields that are for future use

AIS (Group Assignment		PGN: 129807 hex: 1FB0F
19	NMEA Reserved	Byte Field Size: Bit Field Size: resv 2	Request Parameter Command Parameter:
	DD001 Reserved field	Variable numb	ber of reserved bits, all set to logic "1"
	DF52 Bit field bit(Used to align subsequent data on byte boundary.	(n) Range: <mark>Variable</mark>	Resolution: 1 Used to construct bit fields
20	AIS Transceiver Information	Byte Field Size: Bit Field Size: 5	Request Parameter Optional Command Parameter: Required
	DD246 AIS Transceiver Information	1 = Channel B 2 = Channel A 3 = Channel B 4 = Own inform 5 = Channel C 7 = Channel C 8 = Channel C 9 = Channel C 10 - 30 = Rese 31 = AIS device The AIS transport channel of an appropriate transmission of the appropriate NMEA 0183 V The AIS transport channel of the appropriate NMEA 0183 V	A VDL reception, B VDL reception, A VDL transmission, B VDL transmission, B VDL transmission, mation not broadcast, A & B VDL transmission C (VHF Channel 75) reception, C (VHF Channel 76) reception, C (VHF Channel 76) transmission, C (VHF Channel 76) transmission C every ceduce determines channel for Transmission C every cetter information field (values 0, 1, 6, 7) identifies the reception AIS message that was received and placed into the appropriate AIS OFFICE OFFI

Bit Field Size: resv 3

Range: Variable

Byte Field Size:

bit(n)

its current dynamic navigation data.

Command Group Function PGN 126208.

Resolution: 1

Variable number of reserved bits, all set to logic "1"

The AIS transceiver Information field (values 5 and 31) are only used with the

Request Parameter

Command Parameter:

Used to construct bit fields

DF52

NMEA Reserved

DD001 Reserved field

21

Bit field

PGN: 129807 hex: 1FB0F Byte Field Size: 1 22 Sequence ID Request Parameter Optional Bit Field Size: Command Parameter: Optional An upward counting number that binds information transmitted in two or more **DD056** Sequence ID PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG values in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single data set. 0 - 252 = binding available (when SID value reaches 252, resume with 0 on next data set)

whenever practical. Resolution: 1 bit Integer, 8 bit unsigned uint8 Range: 0 to 252 Unit-less number

253 - 254 = reserved for future use

255 = No binding provided. NMEA recommends using binding SID values

AIS Group Assignment

DSC Call Information PGN: 129808 hex: 1FB10

This PGN provides Digital Selective Calling (DSC) data according to ITU M.493-9 with optional expansion according to ITU M.821-1. DSC is a paging system that is used to automate distress alerts sent over terrestrial communication systems such as VHF, MF and HF marine radio systems. DSC provides a mechanism to report significantly more information regarding a distress call rather than just the distress itself. Products equipped with DSC will transmit and receive this information. This PGN will be transmitted as and when required. Calls to be transmitted should generally use the command Group Function Message (PGN 126208) in conjunction with this parameter group to ensure that the correct transmitter is selected.

Single Fra	ame: No	Priority Default: 4	Default	Update Ra	ate:	milliseconds	Frequency:	NA cycles pe	r second
Destinatio	n: Global	Query Support: Require	d Cor	mmand Supp	port: Optional	ACK Rq	mnts: None		
ield#	Field N	ame							
1	DSC For	mat Symbol		Byte Fie Bit Fie	eld Size: 1 eld Size:		Request Par Command P	ameter Optional arameter: Optional	
	DD011	DSC Symbol Definitions			by ITU-R M	1.493 Table 3 fo	or: Phasing and Unique	esenting DSC Symbols of e Functions; Format Spe ; Second Telecommand	ecifier;
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Res	olution: <mark>1 bit</mark>	Unit-less number	
2	DSC Cat	egory Symbol		Byte Fie Bit Fie	eld Size: 1		Request Par Command P	ameter Optional arameter: Optional	
	DD011	DSC Symbol Definitions			by ITU-R M	1.493 Table 3 fo	or: Phasing and Unique	esenting DSC Symbols of e Functions; Format Spe ; Second Telecommand	
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Res	olution: 1 bit	Unit-less number	
3	DSC Mes	ssage Address		Byte Fie Bit Fie	eld Size: char eld Size:	5	Request Par Command P	ameter Optional arameter: Optional	
	DD012 DSC Address or Geographic Area			Individual characters having only decimal values in the rat DSC symbols defined by ITU-R M.493 are used to code the area as defined in ITU-R M.493-9 Section 5. This may rep MMSI, a group MMSI, or a geographic area.					
	DF63	String, fixed	char8(n)	Range:	0 to 1,785 char	<mark>racters R</mark> eso	olution: 1 char	0 to 1,785 bytes. Checount not included, specified by applica Data Dictionary. Un characters shall be transparent available, and fi [0xFF] = Data not a	length is ation in nused reated as Illed with
4	Nature O	Of Distress or 1st Telecomma	ınd	Byte Fie Bit Fi	eld Size: 1 eld Size:		Request Par Command P	ameter Optional optional	
	DD011	DSC Symbol Definitions			by ITU-R M	1.493 Table 3 fo	or: Phasing and Unique	esenting DSC Symbols of e Functions; Format Spe ; Second Telecommand	ecifier;
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Res	olution: 1 bit	Unit-less number	
5	Subsequ Telecom	uent Communication Mode o mand	r 2nd	Byte Fie	eld Size: 1		Request Par		
	DD011	DSC Symbol Definitions		Bit Fi	by ITU-R M	1.493 Table 3 fo	range 000 to 127 repr or: Phasing and Unique	arameter: Optional esenting DSC Symbols of Functions; Format Spe; Second Telecommand	ecifier;
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Res	olution: 1 bit	Unit-less number	

DSC Call Information PGN: 129808 hex: 1FB10

Proposed Rx Frequency / Channel 6

Byte Field Size: char Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD017 Radio Tx or Rx Channel

MF/HF telephone channels to have first digit 3 followed by ITU channel numbers with leading zeros as required. MF/HF teletype channels to have first digit 4; the second and third digit give the frequency bands; and the fourth to sixth digits ITU channel numbers; each with leading zeros as required. VHF channels to have he first digit 9 followed by zero. The next number is "1" indicating the ship station's transmit frequency is being used as a simplex channel frequency, or "2" indicating the coast station's transmit frequency is being used as a simplex channel frequency, "0" otherwise. The remaining three numbers are the VHF channel numbers with leading zeros as required.

DF63 String, fixed char8(n) Range: 0 to 1,785 characters

Resolution: 1 char

0 to 1,785 bytes. Character count not included, length is specified by application in Data Dictionary. Unused characters shall be treated as not available, and filled with [0xFF] = Data not available.

7 Proposed Tx Frequency / Channel Byte Field Size: char Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD017 Radio Tx or Rx Channel

MF/HF telephone channels to have first digit 3 followed by ITU channel numbers with leading zeros as required. MF/HF teletype channels to have first digit 4; the second and third digit give the frequency bands; and the fourth to sixth digits ITU channel numbers; each with leading zeros as required. VHF channels to have he first digit 9 followed by zero. The next number is "1" indicating the ship station's transmit frequency is being used as a simplex channel frequency, or "2" indicating the coast station's transmit frequency is being used as a simplex channel frequency, "0" otherwise. The remaining three numbers are the VHF channel numbers with leading zeros as required.

DF63 String, fixed

char8(n) Range: 0 to 1,785 characters Resolution: 1 char

0 to 1,785 bytes. Character count not included, length is specified by application in Data Dictionary. Unused characters shall be treated as not available, and filled with [0xFF] = Data not available.

DSC Call Information PGN: 129808 hex: 1FB10

Byte Field Size: 8 or 16 n 8 **Telephone Number** Request Parameter Required Bit Field Size: Command Parameter: Optional

ch8or16(n) Range:

Individual characters having only decimal values in the range 0 to 127 for the **DD015** DSC Symbol String DSC symbols defined by ITU-R M.493 are used to code: Telephone number as

defined by ITU-R M.493 Section 8.2.3; DSC Expansion Data as defined by ITU-R M.821 Section 2. 0 to 250 ASCII or

> 0 to 125 Unicode Characters

Resolution: 1 ASCII or

1 Unicode

Character

16 ASCII characters maximum, no Unicode

String, variable, short

DF50

string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = 0 => Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e.

Count = 2) is a null string.

2 to 252 bytes. First byte in

9	Latitude of Vessel Reported					•	Request Parameter Command Parameter: Optional	
	DD022 Latitude, WGS-84			Latitude reference	ed to WGS-84.			
	DF23 Latitude	int32	Range:	+/- 90 deg	Resolution.	1x10E-7 deg	"-" = So cm	outh, resolution ~1.1
10	Longitude of Vessel Reported		•	eld Size: 4		Request Param Command Para		Optional Optional
	DD023 Longitude, WGS-84			Longitude referen	nced to WGS-84.			
	DF25 Longitude	int32	Range:	+/- 180 deg	Resolution.	1x10E-7 deg	"-" = W cm	est, resolution ~1.1
11	Time of Position		•	eld Size: 4		Request Param Command Para		Optional Optional
	DD158 Generic time of day		uint32 Range: 0 to 86,401 s Resolution.			e is in UTC		
	DF06 Time of day	uint32						ors, 0 = midnight, lows for up to two onds per day

DSC Call Information PGN: 129808 hex: 1FB10

12	MMSI Of Ship In Distress			•	eld Size: char ield Size:	5	Request Parameter Optional Command Parameter: Optional					
	DD012	DSC Address or Geographic	e Area	Individual characters having only decimal values DSC symbols defined by ITU-R M.493 are used area as defined in ITU-R M.493-9 Section 5. Th MMSI, a group MMSI, or a geographic area.						to code the address or geographic		
	DF63	String, fixed	char8(n)	Range:	0 to 1,785 char	acters	Resolution:	1 char	count n specifie Data D charact not ava	85 bytes. Charact of included, length of by application in incitionary. Unused ers shall be treated ilable, and filled we are not availab	n is n l as ⁄ith	
13	DSC EOS Symbol			•	eld Size: 1			Request Paran Command Para		Optional Optional		
	DD011 DSC Symbol Definitions			by ITU-R M	.493 Table	e 3 for: Phasi		unctions	SC Symbols define ; Format Specifier elecommand			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-le	ss number		
14	Expansion	on Enabled		•	eld Size: ield Size: <mark>2</mark>			Request Paran Command Para		Optional Optional		
	DD002	Generic status pair			MSB/LSB: 00 = [No, O: 01 = [Yes, O: 10 = Error, 11 = [Unavai	On, Enable],				
	DF52	Bit field	bit(n)	Range:	Variable		Resolution:	1	Used to	construct bit field	is	
15	NMEA R	eserved		•	eld Size: ield Size: resv	6		Request Paran Command Para				
	DD001	Reserved field			Variable nur	nber of res	served bits, a	ll set to logic "1"				
	DF52 Used to alice	Bit field	bit(n) oundary.	Range:	Variable		Resolution:	1	Used to	construct bit field	ls	

DSC Call Information PGN: 129808 hex: 1FB10

Byte Field Size: char Request Parameter Calling Rx Frequency/Channel 16 Optional Bit Field Size: Command Parameter: Optional

DD017 Radio Tx or Rx Channel MF/HF telephone channels to have first digit 3 followed by ITU channel numbers with leading zeros as required. MF/HF teletype channels to have first digit 4; the

second and third digit give the frequency bands; and the fourth to sixth digits ITU channel numbers; each with leading zeros as required. VHF channels to have he first digit 9 followed by zero. The next number is "1" indicating the ship station's transmit frequency is being used as a simplex channel frequency, or "2" indicating the coast station's transmit frequency is being used as a simplex channel frequency, "0" otherwise. The remaining three numbers are the VHF

channel numbers with leading zeros as required. Resolution: 1 char 0 to 1,785 bytes. Character **DF63** String, fixed char8(n) Range: 0 to 1,785 characters

count not included, length is specified by application in Data Dictionary. Unused characters shall be treated as not available, and filled with [0xFF] = Data not available.

17 Calling Tx Frequency/Channel Byte Field Size: char Request Parameter Optional Bit Field Size: Command Parameter: Optional

DD017 Radio Tx or Rx Channel MF/HF telephone channels to have first digit 3 followed by ITU channel numbers with leading zeros as required. MF/HF teletype channels to have first digit 4; the

second and third digit give the frequency bands; and the fourth to sixth digits ITU channel numbers; each with leading zeros as required. VHF channels to have he first digit 9 followed by zero. The next number is "1" indicating the ship station's transmit frequency is being used as a simplex channel frequency, or "2" indicating the coast station's transmit frequency is being used as a simplex channel frequency, "0" otherwise. The remaining three numbers are the VHF

channel numbers with leading zeros as required.

DF63 String, fixed char8(n) Range: 0 to 1,785 characters Resolution: 1 char 0 to 1,785 bytes. Character

count not included, length is specified by application in Data Dictionary. Unused characters shall be treated as not available, and filled with [0xFF] = Data not available.

Time of Receipt/Transmission Byte Field Size: Request Parameter 18 Optional Bit Field Size: Command Parameter: Optional

DD158 Generic time of day 24 hour clock, 0 = midnight, time is in UTC

DF06 Time of day uint32 Range: 0 to 86,401 s Resolution: 1x10E-4 s \sim 24 hours, 0 = midnight,

range allows for up to two leap seconds per day

Date of Receipt/Transmission Byte Field Size: Request Parameter 19 Optional Command Parameter: Optional Bit Field Size:

DD039 Generic date Days since January 1, 1970, Date is relative to UTC Time.

DF41 Date, day count uint16 Range: 0 to 65,532 days Resolution: 1 day 0 = January 1, 1970, max =~179 years

PGN: 129808

								ex. II D IV	
20	DSC Equ	ipment Assigned Message ID	-	Field Size: 2		Request Para Command Pa		Required Optional	
	DD007	Generic numeric ID, medium		Number of rou	ite, waypoint, ever	it, mark, etc.			
		Integer, 16 bit unsigned s not specified in the "Command I Otherwise if this field is specified	Request" or an ISO			onse will with the	Unit-le	ss number	
21	DSC Exp	ansion Field Symbol	-	Field Size: 1		Request Para Command Pa		Optional Optional	
	DD014	DSC Expansion Symbol Defin	nitions	Integer numbe by ITU-R M.8	_	e 000 to 127 repres	senting D	SC Symbols define	ed
	DF53	Integer, 8 bit unsigned	uint8 Range	0 to 252	Resolutio	n: 1 bit	Unit-le	ss number	
22	DSC Exp	ansion Field Data	-	Field Size: 8 or 16	n	Request Para Command Pa		Optional Optional	
	DD015	DSC Symbol String		DSC symbols	J-R M.493 Section	M.493 are used to	code: Te	e 0 to 127 for the lephone number as a as defined by IT	
	DF50	String, variable, short ch	n8or16(n) <i>Range</i> .	0 to 250 ASCII of 0 to 125 Unicode Characters		n: 1 ASCII or 1 Unicode Character	string (byte in	2 bytes. First byte uint8) is the Coundicating the number	t
		ng and size of this field is determinth 38 ASCII characters maximum,		pansion symbol in fiel	d 23.		includi Contro in strin The Co the stri charact Unicod Contro charact Contro charact A strin (total le	byte = $1 \Rightarrow ASC$	rte. es if cII e16) ode II rs e.
23		Number Of Fields, Field 21 d, Expansion Field Type	Byte F	Field Size: 1		Request Para		Optional	
			Bit	Field Size:		Command Pa	rameter:	Optional	
	DD014	DSC Expansion Symbol Defin	nitions	Integer numbe by ITU-R M.8		e 000 to 127 repres	senting D	SC Symbols define	ed.

Range: 0 to 252

uint8

Resolution: 1 bit

Unit-less number

DF53 Integer, 8 bit unsigned

DSC Call Information

DSC Call Information PGN: 129808 hex: 1FB10

Byte Field Size: 8 or 16 n Variable Number Of Fields, Field 22 Request Parameter 24 Optional Repeated, Expansion Field Data

> Bit Field Size: Command Parameter: Optional

DD015 DSC Symbol String Individual characters having only decimal values in the range 0 to 127 for the DSC symbols defined by ITU-R M.493 are used to code: Telephone number as defined by ITU-R M.493 Section 8.2.3; DSC Expansion Data as defined by ITU-

R M.821 Section 2.

ch8or16(n) Range: 0 to 250 ASCII or String, variable, short DF50

The meaning and size of this field is determined by the DSC Expansion symbol in field 24.

String length 38 ASCII characters maximum, no Unicode.

0 to 125 Unicode Characters

Resolution: 1 ASCII or 1 Unicode

Character

string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = $1 \Rightarrow ASCII$

2 to 252 bytes. First byte in

characters

A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

PGN: 129809 hex: 1FB11

This parameter group provides data associated with the ITU-R M.1371 AIS Message 24A AIS Static Data Report, Part A. An AIS device may generate this parameter group either upon a VHF Data Link reception of Message 24A, upon receipt of an ISO or NMEA request PGN, in response to an accepted NMEA Command Group Function, or upon a device's own transmission of a Message 24A.

The Sequence ID field (SID) is used to link this PGN to other related PGN's from the same source address. When no linkage exists, the value of the SID shall be set to 255. Request Support Requirement: Reception of an ISO Request (PGN 059904) for this PGN shall respond by providing as many of these PGNs as necessary.

The minimum response is at least one PGN providing the AIS device's own information.

Additional response PGN(s) may be provided containing information from AIS Message 24A(s) received over the VHF Data Link.

Reception of a Request Group Function (PGN 126208) with no request parameters shall result in the same response as the ISO Request.

All providers of this PGN shall accept and process requests based upon the requested value of Field #3, User ID. This provides a means to request information about a single User ID, including your own.

If the User ID requested is not considered a valid User ID by the receiving device, then the appropriate response depends on how the request was transmitted:

- A global request would result in no response. An addressed request would result in the Acknowledge Group PGN (126208), containing the error state for the requested User ID field of "0x3 = Request or command parameter out-of-range.
- General Command Support: Only AIS Class A, Class B-SO, Class B-CS, Base Station, and future SAR Airborne stations shall accept the Command Group Function PGN 126208 with this PGN for Message 24A.
- All other types of AlS devices not listed above shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".

Command Support Requirement for Rebroadcasting of Messages 24A by an AIS Base Station:

- Only AIS Base Stations shall accept the Command Group Function PGN 126208 with this PGN for Message 24A.
- All other types of AlS devices shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".
- The AIS Station commanded to rebroadcast an AIS Message 24A shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3).
- If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel.

Note 2: The AIS Transceiver Information Command Parameter is "Required".

When commanding this PGN to cause the transmission of Message 24A from an AIS Base Station, the only values that can be commanded are: 2, 3, 5, or 31. All data fields (except for NMEA Reserved field(s), and Sequence ID) must be commanded when using the Command Group Function (PGN 126208) for rebroadcasting.

Note 1: The Repeat Indicator Command Parameter is "Required". The value should reflect the number of previous transmissions for this specific AIS Message. The AIS Base Station will increment this field accordingly prior to transmission.

Command Support Requirement for Configuring Static Data of an AIS Station:

- Only AIS Class A, Class B-SO, Class B-CS, Base Station, and future SAR Airborne stations shall accept the Command Group Function PGN 126208 with this PGN to configure Static data settings for Message 24A.
- All other types of AIS devices shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".
- The PGN field 4 "Name" may be commanded. In addition, field 5 "AIS Transceiver Information" must be set to a value of 4

PGN: 129809 hex: 1FB11

when performing this configuration command.

Note 2: Upon receiving this Command Group Function 126208, the AIS Station shall respond with this PGN reporting its current settings with field 5 – "AIS Transceiver Information" containing a value of 4. Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Revisions: June 2017 - New PGN Name, new description, and new command support requirements.

•	rame: No on: Global	Priority Default: 6 Query Support: Require		Update R mmand Sup	Pate: Pport: Required	milliseconds ACK Rqmnts: N	Frequency: one	NA	cycles per second
Field #	Field N	ame							
1	Message) ID		,	eld Size: ield Size: 6		Request Paran Command Para		Optional Required
	DD188	AIS Message Identifier			Message Ide	entifier (range of 0 to 6	3).		
					See the lates	st version of ITU-R M.	1371 for more inf	formation	
	DF52 24 = AIS C	Bit field class B Static Data Part A	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields
2	Repeat I	ndicator		-	eld Size: ield Size: 2		Request Paran Command Para		Optional Note 1
	DD185	AIS Repeater Indicator			Used by the (range of 0 t	repeater to indicate ho to 3).	w many times a r	nessage h	as been repeated
					0 = Default 1 = First reta 2 = Second 3 = Final ret	retransmission			
					See the late	st version of ITU-R M	.1371 for more in	formation	1.
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
3	User ID			•	eld Size: 4		Request Paran Command Para		Required Required
	DD010	Generic numeric ID, large			Number of r	oute, waypoint, event,	mark, etc.		
	DF55	Integer, 32 bit unsigned ber of mobile station reporting its	uint32 s static infor	-	0 to 4,294,967,	<mark>292 Resolution:</mark>	1 bit	Unit-les	s number
4	Name			•	eld Size: char		Request Paran Command Para		Optional Required
	DD192	Generic String, ASCII, Fixe	d length		Length spec	ified by PGN field defi	inition.		
	DF63 20 characte	String, fixed er string, default value is "@@@	` '		<mark>0 to 1,785 char</mark> 0@@@@@@@@		1 char	count no specifie Data Di characte not avai	85 bytes. Character of included, length is d by application in ctionary. Unused ers shall be treated as lable, and filled with = Data not available.

AIS Static Data Report, Part A

PGN: 129809 hex: 1FB11

5	AIS Transceiver Information		,	eld Size:	7	Request Parameter	Optional		
5	AIS Transceiver Information DD246 AIS Transceiver Information	,	0 = Channe 1 = Channe 2 = Channe 3 = Channe 4 = Own ir 5 = Channe 6 = Channe 7 = Channe 8 = Channe 10 - 30 = F 31 = AIS d The AIS trachannel of PGN. This sentence to The AIS trachannels in the appropriate of t	command Parameter St., St., St., St., St., St., St., St.	ntifies the reception to the appropriate AIS NMEA 0183 VDM ntifies the ed and then placed intechanism used in the ssage. a AIS message that S PGN. This is				
			its current dynamic naviga						
					Group Function PGN 1				
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	Used t	to construct bit fields		
6	NMEA Reserved		•	eld Size: ield Size: <mark>resv</mark>	3	Request Parameter Command Parameter			
	DD001 Reserved field			Variable n	umber of reserved bits,	all set to logic "1"			
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	Used t	to construct bit fields		
	Used to align subsequent data on byte bour	ndary.							
7	Sequence ID			eld Size: 1		Request Parameter Command Parameter	Optional Optional		
	An upward counting number that binds information transmitted in two PGNs from a single source address. Identical SID values within two or different PGN transmissions identifies those PGN transmissions as a sin related data set. For example, identical SID values bind the COG and S in PGN 129026 to the Latitude and Longitude values in PGN 129029 a data set. 0 - 252 = binding available (when SID value reaches 252, resume with data set) 253 - 254 = reserved for future use 255 = No binding provided. NMEA recommends using binding SID value whenever practical.								

Resolution: 1 bit

Unit-less number

uint8 Range: 0 to 252

DF53 Integer, 8 bit unsigned

AIS Static Data Report, Part B

PGN: 129810 hex: 1FB12

This parameter group provides data associated with the ITU-R M.1371 AIS Message 24B AIS Static Data Report, Part A. An AIS device may generate this parameter group either upon a VHF Data Link reception of Message 24B, upon receipt of an ISO or NMEA request PGN, in response to an accepted NMEA Command Group Function, or upon a device's own transmission of a Message 24B.

The Sequence ID field (SID) is used to link this PGN to other related PGN's from the same source address. When no linkage exists, the value of the SID shall be set to 255.

Request Support Requirement:

Reception of an ISO Request (PGN 059904) for this PGN shall respond by providing as many of these PGNs as necessary. The minimum response is at least one PGN providing the AIS device's own information. Additional response PGN(s) may be provided containing information from AIS Message 24B(s) received over the VHF Data Link.

- Reception of a Request Group Function (PGN 126208) with no request parameters shall result in the same response as the ISO Request.
- All providers of this PGN shall accept and process requests based upon the requested value of Field #3, User ID.
- This provides a means to request information about a single User ID, including your own.

If the User ID requested is not considered a valid User ID by the receiving device, then the appropriate response depends on how the request was transmitted:

• A global request would result in no response. An addressed request would result in the Acknowledge Group PGN (126208), containing the error state for the requested User ID field of "0x3 = Request or command parameter out-of-range.

General Command Support: Only AIS Class A, Class B-SO, Class B-CS, Base Station, and future SAR Airborne stations shall accept the Command Group Function PGN 126208 with this PGN for Message 24B. All other types of AIS devices not listed above shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".

Command Support Requirement for Rebroadcasting of Messages 24B by an AIS Base Station:

- Only AIS Base Stations shall accept the Command Group Function PGN 126208 with this PGN for Message 24B.
- All other types of AlS devices shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".
- The AIS Station commanded to rebroadcast an AIS Message 24B shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3).
- If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel. Note 2: The AIS Transceiver Information Command Parameter is "Required".
- When commanding this PGN to cause the transmission of Message 24B from an AIS Base Station, the only values that can be commanded are: 2, 3, 5, or 31.
- All data fields (except for NMEA Reserved field(s), Sequence ID, and Mother Ship MMSI) must be commanded when using the Command Group Function (PGN 126208) for rebroadcasting.

Note 1: The Repeat Indicator Command Parameter is "Required".

The value should reflect the number of previous transmissions for this specific AIS Message.

The AIS Base Station will increment this field accordingly prior to transmission. Command Support Requirement for Configuring Static Data of an AIS Station: Only AIS Class A, Class B-SO, Class B-CS, Base Station, and future SAR Airborne stations shall accept the Command Group Function PGN 126208 with this PGN to configure Static data settings for Message 24B.

PGN: 129810 hex: 1FB12

All other types of AIS devices shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".

The following PGN fields may be command:

- 4 "Type of Ship and Cargo",
- 5 "Vendor ID", 6 "Call Sign",
- 7 "Ship Length",
- 8 "Ship Beam",
- 9 "Reference Point Position from Starboard",
- 10 "Reference Point Position Aft of Bow".

In addition, field 14 – "AIS Transceiver Information" must be set to a value of 4 when performing a configuration command of any of the above seven fields. Note 2: Upon receiving this Command Group Function 126208, the AIS Station shall respond with this PGN reporting its current settings with field 14 – "AIS Transceiver Information" containing a value of 4.

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Revisions: June 2017 – New PGN Name, new description, new command support requirements, field 11 Mother Ship MMSI usage has been deprecated in ITU-R M.1371-5 dated (02/2014), and added new field 14 Type of Electronic Position Fixing Device using 4 of the 6 AIS Spare bits from Field 13.

Single Fra	ame: No	Priority Default: 6	Default	Update R	ate:	milliseconds	Frequency:	NA cycles per second		
Destinatio	n: Global	Query Support: Require	ed Co	ommand Sup	port: Required	ACK Rqmnts	: <mark>None</mark>			
Field #	Field N	ame								
1	Message	ID		•	eld Size:		Request Para			
				Bit F	ield Size: 6			rameter: Required		
	DD188 AIS Message Identifier				Message Ide	ntifier (range of 0 t	0 63).			
					See the lates	t version of ITU-R	M.1371 for more in	nformation.		
	DF52	Bit field	bit(n)	Range:	Variable	Resoluti	ion: 1	Used to construct bit fields		
	24 = AIS C	lass B static data Part B								
2	Repeat Indicator			Byte Field Size:			Request Parameter Optional			
				Bit F	ield Size: 2		Command Pa	rameter: Note 1		
	DD185 AIS Repeater Indicator				Used by the (range of 0 t	1	how many times a	message has been repeated		
			0 = Default							
					1 = First retr 2 = Second r	ransmission retransmission				
					3 = Final ret					
					See the late	st version of ITU-R	M.1371 for more	information.		
	DF52	Bit field	bit(n)	Range:	Variable	Resoluti	ion: 1	Used to construct bit fields		
3	User ID			Byte Fi	eld Size: 4		Request Para	meter Required		
				Bit F	ield Size:		Command Parameter: Required			
	DD010 Generic numeric ID, large			Number of route, waypoint, e			int, event, mark, etc.			
	DF55	Integer, 32 bit unsigned	uint32	Range:	0 to 4,294,967,	292 Resoluti	on: 1 bit	Unit-less number		
	MMSI num	ber of mobile station reporting its	s static info	rmation						

AIS Static Data Report, Part B PGN: 129810 hex: 1FB12 Request Parameter Byte Field Size: 4 Type of Ship and Cargo Optional Bit Field Size: 8 Command Parameter: Required DD193 Ship/Cargo Type 0=Not Available or no ship (default), 1-99= See the latest version of ITU-R M.1371, 100-199=Reserved for Regional (See the latest version of ITU-R M.1371), 200-255=Reserved for future (See the latest version of ITU-R M.1371). DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields **Vendor ID** Byte Field Size: char Request Parameter 5 Optional Bit Field Size: Command Parameter: Required **DD192** Generic String, ASCII, Fixed length Length specified by PGN field definition. char8(n) Range: 0 to 1,785 characters Resolution: 1 char 0 to 1,785 bytes. Character **DF63** String, fixed count not included, length is 7 character string - Unique identification of the unit by a number as defined by the manufacturer; ("@@@@@@@" = not specified by application in available = default) Data Dictionary. Unused characters shall be treated as not available, and filled with [0xFF] = Data not available. Byte Field Size: Request Parameter 6 Call Sign char Optional Bit Field Size: Command Parameter: Required Length specified by PGN field definition. **DD192** Generic String, ASCII, Fixed length char8(n) Range: 0 to 1,785 characters Resolution: 1 char 0 to 1,785 bytes. Character **DF63** String, fixed count not included, length is 7 character string - See the latest version of ITU-R M.1371 for more information; ("@@@@@@@@" = not available = specified by application in default) Data Dictionary. Unused characters shall be treated as not available, and filled with [0xFF] = Data not available.Ship Length 7 Byte Field Size: Request Parameter Optional Bit Field Size: Command Parameter: Required **DD194** Distance, medium Dependent upon PG Field definition. uint16 Range: 0 to 6553.2 m Resolution: 1x10E-1 m Distance, Medium Length of mobile station reporting its static data; Valid range = 0-1022, and must be greater than or equal to field 10 "Reference Point Position Aft of Bow", a value of 65535 indicates that data is not available. For more information, see IMO Circular 227 Section 5.3 Ships Dimensions or NMEA 0400 Section 19.3.2 Vessel Reference Point (This field is valid only if field 3 "User ID" contains a value <= 999999999)

Byte Field Size: 2

Bit Field Size:

uint16 Range: 0 to 6553.2 m

Beam of mobile station reporting its statis data; A value of 65535 indicates that data is not available (This field is valid

Dependent upon PG Field definition.

Request Parameter

Resolution: 1x10E-1 m

Command Parameter: Required

Optional

Ship Beam

DD194 Distance, medium

Distance, Medium

only if field 3 "User ID" contains a value <= 999999999)

8

AIS Static Data Report, Part B

encoded as logic 0's.

PGN: 129810 hex: 1FB12

when unused - applies to AIS

spare fields and AIS fields that are for future use

Byte Field Size: 2 Reference Point Position from Starboard Request Parameter 9 Optional Bit Field Size: Command Parameter: Required **DD194** Distance, medium Dependent upon PG Field definition. Distance, Medium uint16 Range: 0 to 6553.2 m Resolution: 1x10E-1 m Distance to reference point measured from the starboard side of mobile station reporting its static data; Valid range = 0-63, a value of 65535 indicates that data is not available. For more information, see IMO Circular 227 Section 5.3 Ships Dimensions or NMEA 0400 Section 19.3.2 Vessel Reference Point (This field is valid only if field 3 "User ID" contains a value <= 999999999) Byte Field Size: Reference Point Position Aft of Bow Request Parameter Optional Bit Field Size: Command Parameter: Required **DD194** Distance, medium Dependent upon PG Field definition. DF75 Distance, Medium uint16 Range: 0 to 6553.2 m Resolution: 1x10E-1 m Distance to reference point measured aft from the bow of mobile station reporting its static position: Valid range = 0-511. a value of 65535 indicates that data is not available. For more information, see IMO Circular 227 Section 5.3 Ships Dimensions or NMEA 0400 Section 19.3.2 Vessel Reference Point (This field is valid only if field 3 "User ID" contains a value <= 999999999) Mother Ship MMSI Byte Field Size: Request Parameter 11 Optional Bit Field Size: Command Parameter: Optional **DD010** Generic numeric ID, large Number of route, waypoint, event, mark, etc. uint32 Range: 0 to 4,294,967,292 Resolution: 1 bit Unit-less number Integer, 32 bit unsigned This data field is no longer supported by AIS Message 24B and should be set to 4,294,967,295 = Data not available. 12 **AIS Spare** Byte Field Size: Request Parameter Bit Field Size: resv 2 Command Parameter: Required Variable number of reserved bits, all set to logic "0". Normally, spare or reserved **DD311** AIS Spare Field bits in NMEA network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. bit0(n) Range: N2KUnitless Resolution: 1 Special data format **DF115** Bit field defaulting to zer applicable to AIS field that This field mirrors the "Reserved for Regional Applications" bit field found within the corresponding AIS message such must be set to zero for a that future definition within the AIS message can also be accommodated within this field. Normally, spare or reserved NULL data condition or

bits in NMEA Network Messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be

AIS Static Data Report, Part B **PGN: 129810** hex: 1FB12 Request Parameter Type of Electronic Position Fixing Device Byte Field Size: 13 Optional Bit Field Size: 4 Command Parameter: Required **DD191** AIS Electronic Positioning Device Type 0 =Undefined (default) 1 = GPS2 = GLONASS3 = Combined GPS/GLONASS 4 = Loran-C5 = Chayka6 = Integrated Navigation System 7 = Surveyed; For fixed AtoN and virtual AtoN, the charted position should be used. The accurate position enhances its function as a radar reference target 8 = Galilieo 9-14 =Reserved for future use 15 = Internal GNSS See the latest version of ITU-R M.1371 for more information. DF52 Bit field Range: Variable Resolution: 1 Used to construct bit fields bit(n) Byte Field Size: **AIS Transceiver Information** Request Parameter Optional 14 Bit Field Size: 5 Command Parameter: Note 2 **DD246** AIS Transceiver Information 0 = Channel A VDL reception, 1 = Channel B VDL reception, 2 = Channel A VDL transmission, 3 = Channel B VDL transmission, 4 = Own information not broadcast, 5 = Channels A & B VDL transmission 6 = Channel C (VHF Channel 75) reception, 7 = Channel D (VHF Channel 76) reception, 8 = Channel C (VHF Channel 75) transmission, 9 = Channel D (VHF Channel 76) transmission, 10 - 30 = Reserved31 = AIS device determines channel for Transmission The AIS transceiver Information field (values 0, 1, 6, 7) identifies the reception channel of an AIS message that was received and placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDM sentence to report a received AIS Message. The AIS transceiver Information field (values 2, 3, 8, 9) identifies the transmission channel of an AIS message that was transmitted and then placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDO sentence to report a transmitted AIS Message. The AIS transceiver Information field (value 4) identifies an AIS message that was not transmitted and then placed into the appropriate AIS PGN. This is provided by AIS Mobile Stations at a 1hz rate to report to other shipboard systems its current dynamic navigation data. The AIS transceiver Information field (values 5 and 31) are only used with the Command Group Function PGN 126208.

Range: Variable

Byte Field Size:

Range: Variable

Bit Field Size: resv 5

Resolution: 1

Resolution: 1

Variable number of reserved bits, all set to logic "1"

Request Parameter

Command Parameter:

Used to construct bit fields

Used to construct bit fields

bit(n)

bit(n)

DF52

DF52

NMEA Reserved

DD001 Reserved field

Version 3.002 - 09-Feb-23

15

Bit field

Bit field

Used to align subsequent data on byte boundary.

PGN: 129810

hex: 1FB12 Byte Field Size: 1 Sequence ID Request Parameter 16 Optional Bit Field Size: Command Parameter: Optional An upward counting number that binds information transmitted in two or more **DD056** Sequence ID PGNs from a single source address. Identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG values in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single data set. 0 - 252 = binding available (when SID value reaches 252, resume with 0 on next data set)

DF53 Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: 1 bit Unit-less number

253 - 254 = reserved for future use

whenever practical.

255 = No binding provided. NMEA recommends using binding SID values

AIS Static Data Report, Part B

AIS Single Slot Binary Message - DEPRECATED

PGN: 129811 hex: 1FB13

This PGN has been deprecated (as of NMEA PGN Message Database version 2.100) and is not recommended for new designs.

However, support of the deprecated PGN 129811 is strongly recommended to ensure compatibility with legacy equipment.

The PGN description at the time of deprecation was as follows: This parameter group provides data associated with the ITU-R M.1371 Message 25 Single Slot Binary Message supporting both addressed and broadcast communication of binary data.

An AIS device may generate this parameter group either upon receiving a VHF Data Link Message 25, or upon receipt of ISO or NMEA request PGN. The Command Group Function PGN 126208 may be used with this PGN to configure parameters such as the binary data (see ITU-R M.1371-5 Message 25 for additional information).

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Single Fra	me: N	Priority Default: 5	Default	Update Ra	ate:	milliseconds	Frequency:	NA cycles per second		
Destination	:Global	Query Support: Optional	Co	mmand Supp	oort: Optional	ACK Rqmnts	None			
Field#	Field N	ame								
1	Sequenc	e ID		•	ld Size: 1		Request Para Command Pa	O P 1.0.1.G.		
	DD056	Sequence ID			PGNs from different PC related data in PGN 129 data set. 0 - 252 = b data set) 253 - 254 =	a single source addr GN transmissions ide set. For example, id 2026 to the Latitude inding available (wh	ess. Identical SID ventifies those PGN dentical SID values and Longitude values en SID value reach	n transmitted in two or more values within two or more transmissions as a single is bind the COG and SOG values ies in PGN 129029 as a single es 252, resume with 0 on next		
					255 = No b whenever p		ding provided. NMEA recommends using binding SID values ctical.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	on: 1 bit	Unit-less number		
2	Message	ID		Byte Fie Bit Fie	ld Size: eld Size: <mark>6</mark>]	Request Para Command Pa	- p		
	DD188	AIS Message Identifier				entifier (range of 0 to	,			
	D 27.54	D: # 11				est version of ITU-R				
,	DF52	Bit field Single Slot Binary Message	bit(n)	Range:	Variable	Resoluti	ori. 1	Used to construct bit fields		
4	Lo Equais	onigie olot binary Message								

AIS Single Slot Binary Message - DEPRECATED

PGN: 129811 hex: 1FB13

3	Repeat Indicator			•	eld Size: ield Size: 2		Request Parame Command Param		Optional Optional
	DD185	AIS Repeater Indicator			Used by the repe (range of 0 to 3).		ow many times a m	essage l	has been repeated
					0 = Default 1 = First retransi 2 = Second retra 3 = Final retrans	nsmission			
	DF52	Bit field	h:4()	Panga:	See the latest ve	ersion of ITU-R M Resolution	I.1371 for more info		n. construct bit fields
			bit(n)			resolution			
4	Source I	D		•	eld Size: 4 ield Size:		Request Parame Command Param		Optional Optional
	DD010	Generic numeric ID, large			Number of route	, mark, etc.			
	DF55 MMSI Num	Integer, 32 bit unsigned ber of source station.	uint32	Range:	0 to 4,294,967,292	Resolution	1 bit	Unit-les	ss number
5	Destinati	on Indicator		•	eld Size: ield Size: 1		Request Parame Command Param		Optional Optional
	DD387	AIS Destination Indicator			,	o Destination ID Destination ID fi	field used) eld uses 30 data bits	s for MI	MSI
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
6	Binary d	ata flag		•	eld Size: ield Size: 1		Request Parame Command Param		Optional Optional
	DD386	AIS Binary Structure					Application Identification using the 16-bit a		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
7	AIS Spar	е		•	eld Size: ield Size: resv 1]	Request Parame Command Param		
	DD311 AIS Spare Field				bits in NMEA no	etwork messages	all set to logic "0". are encoded with lo are to be encoded a	gic 1's,	
	This field m	Bit field defaulting to zer nirrors the "spare" bit field found w ge can also be accommodated w	vithin the co	orrespondi	N2KUnitless ng AIS message, such	Resolution that future defini	tion within the	applical must be NULL of when us spare fi	data format ble to AIS field that e set to zero for a data condition or nused - applies to AIS elds and AIS fields for future use

AIS Single Slot Binary Message - DEPRECATED

PGN: 129811 hex: 1FB13

AIS Transceiver Information		Byte Fi	eld Size:	Request Para	ameter <mark>Optional</mark>			
		Bit F	ield Size: 5	Command Pa	arameter: Optional			
DD246 AIS Transceiver Information	n		1 = Channel B VDL 2 = Channel A VDL 3 = Channel B VDL 4 = Own information 5 = Channels A & B 6 = Channel C (VHI 7 = Channel D (VHI 8 = Channel C (VHI 9 = Channel D (VHI 10 - 30 = Reserved	reception, transmission, transmission, n not broadcast, VDL transmission Channel 75) reception, Channel 76) reception, Channel 75) transmission, Channel 76) transmission, Channel 76) transmission,	sion			
		The AIS transceiver Information field (values 0, 1, 6, 7) identifies the reception channel of an AIS message that was received and placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDM sentence to report a received AIS Message.						
			transmission channe the appropriate AIS	of an AIS message that was PGN. This corresponds to the	transmitted and then placed into e same mechanism used in the			
			was not transmitted provided by AIS Mo its current dynamic The AIS transceiver	and then placed into the appro- bile Stations at a 1hz rate to r navigation data. Information field (values 5 an	opriate AIS PGN. This is eport to other shipboard systems			
DF52 Bit field	bit(n)	Range:		Resolution: 1	Used to construct bit fields			
Destination ID				•	ameter Optional arameter: Optional			
DD010 Generic numeric ID, large			Number of route, wa	ypoint, event, mark, etc.				
DF55 Integer, 32 bit unsigned MMSI Number of destination station.	uint32	Range:	0 to 4,294,967,292	Resolution: 1 bit	Unit-less number			
Number of bits in Binary Data Field					ameter Optional arameter: Optional			
DD006 Generic counter, short			Numeric count, ever	nt counter, sequence counter				
DF53 Integer, 8 bit unsigned Indicates the number of binary of data bits	uint8 that are co			Resolution: 1 bit	Unit-less number			
Binary Data		•			ameter <mark>Optional</mark> arameter: <mark>Optional</mark>			
DD142 Binary Bit Field			Binary data bit field					
DF52 Bit field Application specific data	bit(n)	Range:	Variable	Resolution: 1	Used to construct bit fields			
	DD246 AIS Transceiver Information DF52 Bit field Destination ID DD010 Generic numeric ID, large DF55 Integer, 32 bit unsigned MMSI Number of destination station. Number of bits in Binary Data Field DD006 Generic counter, short DF53 Integer, 8 bit unsigned Indicates the number of binary of data bits Binary Data DD142 Binary Bit Field DF52 Bit field	DD246 AIS Transceiver Information DF52 Bit field bit(n) Destination ID DD010 Generic numeric ID, large DF55 Integer, 32 bit unsigned uint32 MMSI Number of destination station. Number of bits in Binary Data Field DD006 Generic counter, short DF53 Integer, 8 bit unsigned uint8 Indicates the number of binary of data bits that are cordinary Data DD142 Binary Bit Field DF52 Bit field bit(n)	DD246 AIS Transceiver Information DF52 Bit field bit(n) Range: Destination ID Byte Fi Bit F DD010 Generic numeric ID, large DF55 Integer, 32 bit unsigned uint32 Range: MMSI Number of bits in Binary Data Field Bit F DD006 Generic counter, short DF53 Integer, 8 bit unsigned uint8 Range: Indicates the number of binary of data bits that are contained with Binary Data Binary Data Byte Fi Bit F DD142 Binary Bit Field DF52 Bit field bit(n) Range:	DD246 AIS Transceiver Information DD246 AIS Transceiver Information	DD246 AIS Transceiver Information 0 = Channel A VDI. reception, 1 = Channel B VDI. reception, 2 = Channel B VDI. transmission, 3 = Channel B VDI. transmission, 4 = Own information not broadcast, 5 = Channel B VDI. transmission, 4 = Own information and broadcast, 5 = Channel C (VIII' Channel 75) reception, 7 = Channel C (VIII' Channel 75) reception, 7 = Channel D (VIH' Channel 75) reception, 8 = Channel C (VIII' Channel 75) reception, 7 = Channel D (VIH' Channel 75) reception, 10 = 30 = Reserved 14			

PGN: 129812 hex: 1FB14

This PGN has been deprecated (as of NMEA PGN Message Database version 2.100) and is not recommended for new designs. However, support of the deprecated PGN 129812 is strongly recommended to ensure compatibility with legacy equipment.

The PGN description at the time of deprecation was as follows: This parameter group provides data associated with the ITU-R M.1371 Message 26 Multi Slot Binary Message with Communication State supporting both addressed and broadcast communication of binary data.

This message is primarily intended for scheduled binary transmissions by application of the SOTDMA or ITDMA access scheme. An AIS device may generate this parameter group either upon receiving a VHF Data Link Message 26, or upon receipt of ISO or NMEA request PGN. The Command Group Function PGN 126208 may be used with this PGN to configure parameters such as the binary data (see ITU-R M.1371-5 Message 26 for additional information).

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

This PGN is variable length and provides binary data from 1 to 5 slots. Fields 21 through 24 only exist when there is binary data in the related slot. For example; with a 3 slot binary message, the last field of this PGN is Field 22.

Due to variable length fields at the end of the message, all unused bits in the last byte (of the last field) shall be set to 1.

Single Fr	ame: N	Priority Default: 5	Default	t Update R	?ate:	milliseconds	Frequency:	NA cycles per second
Destination	n: Global	Query Support: Optiona	al Co	ommand Sup	pport: Optional	ACK Rqmnts	S: None	
Field #	Field Na	ame						
1	Sequenc	e ID		•	eld Size: 1		Request Para	- I
				Bit F	ield Size:		Command Pa	rameter: Optional
	DD056 Sequence ID				PGNs from different PG related data in PGN 129 data set. 0 - 252 = b data set) 253 - 254 =	a single source add GN transmissions id a set. For example, 0226 to the Latitude inding available (wl = reserved for future inding provided. N	ress. Identical SID ventifies those PGN identical SID values and Longitude values are SID value reach use	on transmitted in two or more values within two or more transmissions as a single is bind the COG and SOG values les in PGN 129029 as a single les 252, resume with 0 on next using binding SID values
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		ion: 1 bit	Unit-less number
2	Message	_		•	eld Size: ield Size: 6]	Request Para Command Pa	- p
	DD188	AIS Message Identifier			Message Id	entifier (range of 0	to 63).	
					See the late	est version of ITU-R	M.1371 for more in	nformation.
	DF52	Bit field	bit(n)	Range:	Variable	Resolut	ion: 1	Used to construct bit fields
	26 equals N	Multi Slot Binary Message with c	ommunicat	tions state.				

PGN: 129812 hex: 1FB14

3	Repeat I	ndicator		•	eld Size: ield Size: 2		Request Parameter Command Parameter:	Optional Optional		
	DD185	AIS Repeater Indicator	Used by the repeater to indicate how many times a message has been rep (range of 0 to 3).							
				 0 = Default 1 = First retransmission 2 = Second retransmission 3 = Final retransmission 						
					See the latest	version of ITU-R M.	1371 for more information	on.		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields		
4	Source I	D		•	eld Size: 4 ield Size:		Request Parameter Command Parameter:	Optional Optional		
	DD010	Generic numeric ID, large			Number of route, waypoint, event, mark, etc.					
	DF55 MMSI Num	Integer, 32 bit unsigned aber of source station.	uint32	Range:	0 to 4,294,967,29	Resolution:	1 bit Unit-le	ss number		
5	Destinat	ion Indicator		,	eld Size: ield Size: 1		Request Parameter Command Parameter:	Optional Optional		
	DD387	AIS Destination Indicator				(o Destination ID field used) Destination ID field uses 30 data bits for MMSI			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields		
6	Binary d	ata flag		•	eld Size: ield Size: 1		Request Parameter Command Parameter:	Optional Optional		
	DD386	AIS Binary Structure					oplication Identifier bits was using the 16-bit Applica			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields		
7	NMEA R	eserved		•	eld Size: ield Size: <mark>resv</mark>		Request Parameter Command Parameter:			
	DD001	Reserved field			Variable numb	per of reserved bits, a	ll set to logic "1"			
	DF52 Used to ali	Bit field gn subsequent data on a byte bo	bit(n) undary.	Range:	Variable	Resolution:	Used to	o construct bit fields		

PGN: 129812 hex: 1FB14

8	AIS Transceiver Information	eiver Information			Request Para	
	DD246 AIS Transceiver Information	ı	DILF	6 = Channel C (VH 7 = Channel D (VH 8 = Channel C (VH 9 = Channel D (VH 10 - 30 = Reserved	reception, reception, transmission, transmission,	rameter: Optional
				channel of an AIS n PGN. This correspondent to report a	Information field (values 0, 1, nessage that was received and ponds to the same mechanism us received AIS Message. Information field (values 2, 3,	placed into the appropriate AIS sed in the NMEA 0183 VDM
				the appropriate AIS	el of an AIS message that was t PGN. This corresponds to the sentence to report a transmitted	
				was not transmitted provided by AIS Mo its current dynamic		priate AIS PGN. This is eport to other shipboard systems
	DD50 D: C 11	1.44	Danasa	Command Group F	unction PGN 126208.	_
	DF52 Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to construct bit fields
9	Destination ID		•	eld Size: 4 ield Size:	Request Para Command Pa	meter Optional Optional
	DD010 Generic numeric ID, large			Number of route, w	aypoint, event, mark, etc.	
	DF55 Integer, 32 bit unsigned MMSI Number of destination station.	uint32	Range:	0 to 4,294,967,292	Resolution: 1 bit	Unit-less number
10	AIS Spare		•	eld Size: ield Size: resv 2	Request Para Command Pa	
	DD311 AIS Spare Field			bits in NMEA netw	reserved bits, all set to logic "Cook messages are encoded with reserved bits are to be encoded	logic 1's, however for AIS
	DF115 Bit field defaulting to zer This field mirrors the "spare" bit field found w AIS message can also be accommodated w		orrespondi	N2KUnitless ng AIS message, such tha	Resolution: 1 at future definition within the	Special data format applicable to AIS field that must be set to zero for a NULL data condition or when unused - applies to AIS spare fields and AIS fields that are for future use

PGN: 129812 hex: 1FB14

11	Communication state selector flag			•	eld Size: ield Size: 1		Request Parameter Command Paramete	Optional r: Optional	
	DD245	AIS Communication State Se	lctor Flag			MA communication state A communication state for			
							n of ITU-R M.1371 for more information.		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used	to construct bit fields	
12	Commur	nication state		•	eld Size: ield Size: 19		Request Parameter Command Paramete	Optional Optional	
	DD187	AIS Communication State		The Communication State contain allocation algorithms and synchronical				e various TDMA slot	
					See the la	ntest version of ITU-R M.		on.	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used	to construct bit fields	
13	AIS Spar	re		•	eld Size: ield Size: <mark>res</mark>	sv 4	Request Parameter Command Paramete	r:	
	DD311	AIS Spare Field			bits in N	all set to logic "0". Norn re encoded with logic 1 are to be encoded as logi	s, however for AIS		
	This field n	5 Bit field defaulting to zer nirrors the "spare" bit field found w ge can also be accommodated wi	ithin the co	rrespondi	N2KUnitles: ng AIS messag		on within the appli must NUL when spare	ial data format cable to AIS field that be set to zero for a L data condition or unused - applies to AIS fields and AIS fields are for future use	
14	NMEA R	eserved		•	eld Size: ield Size: <mark>res</mark>	sv 6	Request Parameter Command Paramete	r:	
	DD001	Reserved field			Variable	number of reserved bits, a	s, all set to logic "1"		
	DF52 Used to ali	Bit field gn subsequent data on a byte bou	bit(n) Indary.	Range:	Variable	Resolution:	1 Used	to construct bit fields	
15	Number	of Bits in Binary Data Field –	1st slot		eld Size: 1		Request Parameter Command Paramete	Optional r: Optional	
	DD006	Generic counter, short			Numeric	count, event counter, sequ	uence counter		
	DF53 Indicates the	Integer, 8 bit unsigned ne number of data bits that are con	uint8 ntained wit		0 to 252 ary data field fo	Resolution: or 1st slot	1 bit Unit-	less number	
16	Number	of Bits in Binary Data Field –	2nd slot		eld Size: 1		Request Parameter Command Paramete	Optional r: Optional	
	DD006	Generic counter, short			Numeric	count, event counter, seq			
	DF53 Indicates the	Integer, 8 bit unsigned ne number of data bits that are con	uint8 ntained wit		0 to 252 ary data field fo	Resolution: or 2nd slot	1 bit Unit-	less number	

AIS Multi Slot Binary Message - DEPRECATED

PGN: 129812 hex: 1FB14

17	Number of Bits in Binary Data Field – 3rd	slot Byte Field Size: Bit Field Size:	Request Parameter Command Parameter: Optional Optional	
	DD006 Generic counter, short	Numeric count, e	vent counter, sequence counter	
	DF53 Integer, 8 bit unsigned ui Indicates the number of data bits that are contain	nt8 Range: 0 to 252 ed within the binary data field for 3rd slo	Resolution: 1 bit Unit-less number of	
18	Number of Bits in Binary Data Field – 4th	slot Byte Field Size: Bit Field Size:	Request Parameter Optional Command Parameter: Optional	
	DD006 Generic counter, short	Numeric count, e	vent counter, sequence counter	
	DF53 Integer, 8 bit unsigned ui Indicates the number of data bits that are contain	nt8 Range: 0 to 252 ed within the binary data field for 4th slo	Resolution: 1 bit Unit-less number bt	
19	Number of Bits in Binary Data Field – 5th	slot Byte Field Size: Bit Field Size:	Request Parameter Command Parameter: Optional Optional	
	DD006 Generic counter, short	Numeric count, e	vent counter, sequence counter	
	DF53 Integer, 8 bit unsigned ui Indicates the number of data bits that are contain	nt8 Range: 0 to 252 ed within the binary data field for 5th slo	Resolution: 1 bit Unit-less number of	
20	Binary Data – 1st slot	Byte Field Size: Bit Field Size: <mark>n</mark>	Request Parameter Command Parameter: Optional Optional	
	DD142 Binary Bit Field	Binary data bit fie	eld.	
	DF52 Bit field bit Application specific data for the 1st slot	t(n) Range: <mark>Variable</mark>	Resolution: 1 Used to construct bit	fields
21	Binary Data – 2nd slot	Byte Field Size: Bit Field Size: n	Request Parameter Optional Command Parameter: Optional	
	DD142 Binary Bit Field	Binary data bit fie	eld.	
	DF52 Bit field bit Application specific data for the 2nd slot. When the "Number of Bits in Binary Data Field – included in the PGN.	t (n) Range: <mark>Variable</mark> 2nd slot" equals 0 this field and subsequ	Resolution: 1 Used to construct bit uent binary data fields are not	fields
22	Binary Data – 3rd slot	Byte Field Size: Bit Field Size: n	Request Parameter Command Parameter: Optional Optional	
	DD142 Binary Bit Field	Binary data bit fie	eld.	
	DF52 Bit field bit Application specific data for the 3rd slot. When the "Number of Bits in Binary Data Field – included in the PGN.	t (n) Range: <mark>Variable</mark> 3rd slot" equals 0 this field and subsequ	Resolution: 1 Used to construct bit ent binary data fields are not	fields
23	Binary Data – 4th slot	Byte Field Size: Bit Field Size: n	Request Parameter Command Parameter: Optional Optional	
	DD142 Binary Bit Field	Binary data bit fie	eld.	
	DF52 Bit field bit	t(n) Range: Variable	Resolution: 1 Used to construct bit	fields
	Application specific data for the 4th slot. When the "Number of Bits in Binary Data Field - 4 included in the PGN.	Ith slot" equals 0 this field and subseque	ent binary data fields are not	

AIS Multi Slot Binary Message - DEPRECATED

PGN: 129812 hex: 1FB14

24 Binary Data - 5th slot Byte Field Size: Bit Field Size: n Request Parameter Command Parameter: Optional

Optional

DD142 Binary Bit Field

Binary data bit field.

DF52 Bit field bit(n) Range: Variable

Resolution: 1

Used to construct bit fields

Application specific data for the 5th slot.

When the "Number of Bits in Binary Data Field - 5th slot" equals 0 this field is not included in the PGN.

AIS Long-Range Broadcast Message

PGN: 129813 hex: 1FB15

This parameter group provides data associated with the ITU-R M.1371 AIS Message 27 AIS Long-Range Broadcast Message. This message is primarily intended for long-range detection of AIS Class A and Class B "SO" mobile stations by satellite. This message has similar content to Messages 1, 2 and 3.

An AIS device may generate this parameter group either upon a VHF Data Link reception of Message 27, upon receipt of an ISO or NMEA request PGN, or upon a device's own transmission of a Message 27.

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard. Revisions: June 2017 – New description and new AIS Transceiver Information data field 14.

Single Fra	ame: N	Priority Default: 5	Default	Update R	ate:	milliseconds	Frequency:	NA cycles per second	
Destinatio	n: Global	Query Support: Optional	Co	mmand Sup	port: Optional	ACK Rqi	nnts: None		
Field #	Field Na	ame							
1	Sequenc	e ID		•	eld Size: 1 ield Size:		Request Parar Command Par	meter Optional optional	
	DD056	Sequence ID			PGNs from a different PG related data	a single source N transmission set. For examp	address. Identical SID v s identifies those PGN t le, identical SID values	n transmitted in two or more alues within two or more ransmissions as a single bind the COG and SOG values es in PGN 129029 as a single	
					0 - 252 = bir data set)	nding available	(when SID value reache	es 252, resume with 0 on next	
					253 - 254 =	reserved for fut	ure use		
					255 = No bit whenever pr		. NMEA recommends u	using binding SID values	
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Reso	olution: <mark>1 bit</mark>	Unit-less number	
2	Message	ID		•	eld Size: ield Size: 6		Request Parar Command Par	meter Optional rameter: Optional	
	DD188	AIS Message Identifier			Message Ide	ntifier (range o	f 0 to 63).		
					See the lates	st version of ITU-R M.1371 for more information.			
	DF52	Bit field	bit(n)	Range:	Variable	Reso	olution: 1	Used to construct bit fields	
	27 equals L	ong-Range AIS Broadcast Messa	ige						
3	Repeat Ir	ndicator		-	eld Size: ield Size: 2		Request Parar Command Par	meter Optional rameter: Optional	
	DD185	AIS Repeater Indicator			Used by the (range of 0 to		cate how many times a	message has been repeated	
					0 = Default 1 = First retr 2 = Second 1 3 = Final ret	retransmission			
					See the lates	st version of IT	U-R M.1371 for more in	nformation.	
	DF52	Bit field	bit(n)	Range:	Variable	Reso	olution: 1	Used to construct bit fields	

AIS Long-Range Broadcast Message

PGN: 129813 hex: 1FB15

4	User ID			-	eld Size: 4		Request Param Command Para		Optional Optional
	DD010	Generic numeric ID, large			Number of route, w	aypoint, event,	mark, etc.		
	DF55 MMSI Num	Integer, 32 bit unsigned aber of mobile station reporting its	uint32 position.	Range:	0 to 4,294,967,292	Resolution	1 bit	Unit-les	ss number
5	Longitud	le			eld Size: 4		Request Param Command Para		Optional Optional
	DD023	Longitude, WGS-84			Longitude reference	ed to WGS-84.			
	DF25	Longitude	int32	Range:	+/- 180 deg	Resolution	1x10E-7 deg	"-" = W cm	Vest, resolution ~1.1
6	Latitude			-	eld Size: 4		Request Param Command Para		Optional Optional
	DD022	Latitude, WGS-84			Latitude referenced	to WGS-84.			
	DF23	Latitude	int32	Range:	+/- 90 deg	Resolution	1x10E-7 deg	"-" = So cm	outh, resolution ~1.1
7	Position	Accuracy		•	eld Size: ield Size: 1		Request Param Command Para		Optional Optional
	DD184	AIS Position Accuracy			0 = low accuracy > 1 = high accuracy <			SS (defa	ult),
					See the latest version	n of ITU-R M.	.1371 for more info	ormation	1.
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
8	Raim Fla	g		•	eld Size: ield Size: <mark>1</mark>		Request Param Command Para		Optional Optional
	DD189	AIS RAIM-flag			0 = RAIM not in us 1 = RAIM in use	e (default),			
					See the latest version	n of ITU-R M.	.1371 for more info	ormation	1.
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields

AIS Long-Range Broadcast Message

PGN: 129813 hex: 1FB15

9	Navigation Status		•	eld Size:	Request Paran	neter <mark>Optional</mark>
			Bit F	ield Size: 4	Command Para	ameter: Optional
	DD183 AIS Navigational Status			HS, or MP, or IM 10 = reserved for dangerous goods IMO hazard or put 11 = power drive 12 = power drive 13 = reserved for 14 = AIS-SART		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to construct bit fields
10	Position Latency		•	eld Size: ield Size: 1	Request Paran Command Para	neter Optional ameter: Optional
	DD388 AIS Position Latency Flag				tion latency is less than 5 seconds tion latency is greater than 5 second	ds = default
	DF52 Bit field	bit(n)	Range:	Variable	Resolution: 1	Used to construct bit fields
11	AIS Spare		-	eld Size: ield Size: resv 1	Request Paran Command Para	neter <mark>Optional</mark> ameter: <mark>Optional</mark>
	DD311 AIS Spare Field			bits in NMEA ne	of reserved bits, all set to logic "0" twork messages are encoded with l l or reserved bits are to be encoded	logic 1's, however for AIS
	DF115 Bit field defaulting to zer bit0(n) Range: N2KUnitless This field mirrors the "spare" bit field found within the corresponding AIS message AIS message can also be accommodated within this field.				Resolution: 1 that future definition within the	Special data format applicable to AIS field that must be set to zero for a NULL data condition or when unused - applies to AIS spare fields and AIS fields that are for future use
12	Speed Over Ground		•	eld Size: 2	Request Paran Command Para	neter <mark>Optional</mark> ameter: <mark>Optional</mark>
	DD044 Generic Speed DF35 Speed	uint16	Range:	0 to 655.32 m/s	Resolution: 1x10E-2 m/s	1 Knot = 0.5144 m/s

AIS Long-Range Broadcast Message **PGN: 129813** hex: 1FB15 Byte Field Size: 2 **Course Over Ground** Request Parameter 13 Optional

Bit Field Size: **DD165** Course-Over-Ground (COG) The direction of the path over ground actually followed by a vessel.

uint16 Range: 0 to 2Pi rad Resolution: 1x10E-4 rad Resolution ~0.0057deg, 1 DF02 Angle

deg = .01745 rad

AIS Transceiver Information 14

Byte Field Size:

Bit Field Size: 5

Request Parameter

Command Parameter: Optional

Optional Command Parameter: Optional

DD246 AIS Transceiver Information

0 = Channel A VDL reception,

1 = Channel B VDL reception,

2 = Channel A VDL transmission,

3 = Channel B VDL transmission,

4 = Own information not broadcast,

5 = Channels A & B VDL transmission 6 = Channel C (VHF Channel 75) reception,

7 = Channel D (VHF Channel 76) reception,

8 = Channel C (VHF Channel 75) transmission,

9 = Channel D (VHF Channel 76) transmission,

10 - 30 = Reserved

31 = AIS device determines channel for Transmission

The AIS transceiver Information field (values 0, 1, 6, 7) identifies the reception channel of an AIS message that was received and placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDM sentence to report a received AIS Message.

The AIS transceiver Information field (values 2, 3, 8, 9) identifies the transmission channel of an AIS message that was transmitted and then placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDO sentence to report a transmitted AIS Message.

The AIS transceiver Information field (value 4) identifies an AIS message that was not transmitted and then placed into the appropriate AIS PGN. This is provided by AIS Mobile Stations at a 1hz rate to report to other shipboard systems its current dynamic navigation data.

The AIS transceiver Information field (values 5 and 31) are only used with the Command Group Function PGN 126208.

Command Parameter:

Resolution: 1 DF52 Bit field bit(n) Range: Variable Used to construct bit fields **NMEA Reserved** Byte Field Size: Request Parameter

Bit Field Size: resv 3

DD001 Reserved field Variable number of reserved bits, all set to logic "1"

Resolution: 1 Bit field Range: Variable Used to construct bit fields DF52 bit(n)

Used to align subsequent data on byte boundry

15

AIS Single Slot Binary Message

PGN: 129814 hex: 1FB16

This parameter group provides data associated with the ITU-R M.1371 AIS Message 25 AIS Single Slot Binary Message. An AIS device may generate this parameter group either upon a VHF Data Link reception of a Message 25, upon receipt of an ISO or NMEA request PGN, or upon a device's own transmission of a Message 25. Command Support Requirement:

The Command Group Function PGN 126208 shall be used with this PGN to initiate a transmission of this AIS Message. Only AIS Class A, Class B-SO, Base Station, Aton Station, and future SAR Airborne stations shall accept the Command Group Function PGN 126208 with this PGN for Message 25. All other types of AIS devices not listed above shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".

Command Support Requirement for Transmission of Message 25 by all allowed AIS Stations as listed above:

The AIS Station commanded to transmit an AIS Message transmission shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel.

All data fields (except for NMEA Reserved field(s), Sequence ID, Repeat Indicator, and Source ID) must be commanded when using the Command Group Function (PGN 126208) for Transmission of Message 25.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Command Support Requirement for Rebroadcasting of Message 25 by an AIS Base Station:

The AIS Station commanded to rebroadcast a Message 25 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel. All data fields (except for NMEA Reserved field(s) and Sequence ID) must be commanded when using the Command Group Function (PGN 126208) for rebroadcasting.

Note 1: The Repeat Indicator Command Parameter is "Required". The value should reflect the number of previous transmissions for this specific AIS Message. The AIS Base Station will increment this field accordingly prior to transmission.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Revisions:

June 2017 – New description, new notes in field 9, and command support requirements. This PGN 129814 created to replace PGN 129811 due to addition of the AIS Transceiver Information data field.

Ü	ame: No	Priority Default: 5		lt Update Rate:		milliseconds	Frequency:	NA	cycles per	second
Destinatio	n: Global	Query Support: Option	ial C	command Support:	Required	ACK Rqmnts	None			
Field #	Field Na	nme								
1	Sequence	e ID		Byte Field : Bit Field			Request Para Command Pa		Optional Optional	
	DD056 Sequence ID				PGNs from a different PGN related data s	single source addi I transmissions ide et. For example, i	at binds informatio ress. Identical SID v entifies those PGN dentical SID values and Longitude valu	values with transmissic bind the C	in two or mor ons as a single COG and SOG	re : i values
					data set) $253 - 254 = r$	eserved for future	en SID value reach use MEA recommends	·		
	DF53	Integer, 8 bit unsigned	uint8	Range: 0 t	o 252		on: 1 bit	Unit-less	s number	

AIS Single Slot Binary Message

PGN: 129814 hex: 1FB16

2	Message ID		Byte Fie	ld Size: eld Size: 6		Request Param Command Para		Optional Required
	DD188 AIS Message Identifier			Message Identifier (ra				rtoquirou
				See the latest version	of ITU-R M.1	1371 for more infe	ormation	1.
	DF52 Bit field25 equals Single Slot Binary Message	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields
3	Repeat Indicator		Byte Fiel Bit Fie	ld Size: eld Size: <mark>2</mark>		Request Param Command Para		Optional Note 1
	DD185 AIS Repeater Indicator			Used by the repeater t (range of 0 to 3).	o indicate ho	w many times a n	nessage l	has been repeated
				0 = Default 1 = First retransmission 2 = Second retransmission 3 = Final retransmission	ssion			
				See the latest version	of ITU-R M.	1371 for more int	formatio	n.
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields
4	Source ID		Byte Fie Bit Fie	ld Size: 4		Request Param Command Para		Optional Required
	DD010 Generic numeric ID, large			Number of route, way	point, event,	mark, etc.		
	DF55 Integer, 32 bit unsigned MMSI Number of source station.	uint32	Range:	0 to 4,294,967,292	Resolution:	1 bit	Unit-le	ss number
5	Destination Indicator		Byte Fiel Bit Fie	ld Size: eld Size: 1		Request Param Command Para		Optional Required
	DD387 AIS Destination Indicator			0 = Broadcast (no Desti 1 = Addressed (Desti			ts for M	MSI
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields
6	Binary data flag		Byte Fie Bit Fie	ld Size: eld Size: <mark>1</mark>		Request Param Command Para		Optional Required
	DD386 AIS Binary Structure			0 = unstructured bina 1 = binary data coded				
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields
7	AIS Spare		Byte Fiel Bit Fie	ld Size: eld Size: resv 2		Request Param Command Para		Optional Required
	DD311 AIS Spare Field			Variable number of rebits in NMEA networ PGNs the unused or re	k messages a	re encoded with lo	ogic 1's,	however for AIS
	DF115 Bit field defaulting to zer This field mirrors the "spare" bit field found was AIS message can also be accommodated w		orresponding	N2KUnitless g AIS message, such that	Resolution: future definiti	-	applica must be NULL when u	data format ble to AIS field that e set to zero for a data condition or nused - applies to AIS elds and AIS fields
								for future use

AIS Single Slot Binary Message

PGN: 129814 hex: 1FB16

8	NMEA Reserved	Byte Field Size: Bit Field Size: resv 7	Request Parameter Command Parameter:			
	DD001 Reserved field	Variable number of	reserved bits, all set to logic "1"			
	DF52 Bit field bit(n)	Range: Variable	Resolution: 1 Used to	construct bit fields		
	Used to align subsequent data on byte boundary.					
9	AIS Transceiver Information	Byte Field Size: Bit Field Size: 5	Request Parameter Command Parameter:	Optional		
	DD246 AIS Transceiver Information	0 = Channel A VDI 1 = Channel B VDI 2 = Channel A VDI 3 = Channel B VDI 4 = Own informatic 5 = Channels A & B 6 = Channel C (VH 7 = Channel D (VH 8 = Channel D (VH 9 = Channel D (VH 10 - 30 = Reserved 31 = AIS device det The AIS transceiver channel of an AIS n PGN. This correspondence to report a The AIS transceiver transmission channel the appropriate AIS NMEA 0183 VDO The AIS transceiver was not transmitted	L reception, L reception, L transmission, L transmission, D volume to broadcast, B VDL transmission F Channel 75) reception, F Channel 76) reception, F Channel 75) transmission, F Channel 76) transmission, F Channel 76) transmission, F Channel 76) transmission, F Channel 76) transmission T Information field (values 0, 1, 6, 7) identifies the reception message that was received and placed into the appropriate AIS onds to the same mechanism used in the NMEA 0183 VDM received AIS Message. T Information field (values 2, 3, 8, 9) identifies the el of an AIS message that was transmitted and then placed into B PGN. This corresponds to the same mechanism used in the sentence to report a transmitted AIS Message. T Information field (value 4) identifies an AIS message that I and then placed into the appropriate AIS PGN. This is obile Stations at a 1hz rate to report to other shipboard system			
	DD D1 C 11		unction PGN 126208.	1 6 . 11		
	DF52 Bit field bit(n)	Range: Variable		construct bit fields		
10	Destination ID	Byte Field Size: Bit Field Size:	·	Optional		
	DD040 Compute mymoria ID large		Command Parameter:	Required		
	DD010 Generic numeric ID, large		aypoint, event, mark, etc.	s number		
	DF55 Integer, 32 bit unsigned uint32 MMSI Number of destination station.	Range: 0 to 4,294,967,292	Resolution: 1 bit Unit-les	s number		
11	Number of bits in Binary Data Field	Byte Field Size: Bit Field Size:	Request Parameter Command Parameter:	Optional Required		
	DD006 Generic counter, short	Numeric count, event counter, sequence counter				
	DF53 Integer, 8 bit unsigned uint8 Indicates the number of binary of data bits that are co	Range: 0 to 252 ontained within the binary data field	Resolution: 1 bit Unit-les	s number		

AIS Single Slot Binary Message PGN: 129814 hex: 1FB16 **Binary Data** Byte Field Size: Request Parameter 12 Optional Bit Field Size: n Command Parameter: Required DD142 Binary Bit Field Binary data bit field. Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields DF52

Application specific data

AIS Multi Slot Binary Message

PGN: 129815 hex: 1FB17

This parameter group provides data associated with the ITU-R M.1371 AIS Message 26 AIS Multi Slot Binary Message.

An AIS device may generate this parameter group either upon a VHF Data Link reception of a Message 26, upon receipt of an ISO or NMEA request PGN, or upon a device's own transmission of a Message 26.

Command Support Requirement:

The Command Group Function PGN 126208 shall be used with this PGN to initiate a transmission of this AIS Message. Only AIS Class A, Class B-SO, Base Station, Aton Station, and future SAR Airborne stations shall accept the Command Group Function PGN 126208 with this PGN for Message 26.

All other types of AIS devices not listed above shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported". Command Support Requirement for Transmission of Message 26 by all allowed AIS Stations as listed above:

The AIS Station commanded to transmit an AIS Message transmission shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3).

If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel.

All data fields (except for NMEA Reserved field(s), Sequence ID, Repeat Indicator, and Source ID) must be commanded when using the Command Group Function (PGN 126208) for Transmission of Message 26. Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Command Support Requirement for Rebroadcasting of Message 26 by an AIS Base Station:

The AIS Station commanded to rebroadcast a Message 26 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3).

If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel. All data fields (except for NMEA Reserved field(s), Communication State, and Sequence ID) must be commanded when using the Command Group Function (PGN 126208) for rebroadcasting.

Note 1: The Repeat Indicator Command Parameter is "Required". The value should reflect the number of previous transmissions for this specific AIS Message. The AIS Base Station will increment this field accordingly prior to transmission.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

Revisions: June 2017 – New description and command support requirements. This PGN 129815 created to replace PGN 129812 due to addition of the AIS Transceiver Information data field and consolidation of the five binary bit fields into a single binary bit field.

Single Frame: No Priority Default: 5 Default Update Rate: milliseconds Frequency: NA cycles per second

Destination: Global Query Support: Optional Command Support: Required ACK Rapmits: None

Field # Field Name

AIS Multi Slot Binary Message

PGN: 129815 hex: 1FB17

1	Sequence ID				eld Size: 1		quest Parameter mmand Parameter:	Optional Ontional	
	DD056 Sequence ID				An upward counting number that binds information transmitted in two or PGNs from a single source address. Identical SID values within two or modifferent PGN transmissions identifies those PGN transmissions as a sing related data set. For example, identical SID values bind the COG and SO in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a data set.				
					0 - 252 = binding av data set)	ailable (when SID	value reaches 252, res	sume with 0 on next	
					253 - 254 = reserved	for future use			
					255 = No binding pr whenever practical.	ovided. NMEA re	commends using bind	ling SID values	
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution: 1 b	it Unit-les	ss number	
2	Message	ID		•	eld Size: ield Size: <mark>6</mark>		quest Parameter mmand Parameter:	Optional Required	
	DD188	AIS Message Identifier			Message Identifier (1	range of 0 to 63).			
					See the latest version	of ITU-R M.1371	for more information	ı.	
	DF52	Bit field	bit(n)		Variable	Resolution: 1	Used to	construct bit fields	
	26 equais i	Multi Slot Binary Message with co	mmunicatio						
3	Repeat II	ndicator		•	eld Size: ield Size: 2		quest Parameter mmand Parameter:	Optional Note 1	
	DD185	AIS Repeater Indicator					any times a message l		
					0 = Default 1 = First retransmiss 2 = Second retransm	ission			
					3 = Final retransmiss				
	DF52	Bit field	bit(n)	Range:	Variable	n of ITU-R M.137. Resolution: 1	1 for more information	n. construct bit fields	
4	Source I		DIL(II)	Byte Fi	eld Size: 4	Red	quest Parameter mmand Parameter:	Optional	
	DD010	Generic numeric ID, large		Dit 1	Number of route, wa			Nequiled	
	DF55	Integer, 32 bit unsigned ber of source station.	uint32	Range:	0 to 4,294,967,292	Resolution: 1 b		s number	
5	Destinati	on Indicator		•	eld Size: ield Size: <mark>1</mark>		quest Parameter mmand Parameter:	Optional Required	
	DD387 AIS Destination Indicator			0 = Broadcast (no D		,			
					1 = Addressed (Des	tination ID field us	ses 30 data bits for MI	MSI	

AIS Multi Slot Binary Message PGN: 129815 hex: 1FB17 Byte Field Size: Request Parameter 6 Binary data flag Optional Bit Field Size: 1 Command Parameter: Required **DD386** AIS Binary Structure 0 = unstructured binary data (no Application Identifier bits used) 1 = binary data coded as defined by using the 16-bit Application Identifier Bit field Range: Variable Resolution: 1 Used to construct bit fields **DF52** bit(n) 7 **NMEA Reserved** Byte Field Size: Request Parameter Bit Field Size: resv 6 Command Parameter: **DD001** Reserved field Variable number of reserved bits, all set to logic "1" Bit field Resolution: 1 Used to construct bit fields DF52 bit(n) Range: Variable Used to align subsequent data on byte boundary. Byte Field Size: 4 Request Parameter **Destination ID** 8 Optional Bit Field Size: Command Parameter: Required **DD010** Generic numeric ID, large Number of route, waypoint, event, mark, etc. Integer, 32 bit unsigned uint32 Range: 0 to 4,294,967,292 Resolution: 1 bit Unit-less number MMSI Number of destination station. 9 **AIS Spare** Byte Field Size: Request Parameter Optional Bit Field Size: resv 2 Command Parameter: Required Variable number of reserved bits, all set to logic "0". Normally, spare or reserved **DD311** AIS Spare Field bits in NMEA network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. **DF115** Bit field defaulting to zer **bit0(n)** Range: N2KUnitless Resolution: 1 Special data format applicable to AIS field that This field mirrors the "spare" bit field found within the corresponding AIS message, such that future definition within the must be set to zero for a AIS message can also be accommodated within this field. NULL data condition or when unused - applies to AIS spare fields and AIS fields that are for future use 10 Communication state selector flag Byte Field Size: Request Parameter Optional Bit Field Size: 1 Command Parameter: Required **DD245** AIS Communication State Selctor Flag 0=SOTDMA communication state,

				ormation	1.				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
11	11 Communication state		Byte Field Size: Bit Field Size: <mark>19</mark>]	Request Parameter Prohibited Command Parameter: Prohibited		
	DD187	AIS Communication State			unication State contain algorithms and synchro		-	various TDMA slot	
					See the late	est version of ITU-R M	.1371 for more info	ormation	1.
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	¢ 1	Used to	construct bit fields

1=ITDMA communication state follows.

AIS Multi Slot Binary Message

PGN: 129815 hex: 1FB17

12 **AIS Spare** Byte Field Size: Bit Field Size: resv Request Parameter Command Parameter: Required

Optional

DD311 AIS Spare Field

Variable number of reserved bits, all set to logic "0". Normally, spare or reserved bits in NMEA network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's.

DF115 Bit field defaulting to zer **bit0(n)** Range: N2KUnitless

Resolution: 1

This field mirrors the "spare" bit field found within the corresponding AIS message, such that future definition within the AIS message can also be accommodated within this field.

Special data format applicable to AIS field that must be set to zero for a NULL data condition or when unused - applies to AIS spare fields and AIS fields that are for future use

13 **AIS Transceiver Information** Byte Field Size:

Bit Field Size: 5

Request Parameter Command Parameter: Note 2

Optional

DD246 AIS Transceiver Information

0 = Channel A VDL reception,

- 1 = Channel B VDL reception,
- 2 = Channel A VDL transmission,
- 3 = Channel B VDL transmission,
- 4 = Own information not broadcast,
- 5 = Channels A & B VDL transmission
- 6 = Channel C (VHF Channel 75) reception,
- 7 = Channel D (VHF Channel 76) reception,
- 8 = Channel C (VHF Channel 75) transmission,
- 9 = Channel D (VHF Channel 76) transmission,
- 10 30 = Reserved
- 31 = AIS device determines channel for Transmission

The AIS transceiver Information field (values 0, 1, 6, 7) identifies the reception channel of an AIS message that was received and placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDM sentence to report a received AIS Message.

The AIS transceiver Information field (values 2, 3, 8, 9) identifies the transmission channel of an AIS message that was transmitted and then placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDO sentence to report a transmitted AIS Message.

The AIS transceiver Information field (value 4) identifies an AIS message that was not transmitted and then placed into the appropriate AIS PGN. This is provided by AIS Mobile Stations at a 1hz rate to report to other shipboard systems its current dynamic navigation data.

The AIS transceiver Information field (values 5 and 31) are only used with the Command Group Function PGN 126208.

DF52 **NMEA Reserved** bit(n)

Resolution: 1 Range: Variable

Used to construct bit fields

14

Byte Field Size: Bit Field Size: resv Request Parameter Command Parameter:

DD001 Reserved field

Variable number of reserved bits, all set to logic "1"

Bit field

Bit field

bit(n)

Range: Variable

Resolution: 1

Used to construct bit fields

Used to align subsequent data on byte boundary.

AIS I	Multi Slot Binary Message		PGN: 129815 hex: 1FB17
15	Number of Bits in Binary Data Field	Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Required
	DD007 Generic numeric ID, medium	Number of route, v	waypoint, event, mark, etc.
	DF54 Integer, 16 bit unsigned uint Indicates the number of binary data bits that are co	116 Range: 0 to 65,532 ontained within the Binary Data field.	Resolution: 1 bit Unit-less number
16	Binary Data	Byte Field Size: Bit Field Size: n	Request Parameter Optional Command Parameter: Required
	DD142 Binary Bit Field	Binary data bit fie	ld.
	DF52 Bit field bit((n) Range: Variable	Resolution: 1 Used to construct bit fields

AIS Multi Slot Binary Message

Application specific data.

AlS Acknowledge PGN: 129816 hex: 1FB18

This parameter group provides data associated with the ITU-R M.1371 AIS Messages 7 Binary Acknowledge Message and 13 Safety Related Acknowledge Message. Message 7 acknowledges receipt of message 6 while message 13 acknowledges receipt of message 12.

An AIS device may generate this parameter group either upon receiving a VHF data link message 7 or 13, upon receipt of an ISO or NMEA request PGN, or upon a device's own transmission of a Message 7 or 13.

Command Support Requirement for Rebroadcasting of Messages 7 and 13 by an AIS Base Station:

Only AIS Base Stations sradarlfhall accept the Command Group Function PGN 126208 with this PGN for Messages 7 and 13. All other types of AIS devices shall respond with an Acknowledge Group Function with the PGN Error Code field set to "0x4 = Request or Command is not supported".

The AIS Station commanded to rebroadcast a Message 7 or 13 shall generate this PGN as a consequence of a successful transmission, with the "AIS Transceiver Information" data field indicating the channel of transmission (value of 2 or 3). If the AIS message was transmitted on both channels, two PGNs shall be generated, one for each transmission channel.

All data fields (except for NMEA Reserved fields and Sequence ID) must be commanded when using the Command Group Function (PGN 126208) for rebroadcasting.

Note 1: The Repeat Indicator Command Parameter is "Required". The value should reflect the number of previous transmissions for this specific AIS Message. The AIS Base Station will increment this field accordingly prior to transmission.

Note 2: The AIS Transceiver Information Command Parameter is "Required". The only values that can be commanded are: 2, 3, 5, or 31.

Note that future revisions to the ITU-R M.1371 VHF Data Link Messages may result in their spare or reserved bits being defined with a specific meaning, requiring the spare or reserved parameter in this parameter group to have the corresponding new meaning in future revisions of this standard.

June 2017 – New description and command support requirements. This PGN 129816 created to replace PGN 129796 due to missing counter for repeating fields and relocation of Sequence ID field prior to repeating fields.

Single Fra	me: No	Priority Default: 7	Defaul	t Update Rate:		milliseconds	Frequency:	NA	cycles per	second
Destination	:Global	Query Support: Option	al C	ommand Support:	Required	ACK Rqmnts.	None			
Field#	Field Na	ame								
1	Sequence	e ID		Byte Field S Bit Field			Request Parar Command Par		Optional Required	
	DD056	Sequence ID			PGNs from a different PGl related data s in PGN 1290 data set. 0 - 252 = bin data set)	single source addr Value transmissions ide et. For example, id 26 to the Latitude	at binds information ess. Identical SID v entifies those PGN to dentical SID values and Longitude value en SID value reache	alues withi ransmissio bind the C es in PGN	in two or mor ns as a single OG and SOC 129029 as a	re e 3 values single
					255 = No bir whenever pra	0.1	MEA recommends v	ısing bindi	ng SID value	es
	DF53	Integer, 8 bit unsigned	uint8	Range: 0 to	o 252	Resolution	on: <mark>1 bit</mark>	Unit-less	number	

AIS Acknowledge PGN: 129816 hex: 1FB18

2	Message ID		•	eld Size: ield Size: 6		Request Parameter Command Parameter:	Optional Required		
	DD188 AIS Message Identifier		ыст		ntifier (range of 0 to 6		Required		
				See the latest	t version of ITU-R M.	on of ITU-R M.1371 for more information.			
	DF52 Bit field6 = Addressed Binary Message.	bit(n)	Range:	Variable	Resolution	Used t	o construct bit fields		
3	Repeat Indicator		•	eld Size: ield Size: 2		Request Parameter Command Parameter:	Optional Note 1		
	DD185 AIS Repeater Indicator			Used by the range of 0 to	1	ow many times a message	has been repeated		
				0 = Default 1 = First retra 2 = Second ro 3 = Final retr					
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	.1371 for more information	on. o construct bit fields		
4	Source ID		•	eld Size: 4		Request Parameter Command Parameter:	Optional Required		
	DD010 Generic numeric ID, large			Number of ro	oute, waypoint, event,	mark, etc.			
	DF55 Integer, 32 bit unsigned MMSI number of source station.	uint32	Range:	0 to 4,294,967,2	Resolution	: <mark>1 bit Unit-le</mark>	ess number		
5	NMEA Reserved		•	eld Size: ield Size: <mark>resv</mark>	1	Request Parameter Command Parameter:			
	DD001 Reserved field			Variable nun	nber of reserved bits,	all set to logic "1"			
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	Used t	o construct bit fields		
	Used to align subsequent data on byte bou	undary.							

AlS Acknowledge PGN: 129816

hex: 1FB18 Request Parameter Byte Field Size: 6 **AIS Transceiver Information** Optional Bit Field Size: 5 Command Parameter: Note 2 **DD246** AIS Transceiver Information 0 = Channel A VDL reception, 1 = Channel B VDL reception, 2 = Channel A VDL transmission, 3 = Channel B VDL transmission, 4 = Own information not broadcast, 5 = Channels A & B VDL transmission 6 = Channel C (VHF Channel 75) reception, 7 = Channel D (VHF Channel 76) reception, 8 = Channel C (VHF Channel 75) transmission, 9 = Channel D (VHF Channel 76) transmission, 10 - 30 = Reserved31 = AIS device determines channel for Transmission The AIS transceiver Information field (values 0, 1, 6, 7) identifies the reception channel of an AIS message that was received and placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDM sentence to report a received AIS Message. The AIS transceiver Information field (values 2, 3, 8, 9) identifies the transmission channel of an AIS message that was transmitted and then placed into the appropriate AIS PGN. This corresponds to the same mechanism used in the NMEA 0183 VDO sentence to report a transmitted AIS Message. The AIS transceiver Information field (value 4) identifies an AIS message that was not transmitted and then placed into the appropriate AIS PGN. This is provided by AIS Mobile Stations at a 1hz rate to report to other shipboard systems its current dynamic navigation data. The AIS transceiver Information field (values 5 and 31) are only used with the Command Group Function PGN 126208. Range: Variable Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) **AIS Spare** Byte Field Size: Request Parameter 7 Optional Bit Field Size: resv Command Parameter: Required **DD311** AIS Spare Field Variable number of reserved bits, all set to logic "0". Normally, spare or reserved bits in NMEA network messages are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. **DF115** Bit field defaulting to zer bit0(n) Range: N2KUnitless Special data format applicable to AIS field that This field mirrors the "Spare" bit field found within the corresponding AIS message such that future definition within the must be set to zero for a AIS message can also be accommodated within this field. Normally, spare or reserved bits in NMEA Network Messages NULL data condition or are encoded with logic 1's, however for AIS PGNs the unused or reserved bits are to be encoded as logic 0's. when unused - applies to AIS spare fields and AIS fields that are for future use 8 **Number of Acknowledgments** Byte Field Size: Request Parameter Optional Bit Field Size: n 3 Command Parameter: Required

bit(n)

Identifies the number of sets of fields (Destination ID, NMEA Reserved, and Sequence Number)

Range: Variable

Resolution: 1

Used to construct bit fields

DD137 Generic variable bit field

Bit field

DF52

AIS Acknowledge	PGN: 129816
	hex: 1FB18

9	NMEA Reserved	,	Field Size: Field Size: resv 5		Request Parameter Command Parameter:	
	DD001 Reserved field		Variable number of	reserved bits, all	set to logic "1"	
	DF52 Bit field by Used to align subsequent data on byte boundar	-()	Variable	Resolution: 1	Used to	construct bit fields
10	Destination ID"1"	-	Field Size: 4		Request Parameter Command Parameter:	Optional Required
	DD010 Generic numeric ID, large DF55 Integer, 32 bit unsigned u MMSI number of first destination for this acknow		Number of route, w 0 to 4,294,967,292	Resolution: 1		s number
11	NMEA Reserved	•	Field Size: Field Size: resv 1	C	Request Parameter Command Parameter:	
	DD001 Reserved field DF52 Bit field b Used to align subsequent data on byte boundar	()	Variable number of Variable	Resolution: 1	_	construct bit fields
12	Sequence Number for ID"1"	•	Field Size: Field Size: <mark>2</mark>		Request Parameter Command Parameter:	Optional Required
	DD243 AIS Sequence Number		Range 0-3	on of ITII-P M 13	71 for more information	
	DF52 Bit field by Sequence number of message to be acknowled		Variable Variable	Resolution: 1		construct bit fields
13	Destination ID"n"		Field Size: 4		Request Parameter Command Parameter:	Optional Required
	 DD010 Generic numeric ID, large DF55 Integer, 32 bit unsigned u Variable Number of fields, Field number 10 repe 		Number of route, w 0 to 4,294,967,292	Resolution: 1		s number
14	NMEA Reserved	•	Field Size: Field Size: resv 1		Request Parameter Command Parameter:	
	DD001 Reserved field		Variable number of	reserved bits, all	set to logic "1"	
	DF52 Bit field by Variable Number of fields, Field number 11 repo		Variable	Resolution: 1	Used to	construct bit fields
15	Sequence Number for ID"n"	•	Field Size: Field Size:		Request Parameter Command Parameter:	Optional Required
	DD243 AIS Sequence Number		Range 0-3 See the latest version	on of ITU-R M 12	71 for more information	
	DF52 Bit field b		Variable Variable	Resolution: 1		construct bit fields

Loran-C TD Data PGN: 130052 hex: 1FC04

This provides Time Difference (TD) lines of position of Loran-C signals relative to a single Group Repetition Interval.

Field #1, Group Repetition Interval (GRI), is identified as a request parameter for this Parameter Group. All providers of this PGN shall accept and process requests based upon the requested value of Field #1. A device receiving an ISO Request (PGN 059904) for this PGN, shall respond by providing as many of these PGNs as necessary for every GRI that has associated data fields. If a Complex Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

- If no requested fields have been included with the Complex Request, than the response is to return one or more PGNs, just like responding to the ISO Request (PGN 059904) described above.
- If the Complex Request (PGN 126208) includes the GRI field, then the response shall be filtered by the field (Field #1) and field value (GRI #) contained within the request.

For example, if the Complex Request for this PGN contained a value of 9960 for field 1, the Group Repetition Interval (GRI), and this was a GRI that the device was operating with or had information about, than the device would respond by providing a single PGN with Time Difference measurement data associated with the 9960 GRI value requested.

If the GRI requested is considered valid by the device, but the device was not operating on that GRI, or had no data associated with the GRI requested, there are two possible responses:

- 1 The device responds with the PGN containing the GRI requested and all other fields set to the value indicating "Data not available".
- 2 The device responds with the Acknowledge Group PGN (126208) containing the error state of "0x2 = Temporarily unable to comply".

If the request was global no response would be required. If the request was addressed to the device, than either response 1 or 2 would apply.

If the GRI requested is not considered a valid GRI by the receiving device, then the appropriate response would be the Acknowledge Group PGN (126208), containing the error state for the requested GRI field of "0x3 = Request or command parameter out-of-range:".

Single Fra	me: No	Priority Default: 3	Default	t Update Rat	e: 10	<mark>000</mark> milliseco	nds F	requency:	1.	cycles per s	second
Destination	Global	Query Support: Required	Co	ommand Suppo	ort: Optiona	ıl ACh	K Rqmnts: <mark>Nc</mark>	one			
Field#	Field Na	ame									
1	Group R	epetition Interval (GRI)		Byte Field	d Size: 4			Request Parame	eter	Required	
				Bit Fie	ld Size:			Command Parar	neter:	Optional	
	DD027	Loran-C GRI				epetition Interv 9960 = 99,60	` /	nano-sec. Often c	ited in	units of 10 mic	ero-
	DF45	Time interval, precise	int32	Range:	-/- 2.14 s	F	Resolution:	1x10E-9 s			
2	Master R	ange		Byte Field	d Size: 4			Request Parame	eter	Optional	
				Bit Fie	ld Size:			Command Parar	neter:	Optional	
	DD029	Loran - Range (Time)			The actuanano-sec.	1 1 0	time of a Lo	oran-C signal from	the sta	tion to a receiv	er in
	DF45	Time interval, precise	int32	Range:	-/- 2.14 s	F	Resolution:	1x10E-9 s			
3	V Second	dary TD		Byte Field	d Size: 4			Request Parame	eter	Optional	
				Bit Fie	ld Size:			Command Parar	neter:	Optional	
	DD028	Loran-C TD						ano-sec. The arriv			
	DF45	Time interval, precise	int32	Range: -	-/- 2.14 s	F	Resolution:	1x10E-9 s			

Loran-C TD Data PGN: 130052 hex: 1FC04

4	W Secor	ndary TD		-	eld Size: eld Size:	4		Request Param Command Para		Optional Optional
	DD028	Loran-C TD						ano-sec. The arri arrival time of the		
	DF45	Time interval, precise	int32	Range:	+/- 2.14	S	Resolution:	1x10E-9 s		
5	X Secon	dary TD		Byte Fie Bit Fi	eld Size: eld Size:	4		Request Param Command Para		Optional Optional
	DD028	Loran-C TD					. ,	ano-sec. The arri		
	DF45	Time interval, precise	int32	Range:	+/- 2.14	S	Resolution:	1x10E-9 s		
6	Y Secon	dary TD		Byte Fie Bit Fi	eld Size: eld Size:	4		Request Param Command Para		Optional Optional
	DD028	Loran-C TD						ano-sec. The arri arrival time of the		
	DF45	Time interval, precise	int32	Range:	+/- 2.14	S	Resolution:	1x10E-9 s		
7	Z Secon	dary TD		Byte Fie Bit Fi	eld Size: eld Size:	4		Request Param Command Para		Optional Optional
	DD028	Loran-C TD					. ,	ano-sec. The arri		
	DF45	Time interval, precise	int32	Range:	+/- 2.14	S	Resolution:	1x10E-9 s		
8	Station s	status: Master		Byte Fie Bit Fi	eld Size: eld Size:	4		Request Param Command Para		Optional Optional
	DD030	Loran-C station status			xxx1 xx1x x1xx	B: to LSB: = Station in use, x = Low SNR, x = Cycle error, x = Blink where x = don				
	DF52	Bit field	bit(n)	Range:	Variable	:	Resolution:	1	Used to	construct bit fields
9	Station s	status: V		Byte Fie Bit Fi	eld Size: eld Size:	4		Request Param Command Para		Optional Optional
	DD030	Loran-C station status			xxx1 xx1x x1xx	B: to LSB: = Station in use, x = Low SNR, x = Cycle error, x = Blink where x = don				
	DF52	Bit field	bit(n)	Range:	Variable	e	Resolution:	1	Used to	construct bit fields

PGN: 130052

hex: 1FC04 Station status: W Byte Field Size: Request Parameter 10 Optional Bit Field Size: 4 Command Parameter: Optional **DD030** Loran-C station status MSB: to LSB: xxx1 = Station in use,xx1x = Low SNR, x1xx = Cycle error,1xxx = Blinkwhere x = don't care DF52 Bit field Range: Variable Resolution: 1 Used to construct bit fields bit(n) Byte Field Size: Request Parameter 11 Station status: X Optional Bit Field Size: 4 Command Parameter: Optional MSB: to LSB: **DD030** Loran-C station status xxx1 = Station in use,xx1x = Low SNR,x1xx = Cycle error,1xxx = Blinkwhere x = don't care DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields 12 Station status: Y Byte Field Size: Request Parameter Optional Bit Field Size: 4 Command Parameter: Optional MSB: to LSB: **DD030** Loran-C station status xxx1 = Station in use,xx1x = Low SNR,x1xx = Cycle error,1xxx = Blinkwhere x = don't care Bit field Range: Variable Resolution: 1 Used to construct bit fields DF52 bit(n) Byte Field Size: Request Parameter 13 Station status: Z Optional Command Parameter: Optional Bit Field Size: 4 MSB: to LSB: **DD030** Loran-C station status xxx1 = Station in use,xx1x = Low SNR,x1xx = Cycle error,1xxx = Blinkwhere x = don't care **DF52** Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields Mode Byte Field Size: Request Parameter 14 Optional Bit Field Size: 4 Command Parameter: Optional DD025 Mode, Data 0x0 = Autonomous mode,0x1 = Differential, enhanced mode, 0x2 = Estimated mode,0x3 = Simulator mode,0x4 = Manual mode,0x5 to 0xD = Reserved0xE = Error,0xF = Data not availableResolution: 1 Used to construct bit fields DF52 Bit field bit(n) Range: Variable

Loran-C TD Data

oran-C TD Data	PGN: 130052
	hex: 1FC04

Byte Field Size: Request Parameter

Bit Field Size: Command Parameter:

DD001 Reserved field Variable number of reserved bits, all set to logic "1"

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

Used to align subsequent data on a byte boundary.

15

NMEA Reserved

Loran-C Range Data

PGN: 130053 hex: 1FC05

This provides Propagation times (Ranges) of Loran-C signals relative to a single Group Repetition Interval.

Field #1, Group Repetition Interval (GRI), is identified as a request parameter for this Parameter Group.

All providers of this PGN shall accept and process requests based upon the requested value of Field #1.

A device receiving an ISO Request (PGN 059904) for this PGN, shall respond by providing as many of these PGNs as necessary for every GRI that has associated data fields.

If a Complex Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

If no requested fields have been included with the Complex Request, than the response is to return one or more PGNs, just like responding to the ISO Request (PGN 059904) described above.

If the Complex Request (PGN 126208) includes the GRI field, then the response shall be filtered by the field (Field #1) and field value (GRI #) contained within the request.

For example, if the Complex Request for this PGN contained a value of 9960 for field 1, the Group Repetition Interval (GRI), and this was a GRI that the device was operating with or had information about, than the device would respond by providing a single PGN with Range measurement data associated with the 9960 GRI value requested.

If the GRI requested is considered valid by the device, but the device was not operating on that GRI, or had no data associated with the GRI requested, there are two possible responses:

- 1 The device responds with the PGN containing the GRI requested and all other fields set to the value indicating "Data not available".
- 2 The device responds with the Acknowledge Group PGN (126208) containing the error state of "0x2 = Temporarily unable to comply".

If the request was global no response would be required. If the request was addressed to the device, than either response 1 or 2 would apply.

If the GRI requested is not considered a valid GRI by the receiving device, then the appropriate response would be the Acknowledge Group PGN (126208), containing the error state for the requested GRI field of "0x3 = Request or command parameter out-of-range;".

Single Fra	me: No	Priority Default: 3	Defau	It Update Rate:	1000	milliseconds	Frequency:	1.	cycles per s	econd
Destination	n: Global	Query Support: Requir	red C	Command Support:	Optional	ACK Rqmnts:	Vone			
Field #	Field Na	ame								
1	Group R	epetition Interval (GRI)		Byte Field S	Size: 4		Request Paran	neter	Required	
				Bit Field S	Size:		Command Para	ameter:	Optional	
	DD027	Loran-C GRI				tion Interval (GRI) i 0 = 99,600,000 ns)	in nano-sec. Often	cited in t	units of 10 micr	·o-
	DF45	Time interval, precise	int32	Range: +/-	2.14 s	Resolution	n: 1x10E-9 s			
2	Master R	ange		Byte Field S	Size: 4		Request Paran	neter	Optional	
				Bit Field	Size:		Command Para	ameter:	Optional	
	DD029	Loran - Range (Time)			The actual pr	opagation time of a	Loran-C signal from	m the star	tion to a receive	er in
	DF45	Time interval, precise	int32	Range: +/-	2.14 s	Resolution	n: 1x10E-9 s			
3	V Second	dary Range		Byte Field S	Size: 4		Request Paran	neter	Optional	
				Bit Field	Size:		Command Para	ameter:	Optional	
	DD029	Loran - Range (Time)			The actual pr	opagation time of a	Loran-C signal from	m the star	tion to a receive	er in
	DF45	Time interval, precise	int32	Range: +/-	2.14 s	Resolution	n: 1x10E-9 s			

Loran-C Range Data	PGN: 130053
	hex: 1FC05

4	W Secondary Range		Byte Field Size: 4 Bit Field Size:	Request Parameter Command Parameter:	Optional
	DD029 Loran - Range (Time)			on time of a Loran-C signal from the sta	
	DF45 Time interval, precise	int32	Range: +/- 2.14 s	Resolution: 1x10E-9 s	
5	X Secondary Range		Byte Field Size: 4 Bit Field Size:	Request Parameter Command Parameter:	Optional Optional
	DD029 Loran - Range (Time)		The actual propagati nano-sec.	on time of a Loran-C signal from the sta	ation to a receiver in
	DF45 Time interval, precise	int32	Range: +/- 2.14 s	Resolution: 1x10E-9 s	
6	Y Secondary Range		Byte Field Size: 4 Bit Field Size:	Request Parameter Command Parameter:	Optional Optional
	DD029 Loran - Range (Time)		The actual propagati nano-sec.	on time of a Loran-C signal from the sta	ation to a receiver in
	DF45 Time interval, precise	int32	Range: +/- 2.14 s	Resolution: 1x10E-9 s	
7	Z Secondary Range		Byte Field Size: 4 Bit Field Size:	Request Parameter Command Parameter:	Optional Optional
	DD029 Loran - Range (Time)		The actual propagatinano-sec.	on time of a Loran-C signal from the sta	ation to a receiver in
	DF45 Time interval, precise	int32	Range: +/- 2.14 s	Resolution: 1x10E-9 s	
8	Station status: Master		Byte Field Size: Bit Field Size: 4	Request Parameter Command Parameter:	Optional Optional
	DD030 Loran-C station status		MSB: to LSB: xxx1 = Station in use xx1x = Low SNR, x1xx = Cycle error, 1xxx = Blink where x = do		-
	DD030 Loran-C station status DF52 Bit field	bit(n)	xxx1 = Station in use $xx1x = Low SNR,x1xx = Cycle error,1xxx = Blink$	n't care	o construct bit fields
9		bit(n)	xxx1 = Station in usc $xx1x = Low SNR,x1xx = Cycle error,1xxx = Blinkwhere x = do$	n't care	o construct bit fields Optional
9	DF52 Bit field	bit(n)	xxx1 = Station in use xx1x = Low SNR, x1xx = Cycle error, 1xxx = Blink where x = do Range: Variable Byte Field Size:	n't care Resolution: 1 Used to Request Parameter Command Parameter:	o construct bit fields Optional

PGN: 130053

hex: 1FC05 Station status: W Byte Field Size: Request Parameter 10 Optional Bit Field Size: 4 Command Parameter: Optional **DD030** Loran-C station status MSB: to LSB: xxx1 = Station in use,xx1x = Low SNR, x1xx = Cycle error,1xxx = Blinkwhere x = don't care DF52 Bit field Range: Variable Resolution: 1 Used to construct bit fields bit(n) Byte Field Size: Request Parameter 11 Station status: X Optional Bit Field Size: 4 Command Parameter: Optional MSB: to LSB: **DD030** Loran-C station status xxx1 = Station in use,xx1x = Low SNR,x1xx = Cycle error,1xxx = Blinkwhere x = don't care Range: Variable DF52 Bit field bit(n) Resolution: 1 Used to construct bit fields 12 Station status: Y Byte Field Size: Request Parameter Optional Bit Field Size: 4 Command Parameter: Optional MSB: to LSB: **DD030** Loran-C station status xxx1 = Station in use,xx1x = Low SNR,x1xx = Cycle error,1xxx = Blinkwhere x = don't care Bit field Range: Variable Resolution: 1 Used to construct bit fields DF52 bit(n) Byte Field Size: Request Parameter 13 Station status: Z Optional Command Parameter: Optional Bit Field Size: 4 MSB: to LSB: **DD030** Loran-C station status xxx1 = Station in use,xx1x = Low SNR,x1xx = Cycle error,1xxx = Blinkwhere x = don't care **DF52** Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields Mode Byte Field Size: Request Parameter 14 Optional Bit Field Size: 4 Command Parameter: Optional DD025 Mode, Data 0x0 = Autonomous mode,0x1 = Differential, enhanced mode, 0x2 = Estimated mode,0x3 = Simulator mode,0x4 = Manual mode,0x5 to 0xD = Reserved0xE = Error,0xF = Data not availableResolution: 1 Used to construct bit fields DF52 Bit field bit(n) Range: Variable

Loran-C Range Data

Loran-C Range Data PGN: 130053

hex: 1FC05

15 NMEA Reserved

Byte Field Size: Request Parameter

Bit Field Size: resv 4

Command Parameter:

DD001 Reserved field Variable number of reserved bits, all set to logic "1"

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

Used to align subsequent data on a byte boundary.

Loran-C Signal Data PGN: 130054 hex: 1FC06

SNR, ECD, and ASF values of Loran-C signals Field #1, Group Repetition Interval (GRI), is identified as a request parameter for this Parameter Group.

All providers of this PGN shall accept and process requests based upon the requested value of Field #1. A device receiving an ISO Request (PGN 059904) for this PGN, shall respond by providing as many of these PGNs as necessary for every GRI that has associated data fields.

If a Complex Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner: If no requested fields have been included with the Complex Request, than the response is to return one or more PGNs, just like responding to the ISO Request (PGN 059904) described above.

If the Complex Request (PGN 126208) includes the GRI field, then the response shall be filtered by the field (Field #1) and field value (GRI #) contained within the request.

For example, if the Complex Request for this PGN contained a value of 9960 for field 1, the Group Repetition Interval (GRI), and this was a GRI that the device was operating with or had information about, than the device would respond by providing a single PGN with Range measurement data associated with the 9960 GRI value requested.

If the GRI requested is considered valid by the device, but the device was not operating on that GRI, or had no data associated with the GRI requested, there are two possible responses:

- 1 The device responds with the PGN containing the GRI requested and all other fields set to the value indicating "Data not available".
- 2 The device responds with the Acknowledge Group PGN (126208) containing the error state of "0x2 = Temporarily unable to comply".

If the request was global no response would be required. If the request was addressed to the device, than either response 1 or 2 would apply.

Single Fra	ame: No	Priority Default: 3	Default (Update Rate:	1000 r	nilliseconds	Frequency:	1.	cycles per se	econd
Destination	n: Global	Query Support: Requ	ired Con	nmand Support:	Optional	ACK Rqmnts.	None			
ield#	Field N	ame								
1	Group R	epetition Interval (GRI)		Byte Field S	Size: 4		Request Para	meter	Required	
				Bit Field	Size:		Command Pa	rameter:	Optional	
	DD027	Loran-C GRI				ion Interval (GRI) 0 = 99,600,000 ns	in nano-sec. Ofte)	n cited in	units of 10 micro)-
	DF45	Time interval, precise	int32	Range: +/-	2.14 s	Resolution	on: 1x10E-9 s			
2	Station i	dentifier		Byte Field S	Size: char	1	Request Para	meter	Required	
				Bit Field	Size:		Command Pa	rameter:	Optional	
	DD031	Loran-C Station ID			1-character co	de for the Loran-O	C station: $M = mas$	ter, V, W,	X, Y, Z	
	DF63	String, fixed	char8(n)	Range: 0 to	0 1,785 charac	<mark>cters Resolutio</mark>	on: <mark>1 char</mark>	count no specifie Data Di characte not avai	85 bytes. Character included, lenged by application ctionary. Unuseders shall be treated that and filled and availation and availation.	in d ed as with
3	Station S	SNR		Byte Field S Bit Field			Request Para Command Pa		Optional Optional	
	DD026	Loran-C SNR			Signal at stand	lard sampling poi	nt / RMS noise in 3	3kHz BW	at 100KHz	
	DF31	dB, relative measure	int16	Range: +/-	327.64 dB	Resolution	on: 1x10E-2 dB			

H

Loran-C Signal Data	PGN: 130054
	hex: 1FC06

4	Station ECD		Byte Field Size: 4 Bit Field Size:	Request Parameter Command Parameter: Optional
	DD032 Loran-C ECD		Envelope-to-Cycle	Discrepancy (ECD) of the Loran-C pulse
	DF45 Time interval, precise	int32	Range: +/- 2.14 s	Resolution: 1x10E-9 s
5	Station ASF		Byte Field Size: Bit Field Size:	Request Parameter Command Parameter: Optional Optional
5	Station ASF DD033 Loran-C ASF		Bit Field Size:	Command Parameter: Optional ary Factor (ASF) associated with the propagation of the sign

Label PGN: 130060 hex: 1FC0C

The Label PGN is used to set and retrieve a text label assigned to a particular device or a particular hardware resource within a particular device.

The Label PGN supports multiple-channel devices.

Field programmability of the fields within this PGN over the network is optional, but if implemented shall be performed using the NMEA Command Group Function (126208).

Global ISO Requests (PGN 059904) for this Parameter Group shall be ignored.

Global NMEA Request Group Functions (PGN 126208) for this Parameter Group that do not specify Request Parameters shall be ignored.

- Response to a global or an addressed NMEA Request Group Function (PGN 126208) for this Parameter Group that specifies one or more Request Parameters shall be the transmission of this PGN once for each Hardware Channel ID with fields that match the specified parameters.
- Response to an addressed ISO Request (PGN 059904) for this Parameter Group shall be the transmission of this PGN once for each defined Hardware Channel ID, and once for the device itself.
- Response to an addressed NMEA Request Group Function (PGN 126208) for this Parameter Group that does not specify any request parameters shall be the transmission of this PGN once for each defined Hardware Channel ID, and once for the device itself. Response to a valid NMEA Command Group Function (PGN 126208) in addition to any required acknowledgement shall be the transmission of this PGN once for each defined Hardware Channel ID affected by the command.

Additionally, any other device operations that change the values for any Hardware Channel ID configuration shall also result in the transmission of this PGN for each defined Hardware Channel affected.

- To retrieve labels from a device, issue an addressed ISO request for this PGN to the device. Devices will respond to the ISO request by transmitting an occurrence of this PGN for each channel that is capable of being labeled, plus one for the device itself.
- To change the value of a label for a data source instance within a multiple-channel device, an NMEA Command Group Function (126208) is sent to the device with the "Hardware Channel ID" field set the appropriate Hardware Channel ID and the "Label" field set to the desired new label value.
- To change the value of a label for a device taken as a whole, an NMEA Command Group Function (126208) is sent to the device with the "Hardware Channel ID" field set to 252 (0xFC), and with the "Label" field set to the desired label text. The Label message transmitted for Hardware Channel ID 252 (0xFC) will always have Data Source Instance Field Number, Secondary Enumeration Field Number, and Parameter Field Number Fields set to 255 (0xFF).
- To change the value of a label for an entire PGN applicable to all fields within that PGN, an NMEA Command Group Function (126208) is sent to the device with the "Hardware Channel ID" field set to the appropriate Hardware Channel ID, and with the "Label" field set to the desired label text. The Label message transmitted in response will always have Data Source Instance Field Number, Secondary Enumeration Field Number, and Parameter Field Number Fields set to 255 (0xFF).
- If a text label is shared by more than one Hardware Channel ID, then all occurrences affected by the change shall be transmitted. For example, a single-channel device shall support Hardware Channel ID values of 0, for the single sensor channel, and 252, for the device as a whole. It may share a single text label between these two Hardware Channel ID fields, however; in this case, changing the label with Hardware Channel ID 252 will result in the label with Hardware Channel ID 0 also being changed to the same value, resulting in a transmission for both Hardware Channel ID 0 and 252.

Re-transmission of this PGN any time changes are made to its parameters is done so that all displays in the system will be able to update their stored versions of the labels as they are changed. Any displays or display software in the system that implement the Label PGN are required to monitor the network for occurrences of this PGN and to replace this data with the contents of the received message.

Label PGN: 130060 hex: 1FC0C

Note 1: Every Command Group Function transmitted for this PGN shall contain a value for Field 1(Hardware Channel ID). The value commanded shall identify the hardware channel that the remaining commanded fields apply to.

Refer to Appendix D for more detailed explanations and application examples.

Single F	rame: N	Priority Default: 7	Default	Update Rate	Request	illiseconds	Frequency:	#Туре	! cycles per second
Destination	on: <mark>Global</mark>	Query Support: Requ	<mark>uired</mark> Con	mmand Suppo	ort: Optional	ACK Rqmnts: N	one		
Field #	Field Na	ame							
1	Hardwar	e Channel ID		Byte Field Bit Fiel]	Request Par Command F		Required Note 1
	DD357	Hardware Channel ID			temperature sen unique Hardwar	e Channel ID. Val	ch contact. Ea ues in this rang	ich label in a ge are to be	rce, such as a a device will have a assigned to hardware ne until all resources
						efers to the device el for the entire dev		d the label a	associated with this
					253 = Reserved 254 = Error 255 = Data Not	Available			
	DF53	Integer, 8 bit unsigned	uint8	Range: 0		Resolution:	1 bit	Unit-le	ss number
	Uniquely id Labels with Instance Va	Integer, 8 bit unsigned lentifies a hardware resource this field set to 252 (0xFC) salue field, Secondary Enume Field Number field set to their	within a device shall have the P ration Field Nur	e to which the PGN field, Dat mber field, Se	e label applies. ta Source Instance econdary Enumerat	Field Number field	, Data Source		ss number
2	Uniquely id Labels with Instance Va	lentifies a hardware resource this field set to 252 (0xFC) salue field, Secondary Enume	within a device shall have the P ration Field Nur	e to which the PGN field, Dai mber field, Se lata Not Avail Byte Field	e label applies. ta Source Instance econdary Enumerat lable values.	Field Number field	, Data Source	rameter	Optional
2	Uniquely id Labels with Instance Va Parameter	lentifies a hardware resource to this field set to 252 (0xFC) salue field, Secondary Enume Field Number field set to their	within a device shall have the P ration Field Nur	e to which the PGN field, Dai mber field, Se lata Not Avail Byte Field	e label applies. Ita Source Instance econdary Enumerat lable values. Italia Size: 24 24 24 24 24 24 24 2	Field Number field ion Field Value fiel	, Data Source d, and Request Pai Command F	rameter Parameter:	Optional
2	Uniquely id Labels with Instance Va Parameter PGN DD009	lentifies a hardware resource to this field set to 252 (0xFC) salue field, Secondary Enume Field Number field set to their	within a device shall have the P ration Field Nur ir appropriate D bit(n)	e to which the PGN field, Dai mber field, Se ata Not Avail Byte Field Bit Fiel Range:	e label applies. ta Source Instance econdary Enumerati lable values. d Size: ld Size: 24 24-bit Paramete first	Field Number field ion Field Value fiel	, Data Source d, and Request Pal Command F PGN) expresse	rameter Parameter: In binary,	Optional Optional
2	Uniquely id Labels with Instance Va Parameter PGN DD009 DF52 PGN of the	entifies a hardware resource this field set to 252 (0xFC) s alue field, Secondary Enume Field Number field set to thei PGN Bit field	within a device shall have the Pration Field Nur ir appropriate D bit(n) is label applies	e to which the PGN field, Dai mber field, Se ata Not Avail Byte Field Bit Fiel Range:	e label applies. Ita Source Instance econdary Enumerati lable values. Id Size: 24-bit Paramete first Variable d Size: 1 Size:	Field Number field ion Field Value fiel r Group Number (I	, Data Source d, and Request Pal Command F PGN) expresse	rameter Parameter: d in binary, Used to	Optional Optional LSB is transmitted construct bit fields Optional
	Uniquely id Labels with Instance Va Parameter PGN DD009 DF52 PGN of the	entifies a hardware resource this field set to 252 (0xFC) s alue field, Secondary Enume Field Number field set to thei PGN Bit field parameter group to which the	within a device shall have the P ration Field Nur ir appropriate D bit(n) is label applies	e to which the PGN field, Da' mber field, Se ata Not Avail Byte Field Range: Byte Field	e label applies. Ita Source Instance econdary Enumerat lable values. Id Size: 24-bit Paramete first Variable d Size: 1 Size: 1 Size: 1 Size: 1 Size: 1 Size: 1 Size: 1 Size: 1 Size: 1 Size: 1 Size:	Field Number field ion Field Value fiel r Group Number (I	, Data Source d, and Request Pal Command F PGN) expresse Request Pal Command F	rameter Parameter: d in binary, Used to	Optional Optional LSB is transmitted construct bit fields Optional
	Uniquely id Labels with Instance Va Parameter PGN DD009 DF52 PGN of the	lentifies a hardware resource this field set to 252 (0xFC) salue field, Secondary Enume Field Number field set to their PGN Bit field parameter group to which the Irce Instance Field Number	within a device shall have the P ration Field Nur ir appropriate D bit(n) is label applies	e to which the PGN field, Da' mber field, Se ata Not Avail Byte Field Range: Byte Field	e label applies. Ita Source Instance econdary Enumerati lable values. Id Size: 24-bit Paramete first Variable d Size: 1 Id Size: Number of route	Field Number field ion Field Value fiel r Group Number (I Resolution:	, Data Source d, and Request Par Command F PGN) expresser Request Par Command F mark, etc.	rameter Parameter: ed in binary, Used to rameter Parameter:	Optional Optional LSB is transmitted construct bit fields Optional
	Uniquely id Labels with Instance Va Parameter PGN DD009 DF52 PGN of the Data Sou DD005 DF53 For parameter	lentifies a hardware resource this field set to 252 (0xFC) salue field, Secondary Enume Field Number field set to their PGN Bit field parameter group to which the Irce Instance Field Numb Generic numeric ID, shore	within a device shall have the Pration Field Nur ir appropriate D bit(n) is label applies per rt uint8 ed multiple time	e to which the PGN field, Da' mber field, Se eata Not Avail Byte Field Range: Byte Field Bit Fiel Range: Range: 0 es by the sam	e label applies. Ita Source Instance econdary Enumerat lable values. Id Size: Id Size: 24-bit Paramete first Variable Id Size: Number of route It to 252 ne node with differin	Field Number field ion Field Value field Value field r Group Number (Interpretation: Resolution: Resolution: Resolution: g data source insta	, Data Source d, and Request Par Command F PGN) expresse 1 Request Par Command F mark, etc. 1 bit	rameter Parameter: ed in binary, Used to rameter Parameter:	Optional Optional LSB is transmitted construct bit fields Optional Optional

PGN: 130060

								hex: 1FC0C
4	Data Sou	urce Instance Value		•	eld Size: 1		Request Paran Command Para	neter <mark>Optional</mark> ameter: <mark>Optional</mark>
	DD128	Generic instance			0 = Instan 1 = Instan 2 = Instan n = Instan 253 = Res 254 = Erro 255 = Not	ce 1 ce 2 ce n, where n < 253 erved or		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	1 bit	Unit-less number
	the data so	ource instance value to be matche ource for this channel. If a Reques also support the capability on this I	t Paramet	er or Com				
5	Seconda	ry Enumeration Field Numbe	r	-	eld Size: 1 ield Size:		Request Paran Command Para	neter Required ameter: Optional
	DD005	Generic numeric ID, short			Number o	f route, waypoint, event,	mark, etc.	
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	1 bit	Unit-less number
	different me	eter groups that are transmitted measurements; this field identifies the 255 means that the Label is not sp	ne field nu	mber of the	at data type.	liffering data type, each	representing	
6	Seconda	ry Enumeration Field Value		•	eld Size: 1		Request Paran Command Para	meter Required Optional
	DD358	Secondary Enumeration Field	l Value					
		Integer, 8 bit unsigned /pe value to be matched to determ this channel.	uint8 ine which	•	0 to 252 on of the param	Resolution. eter group is to be used	1 010	Unit-less number
7	Paramete	er Field Number		•	eld Size: 1 ield Size:		Request Paran Command Para	neter Required optional
	DD005	Generic numeric ID, short			Number o			
			uint8	Range:	0 to 252	Resolution	· 1 bit	Unit-less number
	DF53	Integer, 8 bit unsigned	umto	riango.	0 10 232	recolution	1 UII	Onit-less number

Label

Label PGN: 130060 hex: 1FC0C

8LabelByte Field Size:8 or 16 nRequest ParameterOptionalBit Field Size:Command Parameter:Optional

DD004 Generic name string, short Name of place, route, waypoint, destination, vessel, vehicle, etc.

DF50 String, variable, short ch8or16(n) Range: 0 to 250 ASCII or Resolution: 1 ASCII or 2 to 252 b

0 to 125 Unicode
Characters

1 Unicode
Character

Contains the text of the label. If this field is programmable, the device should be able to store a Label with a minimum length of 32 ASCII or 16 Unicode characters. If the field is not programmable, labels should not exceed more than 32 ASCII or 16 Unicode characters.

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = 0 => Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

Channel Source Configuration

PGN: 130061 hex: 1FC0D

The Channel Source Configuration parameter group is used to identify data sources that a device receives from the NMEA network to satisfy device operational requirements.

For example, if a device stores the vessel location any time an event monitored by the device occurs, and there are more than one GPS device aboard the vessel, this parameter group may be used to report and also command which GPS is used/to use by the device. An example may be a MOB sensor.

This parameter group is especially useful for 'black box' devices that have no native GUI for direct configuration, and therefore would require configuration over the network. The input being reported/configured is identified using a Data Source Channel ID, in similar fashion to the Label parameter group (PGN 130060) Hardware Channel ID.

However, the Data Source Channel ID in this case is related to a channel of information being consumed by the device from the network, where the Label parameter group Hardware Channel ID was a channel of information being produced/transmitted to the network. An example could be an autopilot that requires rudder position feedback.

The autopilot may assign Data Source Channel ID 0 to rudder position feedback. When the autopilot transmits this parameter group using Data Source Channel ID 0, it is indicating which specific rudder angle adapter is being used for rudder position feedback. In the event that a device supports both this parameter group and the Label parameter group, no assumptions should be made regarding the relationship between source channels and label channels. Global ISO Requests (PGN 059904) for this Parameter Group shall be ignored.

Global NMEA Request Group Functions (PGN 126208) for this Parameter Group that do not specify Request Parameters shall be ignored. Response to a global or an addressed NMEA Request Group Function (PGN 126208) for this Parameter Group that specifies one or more Request Parameters shall be the transmission of this PGN once for each Channel Source ID with fields that match the specified parameters.

Response to an addressed ISO Request (PGN 059904) for this Parameter Group shall be the transmission of this PGN once for each defined Channel Source ID. Response to an addressed NMEA Request Group Function (PGN 126208) for this Parameter Group that does not specify any request parameters shall be the transmission of this PGN once for each defined Channel Source ID.

Response to a valid NMEA Command Group Function (PGN 126208) in addition to any required acknowledgement shall be the transmission of this PGN once for each defined Channel Source ID affected by the command.

Additionally, any other device operations that change the values for any Channel Source ID configuration or selection shall also result in the transmission of this PGN for each defined Channel Source ID affected.

The NMEA Command group function can be used to set the values for a device that broadcasts this parameter group. The level of programmability is dependent on the manufacturer.

On receipt of a valid command, the response should be to immediately use the new criteria to select a new data source, and once selected this parameter group should be transmitted with the result of that selection. Improperly formatted commands or command value combinations not supported by the manufacturer should be negatively acknowledged in their entirety.

Note 1: When NMEA Command group function support is provided, minimum support shall include a value for field

1. Every command shall include a value for field 1 and shall be used to identify the input channel being configured/commanded.

Single Frame: N	Priority Default: 7	De	fault Update Rate:		milliseconds	Frequency:	NA cycles per	second
Destination: Global	Query Support: Red	quired	Command Support:	Optional	ACK Rqmnts:	None		
Field # Field Name								

Channel Source Configuration PGN: 130061 hex: 1FC0D

1	Data So	urce Channel ID			ield Size: 1 ield Size:		Request Parameter Command Parameter	Required Note 1
	DD359	Data Source Channel ID			used in a converted are assign	252 = Identification of a calculation, a value logge output as a physical stired sed sequentially to data re tata requirements are assi	ed when an event occurs mulus. Data Source Cha equirements beginning v	s, or a value innel IDs in this range
	DF53 Uniquely id	Integer, 8 bit unsigned dentifies a required data input for	uint8 r the node.	Range:	0 to 252	Resolution	<mark>1 bit U</mark> nit	less number
2	Source	Selection Status		-	ield Size: ield Size: 2		Request Parameter Command Paramete	Optional er: Optional
	DD360	Source Selection Status			represent to 0b01 = So provided i 0b10 = Re	o source selected for this emplate to match. urce selected for this chadentifies template. served. o Data Available.		•
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1 Used	to construct bit fields
3	NMEA R	eserved		•	ield Size: ield Size: rest	/ 2	Request Parameter Command Paramete	r:
	DD001	Reserved field			Variable n	umber of reserved bits,	all set to logic "1"	
	DF52 Used to ali	Bit field gn subsequent data on a byte b	bit(n) oundary.	Range:	Variable	Resolution	1 Used	to construct bit fields
4	NAME S	election Criteria Mask		•	ield Size: ield Size: 12]	Request Parameter Command Paramete	Optional er: Optional
	DD327	NAME Selection Criteria M	1ask		0xxx xxxx 0xxx xxxx 0xxx xxxx 0xxx xxxx 0xxx xxxx 0xxx x1xx 0xxx x1xx 0xx1 xxxx 0x0x xxxx 1111 1111 'x' = don Note that Inactive fi Reserved 1	xxx1 = NAME shall maxx1x = NAME shall max1xx = NAME shall maxxx = NAME shall maxxx = NAME shall maxxx = Reserved bit (alaxxx = NAME shall maxxx = Reserved bit (alaxxx = Reserve	atch Manufacturer Code atch Device Instance Lo atch Device Instance Up atch Device Function for igns with NAME Reser atch Device Class field atch System Instance fie atch Industry Group fiel igns with NAME Reser able, Mask not used assible. ansmitted as 0. be transmitted as 0, ex	wer field oper field eld ved field 6) eld d ved field 10)
	DF52	Bit field	bit(n)	Range:	Variable	Resolution		to construct bit fields
	Identifies v	which NAME field(s) of the Addre	()					

Channel Source Configuration

PGN: 130061 hex: 1FC0D

5	Source NAME	Byte Field Size: 8 Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD320 Network ID NAME	This field is defined by fields 1-1	0 of PGN 60928
	DF56 Integer, 64 bit unsigned uint64	Range: 0 to (2E+64)-4 Resolution	Unit-less number
	Address Claim NAME of the node used as a source for	this data channel	
6	PGN	Byte Field Size: Bit Field Size: <mark>24</mark>	Request Parameter Command Parameter: Optional Optional
	DD009 PGN	24-bit Parameter Group Number (first	PGN) expressed in binary, LSB is transmitted
	DF52 Bit field bit(n)	Range: Variable Resolution	Used to construct bit fields
	Parameter group to be received for this data channel.		
7	Data Source Instance Field Number	Byte Field Size: 1 Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD005 Generic numeric ID, short	Number of route, waypoint, event,	, mark, etc.
	DF53 Integer, 8 bit unsigned uint8	Range: 0 to 252 Resolution	: 1 bit Unit-less number
	For parameter groups that are transmitted multiple time representing different measurements; this field identified		ances, each
8	Data Source Instance Value	Byte Field Size: 1 Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD128 Generic instance	0 = Instance 0 1 = Instance 1 2 = Instance 2 n = Instance n, where n < 253 253 = Reserved 254 = Error 255 = Not available	
	DF53 Integer, 8 bit unsigned uint8	Range: 0 to 252 Resolution	: 1 bit Unit-less number
	The data source instance value to be matched to deter the data source for this channel. If a Request Parame you must also support the capability on this Data Field.	ter or Command Parameter is supported on any of	
9	Secondary Enumeration Field Number	Byte Field Size: 1 Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD005 Generic numeric ID, short	Number of route, waypoint, event,	, mark, etc.
	DF53 Integer, 8 bit unsigned uint8	Range: 0 to 252 Resolution	: 1 bit Unit-less number
	For parameter groups that are transmitted multiple time different measurements; this field identifies the field nu		representing
10	Secondary Enumeration Field Value	Byte Field Size: 1 Bit Field Size:	Request Parameter Command Parameter: Optional Optional
	DD358 Secondary Enumeration Field Value		
	DF53 Integer, 8 bit unsigned uint8	Range: 0 to 252 Resolution	Unit-less number
	The data type value to be matched to determine which source for this channel.	transmission of the parameter group is to be used	as the data

Cnan	inei Sol	irce Configuration					PGN: 130061 hex: 1FC0D			
11	Paramete	er Field Number		•	eld Size: 1			Request Paran Command Para		Optional Optional
	DD005	Generic numeric ID, short			Number of	route, waypoin	nt, event, 1	mark, etc.		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Res	solution:	1 bit	Unit-les	ss number

Route and WP Service - Database List

PGN: 130064 hex: 1FC10

Complex request for this PGN should return a list of Databases in which a navigation Device organizes its Routes and WPs. A Database may contain one WP-List and multiple Routes. A device need not support the concept of multiple Databases. The support of this PGN is then optional and the default Database ID = 0 shall be used in other "Route and Waypoint Service" PGNs. If supporting this PGN the Number of Databases defaults to 1. The reply should use the same transfer protocol as the request. ISO request shall, if this PGN is supported, return the 3 first fields with respectively: NA, 0 and the Number of Databases Available. For a complete description of the Route and WP PGNs, see the application note in Appendix D.

Single Fr	ame: No	Priority Default: 7	Default	Update Ra	ate:	milliseconds	Frequency:	N/	cycles per secon
Destinatio	on: <mark>Global</mark>	Query Support: Require	ed Co	mmand Supp	oort: Optional	ACK Rqmnts:	None		
ield#	Field Na	ame							
1	Start Dat	abase ID		Byte Fie Bit Fie	ld Size: 2		Request Par Command P		Required Optional
	DD007	Generic numeric ID, medium	n		Number of	route, waypoint, ever	t, mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resolutio	n: 1 bit	Unit-les	ss number
	If not speci-	se ID requested/sent. fied in the request, the reply sha ested Database does not exist, th							
2	nitems			-	ld Size: 2 eld Size:		Request Par Command P		Required Optional
	DD007	Generic numeric ID, mediun	n		Number of	route, waypoint, ever	t, mark, etc.		
		Integer, 16 bit unsigned es requested/sent. fied in the request, the reply sha	uint16	_	0 to 65,532 available (or as	Resolution many as the transpo			ss number
3	Number	of Databases available			ld Size: 2		Request Par Command P		Optional Optional
	DD007	Generic numeric ID, medium	n		Number of	route, waypoint, ever	t, mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resolutio	n: 1 bit	Unit-les	ss number
4	Database	e ID		•	ld Size: 2 eld Size:		Request Par Command P		Optional Optional
	DD007	Generic numeric ID, medium	n		Number of	route, waypoint, ever	t, mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resolutio	n: 1 bit	Unit-les	ss number
	Databases	shall be included in this PGN in	the order of	f increasing	ID.				

Route and WP Service - Database List

PGN: 130064 hex: 1FC10

5	Database	a Name		Bvte Fi	eld Size:	8 or 16 n	1	Request Param	eter	Optional
3	Database	, riamo			ield Size:	0 01 10 11		Command Para		
	DD004	Generic name string, short			Nam	e of place, route	e, waypoint, de	stination, vessel,	vehicle,	etc.
	DF50	String, variable, short	ch8or16(n)	Range:		ASCII or Unicode ers		1 ASCII or 1 Unicode Character	string (byte incof byte including Control in string). The Cother string charact Unicod Control charact Control charact A string (total let	byte = 1 => ASCII
6		Timestamp			ield Size:	4		Request Param Command Para		Optional Optional
	DD158	Generic time of day			24 h	our clock, 0 = r	_			
	DF06	Time of day	uint32	Range:	0 to 86,4	401 s	Resolution:	1x10E-4 s	range a	urs, 0 = midnight, llows for up to two conds per day
7	Database	Datestamp			eld Size: ield Size:	2		Request Param Command Para		Optional Optional
	DD039	Generic date			Days	since January	1, 1970, Date	is relative to UTO	Time.	
	DF41	Date, day count	uint16	Range:	0 to 65,5	532 days	Resolution:	1 day	$0 = Jan$ $\sim 179 \text{ ye}$	uary 1, 1970, max = ears
8	WP Posit	tion Resolution		•	eld Size: ield Size:	4		Request Param Command Para		Optional Optional
	DD238	WP Position Resolution			1= [< 3= [< 4= [< 7= N	>0.1min.], <=0.1& >0.01m <=0.001 & >0.0 <=0.000 1 & >= lot available (no n. = 0.01667de	001] -0.000 001min. ot known)	2= [<=0.01 & 5		
	DF52	Bit field	bit(n)	Range:	Variable	;	Resolution:	1	Used to	construct bit fields
9	NMEA Re	eserved		•	eld Size: ield Size:	resv 4		Request Param Command Para		
	DD001	Reserved field			Varia	able number of	reserved bits, a	ll set to logic "1"		
	DF52 Used to alig	Bit field gn subsequent data on a byte b	bit(n) ooundary.	Range:	Variable	;	Resolution:	1	Used to	construct bit fields

Route and WP Service - Database List PGN: 130064 hex: 1FC10

10	Number	of Routes in Database		•	eld Size: 2		Request Param Command Para		Optional Optional
	DD007	Generic numeric ID, mediu	m		Number of route, wa	aypoint, event,	mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resolution	1 bit	Unit-le	ss number
11	Number	of WPs in Database		-	eld Size: 4		Request Param Command Para		Optional Optional
	DD010	Generic numeric ID, large			Number of route, wa	aypoint, event,	mark, etc.		
	DF55 Includes W	Integer, 32 bit unsigned Ps from the WP-List and all oth	uint32 er WPs emb	_	0 to 4,294,967,292 Routes	Resolution	1 bit	Unit-le	ss number
12	Number	of Bytes in Database		•	eld Size: 4		Request Param Command Para		Optional Optional
	DD010	Generic numeric ID, large			Number of route, wa	aypoint, event,	mark, etc.		
	DF55	Integer, 32 bit unsigned	uint32	Range:	0 to 4,294,967,292	Resolution:	1 bit	Unit-le	ss number
13	Fields 4	thru 12 repeat as needed		•	eld Size: ?		Request Param Command Para		Optional Optional
	DD000	Undefined							
	DF00	Undefined	Undefined	Range:	undefined	Resolution	undefined	Applica	ntion specific, defined

Route and WP Service - Route List

PGN: 130065 hex: 1FC11

Complex request for this PGN should return a list of Routes in a Database. A Database may contain Routes identified with Route ID in the range 0-65532. There may be empty gaps (the Route ID does not represent a valid/existent Route) anywhere in this range. This PGN shall include valid Routes only. The reply should use the same transfer protocol as the request. ISO request for this PGN shall return 059392 with a positive ACK if the PGN is supported For a complete description of the Route and WP PGNs, see the application note in Appendix D.

Single Fr	rame: No	Priority Default: 7	Default U	odate Ra	te:	milliseconds	Frequency:	N	4 cycles per secon
Destinatio	n: Global	Query Support: Required	Comn	nand Supp	ort: Optional	ACK Rqm	nts: None		
ield#	Field Na	me							
1	Start Rou	te ID		Byte Fiel Bit Fie	d Size: 2 Id Size:		Request Para Command Pa		Required Optional
	DD007	Generic numeric ID, medium			Number of ro	oute, waypoint,	event, mark, etc.		
	If not specifi	Integer, 16 bit unsigned or requested/sent. ed in the request, the reply shall deted Route is not available, the def	efault to the	e lowest a			lution: <mark>1 bit</mark>	Unit-le	ss number
2	nitems			•	d Size: 2 Id Size:		Request Para Command Pa		Required Optional
	DD007	Generic numeric ID, medium			Number of ro	oute, waypoint,	event, mark, etc.		
	If not specifi	Integer, 16 bit unsigned quested/sent. ed in the request, the reply shall intotocol space permits).			to 65,532 ilable in the Data		ny of them as the	Unit-le	ss number
3	Number o	of Routes available in Databas	e		d Size: 2		Request Para Command Pa		Optional Optional
	DD007	Generic numeric ID, medium			Number of ro	oute, waypoint,	event, mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16 <i>F</i>	Range: () to 65,532	Resol	lution: 1 bit	Unit-le	ss number
4	Database	ID		•	d Size: <mark>2</mark> Id Size:		Request Para Command Pa		Required Optional
	DD007	Generic numeric ID, medium			Number of ro	oute, waypoint,	event, mark, etc.		
		Integer, 16 bit unsigned pecified in the request. Is typically ed in the request, the reply may us	gathered fr	om a prio			lution: <mark>1 bit</mark>	Unit-le	ss number
5	Route ID				d Size: 2 Id Size:		Request Para Command Pa		Optional Optional
	DD007	Generic numeric ID, medium			Number of ro	oute, waypoint,	event, mark, etc.		
	DF54 Routes shall	Integer, 16 bit unsigned I be included in this PGN in the ord		-	to 65,532 skipping non-valid		lution: <mark>1 bit</mark>	Unit-le	ss number

Route and WP Service - Route List

PGN: 130065 hex: 1FC11

6	Route Na	ame		•	eld Size: 8 or 16 n]	Request Param		Optional
	DD004	G : 1 .		BITF	ield Size:	warmaint da	Command Para		•
	DD004	Generic name string, short		_	Name of place, route,				
	DF50	String, variable, short	ch8or16(n)	Range:	0 to 250 ASCII or 0 to 125 Unicode Characters	Resolution	1 ASCII or 1 Unicode Character	string (u	2 bytes. First byte in unt8) is the Count licating the number in the string,
								Control in string The Coi the string characte Unicode Control characte Control characte A string (total le Count =	byte = 1 => ASCII
7	NMEA R	eserved		•	eld Size: ield Size: resv 2		Request Param Command Para		
	DD001	Reserved field		2,,,,	Variable number of re	eserved bits, a			
	DF52 Used to ali	Bit field gn subsequent data on a byte b	bit(n) oundary.	Range:	Variable	Resolution		Used to	construct bit fields
8	WP Iden	tification Method		-	eld Size: ield Size: <mark>2</mark>		Request Param Command Para		Optional Optional
	DD240	WP Identification Method			0=WP's in WP-List, 1=WP embedded in F 2=Reserved 3=Null (info not avail				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
9	Route St	atus		•	eld Size: ield Size: <mark>4</mark>		Request Param Command Para		Optional Optional
	DD239	Route Status			0=Active, 1=Inactive, 2=Deleted, 3-13= Reserved, 14=Error, 15= Null				
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
10	Fields 5	thru 9 repeat as needed			eld Size: ? ield Size: n		Request Param Command Para		Optional Optional
	DD000	Undefined							
	DF00	Undefined	Undefined	Range:	undefined	Resolution	undefined	Applica at time	tion specific, defined of use.

Route and WP Service - Route/WP-List Attributes

PGN: 130066 hex: 1FC12

Complex request for this PGN should return the attributes of a Route or the WP-List. WARNING: The Route Track may not be defined by the Waypoint positions only: The Navigation Method (GC/RL) and Radius of Turn at each Waypoint are optional additional parameters defining the Track. PGN 130066 field #8 "Critical supplementary parameters" shall be used to determine if there are additional parameters to the Waypoint positions. For a complete description of the Route and WP PGNs, see the application note in Appendix D. A Database may contain one WP-List and multiple Routes. The Database ID and the Route ID shall be specified in the request/reply. Route ID = 65535 (NA) indicates that the request/reply is addressing the WP-List. This PGN contains parameters common for the Route or WP-List. The individual Waypoints with positions and other associated parameters must be requested/transferred in other "Route and WP Service" PGNs, such as PGN 130067 "Route - WP Name & Position". The reply should use the same transfer protocol as the request. ISO request for this PGN shall return 059392 with a positive ACK if the PGN is supported.

Single Fr	rame: No	Priority Default: 7	Default Up			millisec		Frequency	: NA	cycles per se	econd
Destination	n: Global	Query Support: Requ	ired Comm	and Sup	port: Optional	AC	CK Rqmnts: N	one			
Field #	Field Na	ame									
1	Database	e ID	I	Byte Fie	eld Size: 2			Request F		Required	
				Bit Fi	ield Size:			Command	l Parameter:	Optional	
	DD007	Generic numeric ID, medi	um		Number of 1	route, way	point, event,	mark, etc.			
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532		Resolution:	1 bit	Unit-les	ss number	
2	Route ID		I	Byte Fie	eld Size: 2			Request F	'arameter	Required	
				Bit Fi	ield Size:			Command	l Parameter:	Optional	
	DD007	Generic numeric ID, medi	um		Number of 1	route, way	point, event,	mark, etc.			
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532		Resolution:	1 bit	Unit-les	ss number	
	Set to 6553	5 (NA) to access the WP-List	in the Database.								
3	Route/W	P-List Name	I	Byte Fie	eld Size: 8 or	16 n		Request F	arameter	Optional	
				Bit Fi	ield Size:			Command	l Parameter:	Optional	
	DD004	Generic name string, shor	t		Name of pla	ace, route,	waypoint, de	stination, v	essel, vehicle,	etc.	
	DF50	String, variable, short	ch8or16(n)	Range:	0 to 250 ASCI		Resolution:			bytes. First by	
					0 to 125 Unico Characters	ode		1 Unicode Character		uint8) is the Cou licating the num	
					Characters			Character	of bytes	in the string,	
										ng the Count and bytes. Second	
									in string	g is the Control l	byte.
										ntrol byte indica	
										ers (Char8) or e characters (Ch	1()
										byte = $0 \Rightarrow Un$	
									Control	ers byte = 1 => AS	CII
									characte	ers	
										g with no charac ngth of 2 bytes,	
										= 2) is a null stri	

Route and WP Service - Route/WP-List Attributes

PGN: 130066 hex: 1FC12

4	Route/W	P-List Timestamp			eld Size: ield Size:			Request Param Command Para		Optional
	DD158	Generic time of day		ыст		nour clock, 0 = m	idnight, time		arrieter.	Optional
	DF06	Time of day	uint32	Range:	0 to 86,		Resolution:		range a	urs, 0 = midnight, illows for up to two conds per day
5	Route/W	P-List Datestamp		•	eld Size: ield Size:			Request Paran Command Para		Optional Optional
	DD039	Generic date			Day	s since January 1	, 1970, Date	is relative to UTO	C Time.	
	DF41	Date, day count	uint16	Range:	0 to 65,	532 days	Resolution:	1 day	0 = Jar ~179 y	nuary 1, 1970, max = ears
6	Change	at Last Timestamp		•	eld Size: ield Size:	8		Request Param Command Para		Optional Optional
	DD237	Changed at timestamp flag			0xx 0xx 0xx 0xx 0xx 0x1	0 0000 = No char x xxx1 = WP: Ch x xx1x = WP: Ch x x1xx = Changer x 1xxx = Route: Control xxxx = Reserver x xxxx = Reserver x xxxx = Other nor 1 1111 = This flating	ange in main ange in suppl d no. of WP's Change supple d d ot specifyed c	ementary parame in Route/WP-Lis ementary paramet hange	ters (or i t, and/or	name changed/added
	DF52	Bit field	bit(n)	Range:	Variabl	e	Resolution:	1	Used to	construct bit fields
7	Number	of WPs in the Route/WP-List	t		eld Size: ield Size:			Request Param Command Para		Optional Optional
	DD007	Generic numeric ID, medium	1		Nur	mber of route, way	ypoint, event,	mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,	532	Resolution:	1 bit	Unit-le	ss number
8	Critical s	supplementary parameters		•	eld Size: ield Size:	8		Request Param Command Para		Optional Optional
	DD258	Critical supplementary Route	e paramete	ers	xxx xxx xxx xxx xxx xxx	0 0000 = There as x xxx1 = Navigat x xx1x = XTE Lin x x1xx = Spare x 1xxx = Spare 1 xxxx = Spare x xxxx = Spare	ion Method (0 mit, PGN 130	GC/RL), PGN 130		point Positions
					1xx Eac dow para	rnloaded and appointmenters will not b	ended to the Resafe.	Coute information		the parameter must be
	DF52	Bit field	bit(n)	Range:	1xx Eac dow para	x xxxx = Spare h of these bitflags nloaded and appointers will not b spare flags shall	ended to the Resafe.	oute information	. Ignorir	

Route and WP Service - Route/WP-List Attributes

PGN: 130066 hex: 1FC12

9	Navigation Method		•	eld Size: ield Size: 2		Request Parameter Command Parameter:	Optional Optional
	DD119 Calculation Type			0 = Great Circl 1 = Rhumb Lir 2 = Error, 3 = Null	,		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
	Not applicable to the WP-List NOTE: This is the default Navigation M supplementary parameters.	ethod for the Ro	oute. It may	y be altered for speci	fic legs. Ref. field 8,	Critical	
10	WP Identification Method		•	eld Size: ield Size: 2		Request Parameter Command Parameter:	Optional Optional
	DD240 WP Identification Metho	od		0=WP's in WP 1=WP embedd 2=Reserved 3=Null (info no	ed in Rute,		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
	Not applicable to the WP-List						
11	Route Status		•	eld Size: ield Size: 4		Request Parameter Command Parameter:	Optional Optional
	DD239 Route Status			0=Active, 1=Inactive, 2=Deleted, 3-13= Reserve 14=Error, 15= Null	d,		
	DF52 Bit field Not applicable to the WP-List	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
12	XTE Limit for the Route			eld Size: 2		Request Parameter Command Parameter:	Optional Optional
	DD149 Distance ordered			A commanded	distance like radius	order, off-track limit, etc.	
	DF74 Distance, rough	int16	Range:	+/-32,764 m	Resolution:	1 m	
	No negative values. The limit applies to Not applicable to the WP-List. NOTE: This is the default XTE-Limit for parameters.			ed for specific legs. I	Ref. field 8, Critical s	supplementary	
13	NMEA Reserved			eld Size: ield Size: resv ()	Request Parameter Command Parameter:	
	DD001 Reserved field			Variable numb	er of reserved bits, a	ıll set to logic "1"	
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
	Additional future Route parameters (eg. because it is a general rule that new pareminder.						

Route and WP Service - Route - WP Name & Position

PGN: 130067 hex: 1FC13

Complex request of this PGN should return the Waypoints belonging to a Route.

WARNING: The Route Track may not be defined by the Waypoint positions only: The Navigation Method (GC/RL) and Radius of Turn at each Waypoint are optional additional parameters defining the Track.

PGN 130066 field #8 "Critical supplementary parameters" shall be used to determine if there are additional parameters to the Waypoint positions. For a complete description of the Route and WP PGNs, see the application note in Appendix D.

The Waypoints of a Route are numbered with RPS# continuously from 0 and up in the Forward Direction. RPS# is the sequence number of the Waypoint in the Route. (Route Point Sequence #). A Database may contain one WP-List and multiple Routes. The WP-List holds Waypoints identified by WPID in the range 0-65532. Each of these may be single or belong to one or multiple Routes in the Database.

A Waypoint may be private to a particular Route and not exist in the WP List, its WPID shall then be 65535(NA).

The Database ID and Route ID shall be specified in the request/reply.

These will typically be selected from the information received in other ""Route and WP Service" PGNs previously requested from the same Device. The Waypoint Name (if available) and Position shall be filled with valid data, even if the Waypoints are from the WP-List which the receiver may already have downloaded.

The reply should use the same transfer protocol as the request. ISO request for this PGN shall return 059392 with a positive ACK if the PGN is supported.

Single Fr	rame: No	Priority Default: 7	Default	Update R	ate:	milliseconds	Frequency:	NA	cycles per second
Destinatio	n: Global	Query Support: Require	d Co	mmand Sup	port: Optional	ACK Rqmnts: N	one		
ield#	Field Na	ame							
1	Start RPS	S#		-	eld Size: 2 ield Size:		Request Parar Command Par		Required Optional
	DD007	Generic numeric ID, mediun	ı		Number of r	oute, waypoint, event,	mark, etc.		
		Integer, 16 bit unsigned a 1st requested/sent Waypoint. ied in the request, the default is	uint16 the first RP		0 to 65,532 the Route.	Resolution:	1 bit	Unit-les	s number
2	nltems			•	eld Size: 2		Request Parar Command Par		Required Optional
	DD007	Generic numeric ID, mediun	1		Number of r	oute, waypoint, event,	mark, etc.		
	71	Integer, 16 bit unsigned s requested/sent. ied in the request, the reply shal its).	uint16		0 to 65,532 e Route (or as ma	Resolution:		Unit-les	s number
3	Number	of WPs in the Route		•	eld Size: 2 ield Size:		Request Parar Command Par		Optional Optional
	DD007	Generic numeric ID, mediun	1		Number of r	oute, waypoint, event,	mark, etc.		
	DF54 The receive	Integer, 16 bit unsigned or will use this parameter to determ		-	0 to 65,532 d all WPs of the co	Resolution:	1 bit	Unit-les	s number
4	Database	ID		-	eld Size: 2 ield Size:		Request Parar Command Par		Required Optional
	DD007	Generic numeric ID, mediun	ı		Number of r	oute, waypoint, event,	mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resolution	1 bit	Unit-les	s number

Route and WP Service - Route - WP Name & Position

PGN: 130067 hex: 1FC13

5	Route ID			•	eld Size: 2		Request Paran Command Para		Required Optional
	DD007	Generic numeric ID, mediu	ım		Number of route, way	ypoint, event,	mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resolution:	1 bit	Unit-le	ss number
6	WPID				eld Size: 2		Request Paran Command Para		Optional Optional
	DD007	Generic numeric ID, mediu	ım		Number of route, way	ypoint, event,	mark, etc.		
	DF54 Shall have	Integer, 16 bit unsigned valid data if the Waypoint exist		_	0 to 65,532	Resolution	1 bit	Unit-le	ss number
	The Waypo	oints shall be included in the ord	der of increas	ing RPS#	(The order of appearance i	in the Forward	d Direction of		
7	WP Nam	е		Byte Fi	eld Size: 8 or 16 n		Request Param		Optional
				Bit F	ield Size:		Command Para		
	DD004	Generic name string, short			Name of place, route				
	DF50	String, variable, short	ch8or16(n)Range:	0 to 250 ASCII or 0 to 125 Unicode Characters	Resolution:	1 ASCII or 1 Unicode Character	string (2 bytes. First byte in uint8) is the Count dicating the number
	Max. 30 AS	SCII or Unicode Characters						Control in strin The Co the strin charact Unicod Control charact Control charact A strin (total le	byte = 1 => ASCII
8	WP Latit	ude			eld Size: 4 ield Size:		Request Param Command Para		Optional Optional
	DD022	Latitude, WGS-84			Latitude referenced to	o WGS-84.			
	DF23	Latitude	int32	Range:	+/- 90 deg	Resolution	1x10E-7 deg	"-" = Se cm	outh, resolution ~1.1
9	WP Long	gitude			eld Size: 4		Request Paran Command Para		Optional Optional
	DD023	Longitude, WGS-84			Longitude referenced	l to WGS-84.			
	DF25	Longitude	int32	Range:	+/- 180 deg	Resolution	1x10E-7 deg	"-" = W	Vest, resolution ∼1.1

at time of use.

Route and WP Service - Route - WP Name & Position **PGN: 130067** hex: 1FC13 Byte Field Size: Request Parameter 10 Fields 6 thru 9 repeat as needed Optional Bit Field Size: Command Parameter: Optional **DD000** Undefined Undefined Range: undefined Resolution: undefined Application specific, defined DF00 Undefined

Route and WP Service - Route - WP Name

PGN: 130068 hex: 1FC14

Complex request of this PGN should return the Waypoints belonging to a Route. WARNING: The Route Track may not be defined by the Waypoint positions only: The Navigation Method (GC/RL) and Radius of Turn at each Waypoint are optional additional parameters defining the Track. PGN 130066 field #8 "Critical supplementary parameters" shall be used to determine if there are additional parameters to the Waypoint positions. For a complete description of the Route and WP PGNs, see the application note in Appendix D. The Waypoints of a Route are numbered with RPS# continuously from 0 and up in the Forward Direction. RPS# is the sequence number of the Waypoint in the Route. (Route Point Sequence #). A Database may contain one WP-List and multiple Routes. The WP-List holds Waypoints identified by WPID in the range 0-65532. Each of these may be single or belong to one or multiple Routes in the Database. A Waypoint may be private to a particular Route and not exist in the WP List, its WPID shall then be 65535(NA). The Database ID and Route ID shall be specified in the request/reply. These will typically be selected from the information received in other ""Route and WP Service"" PGNs previously requested from the same Device. The Waypoint Name (if available) and Position shall be filled with valid data, even if the Waypoints are from the WP-List which the receiver may already have downloaded. The reply should use the same transfer protocol as the request. ISO request for this PGN shall return 059392 with a positive ACK if the PGN is supported.

Single Fra	ame: No	Priority Default: 7	Default	Update Ra	ate:	milliseconds	Frequency:	NA	cycles per second
Destination	n: <mark>Global</mark>	Query Support: Required	Co	mmand Sup	port: Optional	ACK Rqmnts: No	one		
Field #	Field Na	ame							
1	Start RPS	S#		Byte Fie	eld Size: 2		Request Para	meter	Required
				Bit Fi	eld Size:		Command Pa	rameter:	Optional
	DD007	Generic numeric ID, medium			Number of 1	oute, waypoint, event,	mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resolution:	1 bit	Unit-less	s number
	1st RPS# re	equested/sent							
2	nltems			Byte Fie	eld Size: 2		Request Para	meter	Required
				Bit Fi	eld Size:		Command Pa	rameter:	Optional
	DD007	Generic numeric ID, medium			Number of 1	oute, waypoint, event,	mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resolution:	1 bit	Unit-less	s number
	n RPS# re	quested/sent							
3	Number	of WPs in the Route		Byte Fie	eld Size: 2		Request Para	meter	Optional
				Bit Fi	eld Size:		Command Pa	rameter:	Optional
	DD007	Generic numeric ID, medium			Number of 1	oute, waypoint, event,	mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resolution:	1 bit	Unit-less	s number
4	Database								
		שוא		Byte Fie	eld Size: 2		Request Para	meter	Required
	Dutubuot	טוט		-	eld Size: 2 eld Size:		Request Para Command Pa		Required Optional
		Generic numeric ID, medium		-	eld Size:		Command Pa		
		-	uint16	Bit Fi	eld Size:		Command Pa	rameter:	
	DD007	Generic numeric ID, medium	uint16	Bit Fi	eld Size: Number of 1	oute, waypoint, event, Resolution:	Command Pa	rameter: Unit-less	Optional s number
5	DD007 DF54	Generic numeric ID, medium	uint16	Bit Fid Range: Byte Fid	Number of 1 0 to 65,532	oute, waypoint, event, Resolution:	Command Pa mark, etc.	Unit-less	Optional s number Required
5	DD007 DF54 Route ID	Generic numeric ID, medium	uint16	Bit Fid Range: Byte Fid	Number of 1 0 to 65,532 eld Size: 2 eld Size:	oute, waypoint, event, Resolution:	Command Pamark, etc. 1 bit Request Para Command Pa	Unit-less	Optional s number Required
5	DD007 DF54 Route ID	Generic numeric ID, medium Integer, 16 bit unsigned	uint16 uint16	Bit Fid Range: Byte Fid Bit Fid	Number of 1 0 to 65,532 eld Size: 2 eld Size:	oute, waypoint, event, Resolution:	Command Pa mark, etc. 1 bit Request Para Command Pa mark, etc.	Unit-less meter rameter:	Optional s number Required
	DD007 DF54 Route ID	Generic numeric ID, medium Integer, 16 bit unsigned Generic numeric ID, medium		Bit Fic Range: Byte Fic Bit Fic Range:	Number of r O to 65,532 eld Size: Number of r O to 65,532	Resolution: Resolution: Resolution:	Command Pa mark, etc. 1 bit Request Para Command Pa mark, etc. 1 bit	Unit-less Unit-less Meter rameter: Unit-less	optional s number Required Optional s number
5	DD007 DF54 Route ID DD007 DF54	Generic numeric ID, medium Integer, 16 bit unsigned Generic numeric ID, medium		Bit Fid Range: Byte Fid Bit Fid Range:	Number of 1 0 to 65,532 eld Size: Number of 1	Resolution: Resolution: Resolution:	Command Pa mark, etc. 1 bit Request Para Command Pa mark, etc.	Unit-less meter Unit-less meter unit-less	Optional s number Required Optional s number Optional
	DD007 DF54 Route ID DD007 DF54 WPID	Generic numeric ID, medium Integer, 16 bit unsigned Generic numeric ID, medium		Bit Fid Range: Byte Fid Bit Fid Range:	Number of 1 0 to 65,532 eld Size: Number of 1 0 to 65,532 eld Size: Number of 1 0 to 65,532 eld Size: 2 eld Size: 2	Resolution: Resolution: Resolution:	Command Pamark, etc. 1 bit Request Para Command Pamark, etc. 1 bit Request Para Command Pa	Unit-less meter Unit-less meter unit-less	Optional s number Required Optional s number Optional

Route and WP Service - Route - WP Name

String, variable, short

PGN: 130068 hex: 1FC14

7 **WP Name**

DF50

Byte Field Size: 8 or 16 n Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD004 Generic name string, short

Max. 30 ASCII or Unicode Characters

Name of place, route, waypoint, destination, vessel, vehicle, etc.

ch8or16(n)Range:

0 to 250 ASCII or 0 to 125 Unicode Characters

Resolution: 1 ASCII or 1 Unicode Character

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = 0 => Unicode characters Control byte = 1 => ASCII characters A string with no characters

(total length of 2 bytes, i.e. Count = 2) is a null string.

8 field 6 thru 7 repeat as needed Byte Field Size: Bit Field Size: n

Request Parameter Command Parameter: Optional

Optional

DD000 Undefined

DF00 Undefined Undefined Range: undefined

Resolution: undefined

Application specific, defined

at time of use.

Route and WP Service - XTE Limit & Navigation Method

PGN: 130069 hex: 1FC15

Complex request of this PGN will return XTE Limit and/or Navigation Method specific to individual legs of a Route. The Database ID and Route ID shall be specified in the request/reply. The parameters apply to the one leg after the Waypoint identified with RPS# in the Forward Direction of the Route and overrides any Route default XTE Limit and Navigation Method. Waypoints where none of these parameters has valid data shall not be included in this PGN. The reply should use the same transfer protocol as the request. ISO request for this PGN shall return 059392 with a positive ACK if the PGN is supported. For a complete description of the Route and WP PGNs, see the application note in Appendix D.

-	rame: No	Priority Default: 7		Update Rate:			Frequency:	NA cycles per second
Destination F ield #	on: <mark>Global</mark>	Query Support: Required	Co	mmand Support:	Optional	ACK Rqmnts: N	one	
1 1	Field Na			Byte Field S			Request Paramete	
	DD007	Generic numeric ID, medium			Number of ro	ute, waypoint, event,	mark, etc.	
	If not specif	Integer, 16 bit unsigned equested/sent fied in the request, the default is the sted RPS# has no valid data, the control of the sted RPS# has no valid data, the control of the sted RPS# has no valid data, the control of the sted RPS# has no valid data, the control of the sted RPS# has no valid data, the control of the sted RPS# has no valid data, the control of the sted RPS# has no valid data, the control of the sted RPS# has no valid data, the control of the sted RPS# has no valid data, the control of the sted RPS# has no valid data.			d data.	Resolution: S#.	1 bit Ur	nit-less number
2	nItems			Byte Field S Bit Field			Request Paramete	•
	DD007	Generic numeric ID, medium			Number of ro	ute, waypoint, event,	mark, etc.	
	DF54	Integer, 16 bit unsigned uested/sent.	uint16	Range: 0 t	o 65,532	Resolution:	1 bit Ur	nit-less number
		ied in the request, the reply shall in	nclude al	RPS# with val	id data (or as n	nany the transfer prot	ocol space	
3	Number of Waypoints with a specific XTE Limit or Nav. Method			Byte Field	Size: 2		Request Paramete	er Optional
				Bit Field	Size:		Command Parame	eter: Optional
	DD007	Generic numeric ID, medium			Number of ro	ute, waypoint, event,	mark, etc.	
	DF54 Note: This r	Integer, 16 bit unsigned may be less than Number of Wayp	uint16 oints in th	Range: 0 t ne Route.	o 65,532	Resolution:	<mark>1 bit Ur</mark>	nit-less number
4	Database) ID		Byte Field : Bit Field			Request Paramete	
	DD007	Generic numeric ID, medium			Number of ro	ute, waypoint, event,	mark, etc.	
	DF54	Integer, 16 bit unsigned	uint16	Range: 0 t	o 65,532	Resolution:	1 bit Ur	nit-less number
5	Route ID			Byte Field S Bit Field			Request Paramete	
	DD007	Generic numeric ID, medium			Number of ro	ute, waypoint, event,	mark, etc.	
	DF54	Integer, 16 bit unsigned	uint16	Range: 0 t	o 65,532	Resolution:	1 bit Ur	nit-less number
6	RPS#			Byte Field S Bit Field			Request Paramete	- p
	DD007	Generic numeric ID, medium			Number of ro	ute, waypoint, event,	mark, etc.	
	DF54	<i>U</i> ,	uint16	Range: 0 t	,	Resolution:	1 bit Ur	nit-less number
	Waypoints	without individually specific XTE Li	mit or Na	vigation Metho	d shall not be i	ncluded.		

Route and WP Service - XTE Limit & Navigation Method

PGN: 130069 hex: 1FC15

7	XTE limit	in the leg after WP		•	eld Size: 2 ield Size:		Request Parame Command Para		Optional Optional
	DD149	Distance ordered			A command	ded distance like radi	us order, off-track lin	nit, etc.	
	DF74 No negative	Distance, rough e values. The limit applies to be	int16 oth sides of th	Range: ne track.	+/-32,764 m	Resolutio	n: <mark>1 m</mark>		
8	Nav. Me	thod in the leg after WP		•	eld Size: ield Size: 2]	Request Parame Command Para		Optional Optional
	DD119	Calculation Type				Circle calculations, Line calculations,			
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: 1	Used to	construct bit fields
9	NMEA Re	eserved		•	eld Size: ield Size: <mark>resv</mark>	6	Request Parame Command Para		
	DD001	Reserved field			Variable nu	imber of reserved bits	, all set to logic "1"		
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: 1	Used to	construct bit fields
	Used to alig	gn subsequent data on a byte b	ooundary.						
10	Fields 6 t	thru 9 repeat as needed		•	eld Size: ? ield Size: n		Request Parame Command Para		Optional Optional
	DD000	Undefined							
	DF00	Undefined	Undefined	Range:	undefined	Resolutio		Applica at time	ation specific, defined of use.

Route and WP Service - WP Comment

PGN: 130070 hex: 1FC16

Complex request of this PGN should return supplementary Comments attached to Waypoints in a Route or a WP-List. Waypoints without a Comment shall not be included in this PGN. If the Route ID is set to 65535 (NA), the Comments will be for the Waypoints in the WP-List. The Database ID shall be specified in the request/reply. The reply should use the same transfer protocol as the request. ISO request for this PGN shall return 059392 with a positive ACK if the PGN is supported. For a complete description of the Route and WP PGNs, see the application note in Appendix D.

Single Fr	rame: No	Priority Default: 7	Default Update R	Rate:	milliseconds	Frequency: N	A cycles per second
Destination	on: <mark>Global</mark>	Query Support: Required	Command Sup	oport: Optional	ACK Rqmnts: N	one	
Field#	Field Nam	e					
1	Start ID		-	eld Size: 2 ield Size:		Request Parameter Command Parameter:	Required Optional
	DD007 G	eneric numeric ID, medium		Number of	route, waypoint, event,	mark, etc.	
	DF54	Integer, 16 bit unsigned u	int16 Range:	0 to 65,532	Resolution:	1 bit Unit-le	ess number
	If not specified	sent WPID in a WP-List or RPS# I in the request, the default is the d WPID/RPS# does not have a 0	lowest WPID/RPS			PS#.	
2	nItems			ield Size: 2		Request Parameter Command Parameter:	Required Optional
	DD007 G	eneric numeric ID, medium		Number of	route, waypoint, event,	mark, etc.	
	DF54	Integer, 16 bit unsigned u	int16 Range:	0 to 65,532	Resolution:	1 bit Unit-le	ess number
		equested/sent. I in the request, the default is the	all the Waypoints	with a Comment (or as many the transfe	r protocol	
3	Number of	WPs with Comments		eld Size: 2		Request Parameter Command Parameter:	Optional Optional
	DD007 G	eneric numeric ID, medium		Number of	route, waypoint, event,	mark, etc.	
	DF54	Integer, 16 bit unsigned u	int16 Range:	0 to 65,532	Resolution:	1 bit Unit-le	ess number
4	Database II)		eld Size: 2		Request Parameter Command Parameter:	Required Optional
	DD007 G	eneric numeric ID, medium		Number of	route, waypoint, event,	mark, etc.	
	DF54	Integer, 16 bit unsigned u	int16 Range:	0 to 65,532	Resolution:	1 bit Unit-le	ess number
5	Route ID			ield Size: 2		Request Parameter Command Parameter:	Required Optional
	DD007 G	eneric numeric ID, medium		Number of	route, waypoint, event,	mark, etc.	
		Integer, 16 bit unsigned uNA) to access the WP-List in the		0 to 65,532	Resolution:	1 bit Unit-le	ess number
6	WPID / RPS	#		ield Size: 2		Request Parameter Command Parameter:	Optional Optional
	DD007 G	eneric numeric ID, medium		Number of	route, waypoint, event,	mark, etc.	
	WPID shall be	Integer, 16 bit unsigned u used when addressing a WP-Lis used when addressing a Route.		0 to 65,532	Resolution:	1 bit Unit-le	ess number

Route and WP Service - WP Comment

PGN: 130070 hex: 1FC16

7 Comment Byte Field Size: 8 or 16 Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD198 Generic name string, Medium

Max 1782 ASCII or 891 Unicode characters

Medium size text strings.

String, variable, medium ch8or16(n) Range: DF51

0 to 1,782 ASCII or 0 to 891 Unicode Characters

1 Unicode

Resolution: 1 ASCII or Character

3 to 1,785 bytes. First and Second bytes in string (unit16) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Third byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 3 bytes, i.e. Count = 3) is a null string.

Fields 6 thru 7 repeat as needed 8

Byte Field Size: Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD000 Undefined

DF00 Undefined Undefined Range: undefined

Resolution: undefined

Application specific, defined at time of use.

Route and WP Service - Route Comment

PGN: 130071 hex: 1FC17

Complex request of this PGN should return supplementary Comments attached to Routes. The Database ID shall be specified in the request/reply. Routes without a comment shall not be included in this PGN. The reply should use the same transfer protocol as the request. ISO request for this PGN shall return 059392 with a positive ACK if the PGN is supported. For a complete description of the Route and WP PGNs, see the application note in Appendix D.

Single Fr	rame: No	Priority Default: 7	Default	Update Ra	ate:	milliseconds	Frequency:	N	Cycles per seco
Destinatio	on: <mark>Global</mark>	Query Support: Required	Co	mmand Supp	ort: Optional	ACK Rqmnts	None None		
ield#	Field Na	ame							
1	Start Rou	te ID		Byte Fie Bit Fie	eld Size: 2		Request Parai Command Pai		Required Optional
	DD007	Generic numeric ID, medium			Number of	route, waypoint, eve	ent, mark, etc.		
	If not specifi	Integer, 16 bit unsigned D requested/sent. ied in the request, the reply shall sted Route has no Comment, the		the lowest F		comment.	ion: <mark>1 bit</mark>	Unit-le	ss number
2	nltems			-	eld Size: 2		Request Parai Command Pai		Required Optional
	DD007	Generic numeric ID, medium			Number of	route, waypoint, eve	ent, mark, etc.		
	If not specif	Integer, 16 bit unsigned quested/sent. ied in the request, the reply shall t protocol space permits).	uint16 include al		0 to 65,532 h a Comment in		ion: 1 bit s many of them as	Unit-le	ss number
3	Number o	of Routes with Comments		•	eld Size: 2		Request Parai Command Pai		Optional Optional
	DD007	Generic numeric ID, medium			Number of	route, waypoint, eve	rent, mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resoluti	ion: 1 bit	Unit-le	ss number
4	Database	ID		Byte Fie Bit Fie	eld Size: 2		Request Parai Command Pai		Required Optional
	DD007	Generic numeric ID, medium			Number of	route, waypoint, eve	ent, mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resoluti	ion: 1 bit	Unit-le	ss number
5	Route ID			-	eld Size: 2		Request Parai Command Pai		Optional Optional
	DD007 Generic numeric ID, medium				Number of route, waypoint, event, mark, etc.				
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resoluti	ion: 1 bit	Unit-le	ss number

Route and WP Service - Route Comment

PGN: 130071 hex: 1FC17

6 Comment Byte Field Size: 8 or 16 Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD198 Generic name string, Medium

Medium size text strings.

DF51 String, variable, medium ch8or16(n) Range:

0 to 1,782 ASCII or

0 to 891 Unicode Characters

Resolution: 1 ASCII or

1 Unicode Character

3 to 1,785 bytes. First and Second bytes in string (unit16) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Third byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 3 bytes, i.e. Count = 3) is a null string.

Fields 5 thru 6 repeat as needed 7

Byte Field Size:

Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD000 Undefined

DF00 Undefined Undefined Range: undefined

Resolution: undefined

Application specific, defined at time of use.

Route and WP Service - Database Comment

PGN: 130072 hex: 1FC18

Complex request of this PGN should return supplementary Comments attached to Databases in the navigation Device. Databases without a Comment shall not be included in this PGN. The reply should use the same transfer protocol as the request. ISO request for this PGN shall return 059392 with a positive ACK if PGN is supported. For a complete description of the Route and WP PGNs, see the application note in Appendix D.

Single Fr	rame: No	Priority Default: 7	Default	Update Ra	ate:	milliseconds	Frequency:	NA	cycles per second
Destinatio	n: Global	Query Support: Required	Cor	mmand Supp	oort: Optional	ACK Rqmnts: N	one		
ield#	Field Na	ame							
1	Start Dat	abase ID		-	eld Size: 2		Request Paran Command Para		Required Optional
	DD007	Generic numeric ID, medium			Number of r	oute, waypoint, event,	mark, etc.		
	If not speci	Integer, 16 bit unsigned se ID requested/sent. fied in the request, the reply shall disted Database has no Comment, the second of the second o		the lowest [1 bit	Unit-les	s number
2	nltems			-	eld Size: 2		Request Paran Command Para		Required Optional
	DD007	Generic numeric ID, medium			Number of r	oute, waypoint, event,	mark, etc.		
	If not speci-	Integer, 16 bit unsigned as requested/sent. fied in the request, the reply shall in ace permits).	uint16 nclude all		0 to 65,532 with a Comment	Resolution:		Unit-les	s number
3	Number	of Databases with comments		•	eld Size: 2		Request Parameter Command Parameter:		
	DD007	Generic numeric ID, medium			Number of r	oute, waypoint, event,	mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resolution	1 bit	Unit-les	s number
4	Database ID			•	eld Size: 2		Request Paran Command Para		Optional Optional
	DD007	Generic numeric ID, medium			Number of r	oute, waypoint, event,	mark, etc.		
	DF54 Integer, 16 bit unsigned uint16				0 to 65,532	Resolution	1 bit	Unit-les	s number

Licensee: Maretron| Document ID: C0EE241|Purchased: February 21, 2023 4:00 GMT|

Route and WP Service - Database Comment

PGN: 130072 hex: 1FC18

5 Comment text Byte Field Size: 8 or 16 Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD198 Generic name string, Medium

Max. 1782 ASCII or 891 Unicode characters

Medium size text strings.

DF51 String, variable, medium ch8or16(n) Range:

0 to 1,782 ASCII or 0 to 891 Unicode Characters

Resolution: 1 ASCII or

1 Unicode Character

3 to 1,785 bytes. First and Second bytes in string (unit16) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Third byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 3 bytes, i.e. Count = 3) is a null string.

Fields 4 thru 5 repeat as needed 6

Byte Field Size:

Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD000 Undefined

DF00 Undefined

Undefined Range: undefined

Resolution: undefined

Application specific, defined

at time of use.

Route and WP Service - Radius of Turn

PGN: 130073 hex: 1FC19

Complex request of this PGN should return the Radius of Turn at specific Waypoints of a Route. For a complete description of the Route and WP PGNs, see the application note in Appendix D. The Radius of Turn is described in Appendix D.5.15.6. The Database ID and Route ID shall be specified in the request/reply. The Radius overrides any Route default Radius of Turn. Only those Waypoints with an individually specified Radius of Turn shall be included in this PGN. The Waypoints are identified with RPS#. The reply should use the same transfer protocol as the request. ISO request for this PGN shall return 059392 with a positive ACK if the PGN is supported.

Single F	rame: No	Priority Default: 7	Default	Update Rat	e:	milliseconds	Frequency:	NA cycles per second
Destination	on: Global	Query Support: Required	Co	mmand Suppo	ort: Optional	ACK Rqmnts: N	one	
ield#	Field Na	ame						
1	Start RP	S#		Byte Field Bit Fiel			Request Paramete Command Parame	•
	DD007	Generic numeric ID, medium			Number of r	oute, waypoint, event,	mark, etc.	
		Integer, 16 bit unsigned equested/sent fied in the request, the default is the	uint16		to 65,532	Resolution:	1 bit Ur	nit-less number
		ested RPS# has no valid data, the o				PS#.		
2	nltems			Byte Field Bit Fiel	d Size: 2		Request Paramete	
	DD007	Generic numeric ID, medium			Number of r	oute, waypoint, event,	mark, etc.	
	DF54	Integer, 16 bit unsigned	uint16	Range: (to 65,532	Resolution:	1 bit Ur	nit-less number
		quested/sent fied in the request, the reply shall in	nclude al	I RPS# with v	valid data (or as	many the transfer prot	ocol space	
3	Number of Turn	of Waypoints with a specific F	Radius	Byte Field	d Size: 2		Request Paramete	er Optional
				Bit Fiel			Command Parame	eter: Optional
	DD007	Generic numeric ID, medium			Number of r	oute, waypoint, event,	mark, etc.	
	DF54	0 ,	uint16) to 65,532	Resolution:	1 bit Ur	nit-less number
	Note: This	may be less than the number of W	aypoints	in the Route				
4	Database	e ID		Byte Field Bit Fiel	d Size: 2 ld Size:		Request Paramete Command Parame	· · · · · · · · · · · · · · · · · · ·
	DD007	Generic numeric ID, medium			Number of r	oute, waypoint, event,	mark, etc.	
	DF54	Integer, 16 bit unsigned	uint16	Range: () to 65,532	Resolution:	1 bit Ur	nit-less number
5	Route ID			Byte Field Bit Fiel	d Size: 2 ld Size:		Request Paramete	•
	DD007	Generic numeric ID, medium			Number of r	oute, waypoint, event,	mark, etc.	
	DF54	Integer, 16 bit unsigned	uint16	Range: () to 65,532	Resolution:	1 bit Ur	nit-less number
6	RPS#			Byte Field Bit Fiel	d Size: 2		Request Paramete	- p
	DD007	Generic numeric ID, medium			Number of r	oute, waypoint, event,	mark, etc.	
	DF54	Integer, 16 bit unsigned	uint16	Range: (to 65,532	Resolution:	1 bit Ur	nit-less number
	Waypoints	using the Route-default Radius or	no Radiu	s shall not be	e included.		_	

Route and WP Service - Radius of Turn PGN: 130073 hex: 1FC19

7	Radius of Turn	Byte Field Size: Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD149 Distance ordered	A commanded dist	tance like radius order, off-track limit, etc.
	DF74 Distance, rough No negative values.	int16 Range: +/-32,764 m	Resolution: 1 m
8	Fields 6 and 7 repeated as needed	Byte Field Size: ? Bit Field Size: n	Request Parameter Command Parameter: Optional Optional
8	Fields 6 and 7 repeated as needed DD000 Undefined	•	,

Route and WP Service - WP List - WP Name & Position

PGN: 130074 hex: 1FC1A

Complex request of this PGN should return the Waypoints of a WP-List. WARNING: The Route Track may not be defined by the Waypoint positions only: The Navigation Method (GC/RL) and Radius of Turn at each Waypoint are optional additional parameters defining the Track. PGN 130066 field #8 "Critical supplementary parameters" shall be used to determine if there are additional parameters to the Waypoint positions. For a complete description of the Route and WP PGNs, see the application note in Appendix D. The WP-List has Waypoints identified by WPID in the range 0-65532. Each of these may be single or belong to one or multiple Routes in the Database. There may be empty gaps anywhere in the range of WPIDs. These (non-valid WPs) shall not be included in this PGN. A Waypoint is valid when its Position is valid. A Database may contain one WP-List and multiple Routes. The Database ID shall be specified in the request/reply. The Database ID will typically be selected from the information received in the ""Route and WP Service - Database List"" PGN previously requested from the same Device. The reply should use the same transfer protocol as the request. ISO request for this PGN shall return 059392 with a positive ACK if the PGN is supported.

Single Fi	rame: No	Priority Default: 7	Default	t Update R	ate:	milliseconds	Frequency:	NA cycles per second
Destinatio	on: <mark>Global</mark>	Query Support: Require	d Co	ommand Sup	pport: Optional	ACK Rqmnts: No	one	
ield#	Field N	ame						
1	Start WP	סוי			eld Size: 2 ield Size:		Request Param Command Para	neter Required ameter: Optional
	DD007	Generic numeric ID, mediun	1		Number of r	oute, waypoint, event,	mark, etc.	
	If not speci	Integer, 16 bit unsigned ted/sent WPID. ified in the request, the default is ested Waypoint is not valid, the d		WPID with		Resolution:	1 bit	Unit-less number
2	nltems			-	eld Size: 2		Request Param Command Para	neter Required Optional
	DD007	Generic numeric ID, mediun	1		Number of r	oute, waypoint, event,	mark, etc.	
	Non-valid \	Integer, 16 bit unsigned ts requested/sent. Naypoints shall be skipped and in the request, the reply shall bace permits).		ded in this o		Resolution:		Unit-less number
3	Number	of valid WPs in the WP-List		•	eld Size: 2 ield Size:		Request Param Command Para	neter Optional ameter: Optional
	DD007	Generic numeric ID, mediun	ı		Number of r	oute, waypoint, event,	mark, etc.	
	DF54	17.1.					,	
	DIST	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resolution:		Unit-less number
4	Database		uint16	Byte Fi	0 to 65,532 eld Size: 2		1 bit Request Param	
4	Database			Byte Fi	eld Size: 2		1 bit Request Param Command Para	neter Required
4	Database	e ID		Byte Fi	eld Size: 2		1 bit Request Param Command Para mark, etc.	neter Required
5	DD0007 DF54 NMEA R	e ID Generic numeric ID, medium Integer, 16 bit unsigned eserved	n	Byte Fid Bit Fid Range:	eld Size: Number of r 0 to 65,532 eld Size: ield Size: resv	oute, waypoint, event, Resolution:	1 bit Request Param Command Para mark, etc. 1 bit Request Param Command Para	Protect Required Optional Unit-less number Protect Pr
	Database DD007 DF54	Generic numeric ID, medium	n	Byte Fit Bit Fit Range: Byte Fit Bit Fit	eld Size: Number of r 0 to 65,532 eld Size: ield Size: resv	oute, waypoint, event, Resolution:	1 bit Request Param Command Para mark, etc. 1 bit Request Param Command Para all set to logic "1"	Protect Required Optional Unit-less number Protect Pr

Route and WP Service - WP List - WP Name & Position

PGN: 130074 hex: 1FC1A

6	WPID				eld Size: 2		Request Param Command Para		Optional Optional
	DD007	Generic numeric ID, mediu	ım		Number of route, way	point, event,	mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16 Rar	nge:	0 to 65,532	Resolution:	1 bit	Unit-le	ss number
		pints shall be included in the ord WPs shall not be included.	der of increasing V	VPIDs.					
7	WP Nam	е	•		eld Size: 8 or 16 n]	Request Param Command Para		Optional Optional
	DD004	Generic name string, short			Name of place, route,	waypoint, de	stination, vessel,	vehicle,	etc.
	DF50	String, variable, short	ch8or16(n) <i>Ran</i>		0 to 250 ASCII or 0 to 125 Unicode Characters	Resolution:	1 ASCII or 1 Unicode Character	string (byte in	2 bytes. First byte in uint8) is the Count dicating the number in the string,
								Control in strin The Co the strin charact Unicod Control charact Control charact A strin (total le	byte = 1 => ASCII
8	WP Latit	ude	-		eld Size: 4		Request Param		Optional Optional
	DD022	Latitude, WGS-84			Latitude referenced to	WGS-84.			
	DF23	Latitude	int32 Rai	nge:	+/- 90 deg	Resolution:	1x10E-7 deg	"-" = Se	outh, resolution ~1.1
9	WP Long	gitude	•		eld Size: 4		Request Param Command Para		Optional Optional
	DD023	Longitude, WGS-84			Longitude referenced	to WGS-84.			
	DF25	Longitude	int32 Ran	nge:	+/- 180 deg	Resolution:	1x10E-7 deg	"-" = W	Vest, resolution ∼1.1
10	Fields 6	thru 9 repeat as needed			eld Size: ?		Request Param Command Para		Optional Optional
	DD000	Undefined							
	DF00	Undefined	Undefined Rai	nge:	undefined	Resolution:	undefined	Applica at time	ation specific, defined of use.

Wind Data PGN: 130306 hex: 1FD02

Direction and speed of Wind. True wind can be referenced to the vessel or to the ground. The Apparent Wind is what is felt standing on the (moving) ship, I.e., the wind measured by the typical mast head instruments. The boat referenced true wind is given by the vector sum of Apparent wind and vessel's heading and speed though the water. The ground referenced true wind is given by the vector sum of Apparent wind and vessel's heading and speed over ground.

Single Fr	ame: Yes	Priority Default: 2	Default	Update R	<i>tate:</i> 100 m	nilliseconds	Frequency:	10.	cycles per second
Destination	n: Global	Query Support: Optiona	l Co	mmand Sup	oport: Optional	ACK Rqmnts: N	one		
Field #	Field Na	ame							
1	Sequenc	e ID			eld Size: 1		Request Paran Command Para		Optional Optional
	DD056	Sequence ID			PGNs from a si different PGN related data set		. Identical SID va fies those PGN tr tical SID values I	dues with ansmission oind the O	nin two or more
					0 - 252 = bindi data set)	ng available (when	SID value reache	s 252, res	sume with 0 on next
					253 - 254 = res	served for future use			
					255 = No bind whenever pract	ing provided. NME tical.	A recommends u	sing bind	ing SID values
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit	Unit-les	s number
2	Wind Sp	eed			eld Size: 2 ield Size:		Request Paran Command Para		Optional Optional
	DD044	Generic Speed							
	DF35	Speed	uint16	Range:	0 to 655.32 m/s	Resolution:	1x10E-2 m/s	1 Knot =	= 0.5144 m/s
3	Wind Dir	ection			eld Size: 2		Request Paran Command Para		Optional Optional
	DD045	Wind Direction							
	DF02	Angle	uint16	Range:	0 to 2Pi rad	Resolution:	1x10E-4 rad		ion ~0.0057deg, 1 11745 rad
4	Wind Re	ference		•	eld Size: ield Size: 3		Request Paran Command Para		Optional Optional
	DD205 Wind Reference				using COG/SO 0x01 = Theore calculated usin 0x02 = Appare 0x03 = Theore calculated usin 0x04 = Theore	orginial of the second of the	referenced, refere the vessel center Centerline of the	nced to M line) vessel, re	ferenced to ground;
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields

Wind Data PGN: 130306

hex: 1FD02

5 NMEA Reserved

Byte Field Size:

Bit Field Size: resv 21

Request Parameter
Command Parameter:

DD001 Reserved field

Variable number of reserved bits, all set to logic "1"

DF52 Bit field

Range: Variable

bit(n)

Resolution: 1

Used to construct bit fields

Used to align subsequent data on a byte boundary.

Environmental Parameters - DEPRECATED

PGN: 130310 hex: 1FD06

This PGN has been deprecated (as of version 1.200, PGN 130311 replaced PGN 130310) and is not recommended for new designs. However, support of PGN 130310 may be necessary to ensure compatibility with legacy equipment. PGN 130311 has also been deprecated as of version 1.210. The following PGNs are recommended to be used for new designs: 130314-Actual Pressure, 130315-Set Pressure, 130316-Temperature-Extended Range. The latest definition of PGN 130310 before deprecation was as follows: Local atmospheric environmental conditions.

Single Fr	ame: Yes	Priority Default: 5	Default	Update Rate	500 n	nilliseconds	Frequency:	2.	cycles per s	econd
Destinatio	n: <mark>Global</mark>	Query Support: Optional	Co	mmand Support	t: Optional	ACK Rqmnts: N	one			
ield#	Field Na	ame								
1	Sequenc	e ID		Byte Field	Size: 1		Request Param	neter	Optional	
				Bit Field	Size:		Command Para	ameter:	Optional	
	DD056	Sequence ID			PGNs from a s different PGN related data set in PGN 12902 data set.	unting number that beingle source address transmissions idention. For example, ider to the Latitude and	s. Identical SID va fies those PGN tra tical SID values b I Longitude value	llues with ansmissi- oind the O s in PGN	nin two or more ons as a single COG and SOG 1 129029 as a si	values
					0 - 252 = bindi data set)	ing available (when	SID value reaches	s 252, res	sume with 0 on	next
					253 - 254 = res	served for future use				
					255 = No bind whenever prac	ing provided. NME	A recommends us	sing bind	ling SID values	
	DF53	Integer, 8 bit unsigned	uint8	Range: 01	to 252	Resolution.	1 bit	Unit-les	ss number	
2	Water Te	emp		Byte Field Bit Field			Request Param Command Para		Optional Optional	
	DD043	Generic Temperature								
	DF39	Temperature, low	uint16	Range: 01	to 655.32 deg k	Resolution.	1x10E-2 deg K			
3	Outside /	Ambient Air Temp.		Byte Field Bit Field			Request Param Command Para		Optional Optional	
	DD043	Generic Temperature								
	DF39	Temperature, low	uint16	Range: 0 1	to 655.32 deg k	Resolution.	1x10E-2 deg K			
4	Atmosph	eric Pressure		Byte Field Bit Field			Request Param Command Para		Optional Optional	
	DD049	Generic Pressure								
	DF47	Pressure, medium	uint16	Range: 0 1	to 6,553,200 Pa	Resolution.	1x10E+2 Pa			
5	NMEA R	eserved		Byte Field Bit Field		3	Request Param Command Para			
	DD001	Reserved field			Variable numb	er of reserved bits, a	all set to logic "1"			
	DF52	Bit field	bit(n)	Range: Va	ariable	Resolution.	1	Used to	construct bit fi	elds
	Used to alig	gn subsequent data on a byte bour	ndary.							

Environmental Parameters- DEPRECATED

PGN: 130311 hex: 1FD07

This PGN has been deprecated (as of version 1.210) and is not recommended for new designs. However, support of PGN 130311 may be necessary to ensure compatibility with legacy equipment. This PGN 130311 was originally created as a replacement to PGN 130310 in version 1.200. This PGN 130311 has since been deprecated (as of version 1.210, PGN's 130312, 130313, 130314, and 130315 replaced PGN 130311) and is not recommended for new designs. However, support of PGN 130311 may be necessary to ensure compatibility with legacy equipment. PGN 130312 has also been deprecated and replaced by PGN 130316 as of version 1.310. The following PGNs are recommended to be used for new designs: 130314-Actual Pressure, 130315-Set Pressure, 130316-Temperature-Extended Range. The latest definition of PGN 130311 before deprecation was as follows: Environmental Conditions contains Temperature, Humidity, and Atmospheric Pressure. This PGN is a rework of PGN 130310.

Single Fra	ame: Yes	Priority Default: 5	Default	Update R	ate: 500 r	milliseconds	Frequency:	2.	cycles per second
Destinatio	n: Global	Query Support: Optiona	al Co	ommand Sup	port: Optional	ACK Rqmnts:	None		
Field #	Field Na	ame							
1	Sequenc	e ID		-	eld Size: 1		Request Paran Command Para		Optional Optional
	DD056	Sequence ID			PGNs from a s different PGN related data se	single source addr transmissions ide t. For example, ic	at binds information ess. Identical SID va entifies those PGN tr dentical SID values band Longitude value	alues withi cansmission bind the C	n two or more ns as a single OG and SOG values
					0 - 252 = bind data set)	ing available (who	en SID value reache	s 252, resu	ime with 0 on next
					253 - 254 = re	served for future	ise		
					255 = No bind whenever prac		MEA recommends u	sing bindi	ng SID values
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	on: 1 bit	Unit-less	number
2	Tempera	ture Instance		-	eld Size: ield Size: <mark>6</mark>		Request Paran Command Par		Optional Optional
2	DD229 Temperature Instance				0x02 = Inside 0x03 = Engine	e Temperature, Temperature, e Room Temperatur Cabin Temperatur ed,			
	DF52 Used to qua	Bit field alify contents of field 4	bit(n)	Range:	Variable	Resolutio	on: <mark>1</mark>	Used to o	construct bit fields
3	Humidity	Instance		Byte Field Size: Bit Field Size: 2			Request Parameter Optional Command Parameter: Optional		
	DD230 Humidity Instance				0x00 = Inside $0x01 = Outsid$ $0x02 = reserve$ $0x03 = Data N$	e Humidity, ed,			
	DF52 Used to qua	Bit field alify contents of field 5	bit(n)	Range:	Variable	Resolutio	on: 1	Used to o	construct bit fields

Environmental Parameters- DEPRECATED

PGN: 130311 hex: 1FD07

4	Temperature		Byte Field Size: 2 Bit Field Size:			Request Parameter Command Paramete	Optional Optional
	DD043 Generic Temperature	DD043 Generic Temperature					
	DF39 Temperature, low	uint16	Range:	0 to 655.32 deg K	Resolution	1x10E-2 deg K	
5	Humidity		Byte Field Size: 2 Bit Field Size:			Request Parameter Command Paramete	Optional Optional
	DD231 Humidity			Relative Humidity			
	DF84 Percent, Relative Measur	int16	Range:	-131.072% to 131.056%	Resolution	4x10E-3 %	
6	Atmospheric Pressure		•	eld Size: 2		Request Parameter Command Paramete	Optional er: Optional
	DD049 Generic Pressure						
	DF47 Pressure, medium	uint16	Range:	0 to 6,553,200 Pa	Resolution:	1x10E+2 Pa	

Temperature - DEPRECATED

PGN: 130312 hex: 1FD08

This PGN 130312 was originally created as a replacement for Temperature provided by PGN 130311 in version 1.210. PGN 130312 has also been deprecated and replaced by PGN 130316 as of version 1.310. However, support of PGN 130312 may be necessary to ensure compatibility with legacy equipment. The following PGN is recommended to be used for new designs: 130316-Temperature-Extended Range. The latest definition of PGN 130312 before deprecation was as follows: This PGN contains the Sequence ID, a Temperature Instance, Temperature Source, Temperature Value, and Set Temperature. For example the Temperature might be the temperature of sea water or live well as defined by the Temperature Source (field 3), with a Temperature Instance (field 2) of 1. Using Set Temperature (field 5) this PGN can also be used to control temperature or to report a targeted temperature. This PGN is a rework of PGN 130311 and was introduced in version 1.210 of this standard.

Single Fra	ame: Yes	Priority Default: 5	Default U	Jpdate Ra	te: 200	<mark>0</mark> millisecor	nds /	Frequency:	.5	cycles per	second
Destinatio	n: Global	Query Support: Optional	Com	nmand Supp	ort: Optional	ACK	Rqmnts: No	one			
ield#	Field Na	ame									
1	Sequenc	e ID		Byte Fie Bit Fie	ld Size: 1			Request Par Command Pa		Optional Optional	
	DD056	Sequence ID			PGNs from different PC related data in PGN 129 data set. 0 - 252 = b data set) 253 - 254 =	a single sour GN transmiss set. For exa 2026 to the L inding availa	rce address. sions identifications, identifications and additional and additional and additional ad	inds informati- Identical SID fies those PGN tical SID value Longitude val SID value reac	values with transmissi es bind the G lues in PGN hes 252, res	nin two or more ons as a single COG and SOC I 129029 as a sume with 0 or	re e G values single n next
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	R	esolution:	1 bit	Unit-les	ss number	
2	Tempera	ture Instance		Byte Fie Bit Fie	ld Size: 1			Request Par Command Pa		Optional Optional	
	DD128	Generic instance			0 = Instanc 1 = Instanc 2 = Instanc n = Instanc 253 = Rese 254 = Error 255 = Not a	e 1 e 2 e n, where n	< 253				
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	R	esolution:	1 bit	Unit-les	ss number	
	•	st Parameter or Command Paramon this Data Field.	eter is supp	oorted on a	iny other Data F	ield, you mu	st also supp	oort the			

Temperature - DEPRECATED

PGN: 130312 hex: 1FD08

Temperature Source		Byte Field Size:	Request Paramet	er Optional
		Bit Field Size: 8	Command Param	-
DD291 Temperature Source		11 = Wind Chill T 12 = Heat Index T 13 = Freezer Tem 14 = Exhaust Gas 15 = Shaft Seal To 16 through 128 Ro 129 through 252 C 253 = Not Suppor 254 = Error	sture perature perature n Temperature Temperature mperature mperature n Temperature mperature em Temperature em Temperature femperature Temperature Temperature, Apparent Temperature perature Temperature	
DF52 Bit field	bit(n)	Range: Variable		sed to construct bit field
Actual Temperature		Byte Field Size: 2 Bit Field Size:	Request Paramet Command Param	-
DD043 Generic Temperature				
DF39 Temperature, low	uint16	Range: 0 to 655.32 deg K	Resolution: 1x10E-2 deg K	
Set Temperature		Byte Field Size: 2 Bit Field Size:	Request Paramet Command Param	- 1
DD043 Generic Temperature				
DF39 Temperature, low	uint16	Range: 0 to 655.32 deg K	Resolution: 1x10E-2 deg K	
NMEA Reserved		Byte Field Size: Bit Field Size: resv 8	Request Paramet Command Param	
DD001 Reserved field		Variable number of	of reserved bits, all set to logic "1"	
DF52 Bit field Used to align subsequent data on a l	bit(n) byte boundary.	Range: Variable	Resolution: 1	sed to construct bit field

Humidity PGN: 130313 hex: 1FD09

This PGN contains the Sequence ID, a Humidity Instance, Humidity Source, the Actual Humidity, and the Set Humidity Value. For example the Humidity might be Inside as defined by the Humidity Source (field 3) with a Humidity Instance (field 2) of 2. Using Set Humidity (field 5) this PGN can also be used to control humidity or to report a targeted humidity. This PGN is a rework of PGN 130311 and was introduced in version 1.210 of this standard, it is to be used for new designs.

Single Fr	ame: Yes	Priority Default: 5	Default U	Jpdate R	ate: 2000	milliseconds	Frequency:	.5 cycles per second	
Destination	n: Global	Query Support: Optional	Com	nmand Sup	port: Optional	ACK Rqmnts	None		
Field #	Field Nan	ne							
1	Sequence	ID		•	eld Size: 1		Request Paran Command Par	neter Optional ameter: Optional	
	DD056 S	equence ID			PGNs from a different PGl related data s	single source adda N transmissions ide set. For example, i	ress. Identical SID va entifies those PGN to dentical SID values	transmitted in two or more alues within two or more ransmissions as a single bind the COG and SOG values as in PGN 129029 as a single	
				0 - 252 = bin data set)) - 252 = binding available (when SID value reaches 252, resume with 0 on next data set)				
					253 - 254 = 1	reserved for future	use		
					255 = No bir whenever pra		MEA recommends u	sing binding SID values	
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resoluti	on: 1 bit	Unit-less number	
2	Humidity Ir	nstance		•	eld Size: 1		Request Paran Command Par	neter Optional ameter: Optional	
	DD128 G	eneric instance			0 = Instance 1 = Instance 2 = Instance n = Instance 253 = Reserv 254 = Error 255 = Not av	1 2 n, where n < 253 ved			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resoluti	on: 1 bit	Unit-less number	
	If a Request	Parameter or Command Paramethis Data Field.	eter is supp	ported on	any other Data Fie	eld, you must also s	support the		
3	Humidity S	ource		•	eld Size: eld Size: <mark>8</mark>		Request Paran Command Par	neter Optional ameter: Optional	
	DD292 H	fumidity Source			00 = Inside I 01 = Outside 02 through 1	Humidity			
					253 = Not St 254 = Error		dity Sources other th	nan those defined	
	DF52	Bit field	bit(n)	Range:	Variable	Resoluti	on: 1	Used to construct bit fields	

Humidity	PGN: 130313
	hex: 1FD09

4	Actual Humidity		Byte Field Size: 2 Bit Field Size:			Request Param Command Para	Optional Optional		
	DD231 Humidity		Relative Humidity						
	DF84 Percent,	Relative Measur int16	Range:	-131.072% to 131.056%	Resolution	4x10E-3 %			
5	Set Humidity		•	Byte Field Size: 2 Bit Field Size:			Request Parameter Option Command Parameter: Option		
	DD231 Humidity			Relative Humidity					
	DF84 Percent,	Relative Measur int16	Range:	-131.072% to 131.056%	Resolution	4x10E-3 %			
6	NMEA Reserved		•	eld Size: ield Size: resv 8		Request Param Command Para			
	DD001 Reserved	field		eserved bits, a	all set to logic "1"				
	DF52 Bit field	bit(n)	(n) Range: Variable		Resolution	1	Used to	construct bit field	ls
	Used to align subseque	ent data on a byte boundary.	poundary.						

Actual Pressure PGN: 130314 hex: 1FD0A

This PGN contains a Sequence ID, Pressure Instance, Pressure Source, and the Pressure Value. For example Pressure might be Atmospheric Pressure as defined by the Pressure Source (Field 3) with a Pressure Instance (Field 2) of 1. Some devices may provide the capability to measure multiple instances of the same measurement type. An example of this might be a device that measures three filter pressures. For such a device, this PGN would be sent three times, once for each filter pressure measurement (Field 4) of a specific pressure source (Field 3) with a unique pressure instance value in Field 2. PGN 130314 replaces PGN 130311 as of version 1.310 of this standard, and is to be used for new designs. The deprecated PGN 130311 provides compatibility with legacy equipment.

Single Fr	rame: Yes	Priority Default: 5	Default U	pdate Ra	te: 2000	milliseconds	Frequency:	.5 cycles per second	
Destinatio	n: Global	Query Support: Optiona	Com	mand Supp	ort: Optional	ACK Rqmnt	s: None		
ield#	Field N	ame							
1	Sequence ID			Byte Fiel Bit Fie	d Size: 1		Request Para Command Pa	meter Optional rameter: Optional	
DD056 Sec		Sequence ID	40	Pange: 1	PGNs from a different PGN related data s in PGN 1290 data set. 0 - 252 = bind data set) 253 - 254 = r. 255 = No bin whenever pra	cunting number that binds information transmitted in two or single source address. Identical SID values within two or mo transmissions identifies those PGN transmissions as a singlet. For example, identical SID values bind the COG and SOC to the Latitude and Longitude values in PGN 129029 as a ling available (when SID value reaches 252, resume with 0 of esserved for future use			
		Integer, 8 bit unsigned nce ID field (SID) is used to link sts, the value of the SID shall be	this PGN to o	Range: (ther relate			tion: 1 bit dress. When no	Unit-less number	
2	Pressure	Instance		Byte Fiel Bit Fie	d Size: 1		Request Para Command Pa	meter Optional rameter: Optional	
	DD128	Generic instance			0 = Instance (1 = Instance (2	1 2 1, where n < 253 ed			
	DF53	Integer, 8 bit unsigned	uint8	Range: () to 252	Resolut	ion: <mark>1 bit</mark>	Unit-less number	
		st Parameter or Command Parai on this Data Field.	meter is supp	orted on a	ny other Data Fiel	ld, you must also	support the		

Actual Pressure PGN: 130314 hex: 1FD0A

3	Pressure Source		Byte Field Size:	Request Parameter Optional		
			Bit Field Size: 8	Command Parameter: Optional		
	DD289 Pressure Source		00 = Atmospheric Pr 01 = Water Pressure 02 = Steam Pressure 03 = Compressed Ai 04 = Hydraulic Press 05 = Filter Pressure 06 = Altimiter Settin 07 = Oil Pressure 08 = Fuel Pressure 09 thru 128 Reserved 129 thru 252 Generic 253 = Reserved 254 = Error 255 = No Change / Do	r Pressure sure g d e pressure sources other than those defined		
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1 Used to construct bit fields		
4	Pressure		Byte Field Size: 4 Bit Field Size:	Request Parameter Optional Command Parameter: Optional		
	DD290 Pressure					
	DF103 Pressure	int32	Range: +/- 2.1E8	Resolution: 1x10E-1 Pa		
5	NMEA Reserved		Byte Field Size: Bit Field Size: resv 8	Request Parameter Command Parameter:		
	DD001 Reserved field		Variable number of	reserved bits, all set to logic "1"		
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1 Used to construct bit fields		
	Used to align subsequent data on a byte bo	undary.				

Set Pressure PGN: 130315

hex: 1FD0B

This PGN contains the Sequence ID, a Pressure Instance, Pressure Source, and the Set Pressure Value. This PGN can be sent to a device that controls pressure to change its targeted pressure, or it can be sent out by the control device to indicate its current targeted pressure. This PGN is a rework of PGN 130311 and was introduced in version 1.210 of this standard, it is to be used for new designs.

Single Fr	ame: Yes	Priority Default: 5	Default	Update R	ate:	milliseconds	Frequency:	NA cycles per se	econd
Destinatio	n: <mark>Global</mark>	Query Support: Optional	Co	mmand Sup	port: Optiona	ACK Rqmnts:	None		
ield#	Field N	ame							
1	Sequenc	ce ID		•	eld Size: 1 ield Size:		Request Para Command Pa	meter Optional optional	
	DD056	Sequence ID			PGNs fro different related da	m a single source addre PGN transmissions ide ata set. For example, id	ess. Identical SID v ntifies those PGN entical SID values	n transmitted in two or mo values within two or more transmissions as a single bind the COG and SOG v. es in PGN 129029 as a sin	alues
					0 - 252 = data set)	binding available (who	n SID value reach	es 252, resume with 0 on n	ıext
					253 - 254	= reserved for future u	se		
						binding provided. NA	IEA recommends	using binding SID values	
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolutio	n: 1 bit	Unit-less number	
2	Pressue	Instance			eld Size: 1		Request Para Command Pa	meter Optional rameter: Optional	
	DD128	Generic instance			253 = Re $254 = Er$	nce 1 nce 2 nce n, where n < 253 served			
	DF53	Integer, 8 bit unsigned	uint8	-	0 to 252	Resolutio		Unit-less number	
		est Parameter or Command Paramon this Data Field.	eter is su	pported on	any other Data	Field, you must also s	upport the		
3	Pressure			•	eld Size: ield Size: 8		Request Para Command Pa	meter <mark>Optional</mark> rameter: Optional	
	DD289	Pressure Source			01 = Wai 02 = Stea 03 = Cor 04 = Hyc 05 = Filt 06 = Alti 07 = Oil 08 = Fue 09 thru 1 129 thru 253=Res 254=Erro	l Pressure 28 Reserved 252 Generic pressure se erved		nose defined	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	n: <mark>1</mark>	Used to construct bit fie	lds

PGN: 130315

						hex: 1FD0B
4	Pressure		•	eld Size: 4	Request Parar Command Par	O P 1.0.1.5
	DD290 Pressure					
	DF103 Pressure	int32	Range:	+/- 2.1E8	Resolution: 1x10E-1 Pa	
5	NMEA Reserved			eld Size: resv 8	Request Paran Command Par	
	DD001 Reserved field			Variable number of	reserved bits, all set to logic "1"	•
	DF52 Bit field Used to align subsequent data on a byte bou	bit(n) ndary.	Range:	Variable	Resolution: 1	Used to construct bit fields

Set Pressure

Temperature, Extended Range

PGN: 130316 hex: 1FD0C

This parameter group is used to report Temperature measurements that are not included in parameter groups for a specific equipment type.

For example, this parameter group would not be used to report Engine Temperature, which is already included in Engine Parameters, Dynamic (PGN 127489).

The Sequence ID field may be used to synchronize the measurement reported by this parameter group within a related group of measurements.

The Set Temperature field may be used to report a target temperature, or using the Command Group Function (PGN 126208) to set a target or control temperature.

This PGN performs the same function and replaces the Temperature parameter group Temperature (PGN 130312) for all new designs subsequent to version 1.301, and provides a wider temperature range data type for Actual Temperature to accommodate high temperature applications such as Exhaust Gas Temperature.

Note1: Values for field 2, Temperature Instance, shall be included when the Command Group Function 126208 is used with this PGN.

This value shall be interpreted as the temperature measurement or channel input for any commanded fields, such as Field 5.

n: Global	Query Support: Optiona	l Co	ommand Supp	ont. Ontiona) AC	CK Ramnts: N				
				optione	al AC	on ryiiiils. IN	one			
Field Na	ame									
Sequenc	e ID		Byte Fie Bit Fi				Request Para Command Pa		Optional Optional	
DD056	Sequence ID			PGNs frod different related din PGN 1 data set. 0 - 252 = data set) 253 - 254	m a single sc PGN transm ata set. For e 29026 to the binding ava 4 = reserved to binding pro	ource address issions identi example, iden Latitude and ilable (when for future use	i. Identical SID v fies those PGN tical SID values I Longitude valu SID value reach	values with transmissi bind the G nes in PGN es 252, res	hin two or more ons as a single COG and SOG I 129029 as a s	value single
DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution	1 bit	Unit-les	ss number	
2 Temperature Instance			•				•		Optional Note 1	
DD128	Generic instance			1 = Insta 2 = Insta n = Insta 253 = Re 254 = Er	nce 1 nce 2 nce n, where served ror	e n < 253				
DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution	1 bit	Unit-les	ss number	
	DF53 Temperat DD128	DD056 Sequence ID DF53 Integer, 8 bit unsigned Temperature Instance DD128 Generic instance DF53 Integer, 8 bit unsigned	DD056 Sequence ID DF53 Integer, 8 bit unsigned uint8 Temperature Instance DD128 Generic instance DF53 Integer, 8 bit unsigned uint8	DD056 Sequence ID DF53 Integer, 8 bit unsigned uint8 Range: Temperature Instance Byte Fie Bit Fie DD128 Generic instance DF53 Integer, 8 bit unsigned uint8 Range:	DD056 Sequence ID An upwa PGNs fro different related da in PGN 1 data set. 0 - 252 = data set) 253 - 254 255 = No whenever DF53 Integer, 8 bit unsigned uint8 Range: 0 to 252 Temperature Instance Byte Field Size: 1 Bit Field Size: 1 Bit Field Size: 1 Bit Field Size: 2 lanstance 1 lanstance 2 lan	Bit Field Size: An upward counting reference ID An upward counting reference PGNs from a single so different PGN transmerelated data set. For ein PGN 129026 to the data set. 0 - 252 = binding avaidata set) 253 - 254 = reserved: 255 = No binding prowhenever practical. DF53 Integer, 8 bit unsigned uint8 Range: 0 to 252 Temperature Instance Byte Field Size: Bit Field Size: 0 = Instance 0 1 = Instance 1 2 = Instance 1 2 = Instance 2 n = Instance 3 1 = Instance 2 n = Instance 3 1 = Instance 3 2 = Instance 3 2 = Instance 3 3 = Instance	DD056 Sequence ID An upward counting number that be PGNs from a single source address different PGN transmissions identified data set. For example, identified data set. For example, identified data set. 0 - 252 = binding available (when data set) 253 - 254 = reserved for future use 255 = No binding provided. NME whenever practical. DF53 Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: Byte Field Size: 1 Bit Field	DD056 Sequence ID An upward counting number that binds information PGNs from a single source address. Identical SID validifferent PGN transmissions identifies those PGN related data set. For example, identical SID values in PGN 129026 to the Latitude and Longitude valuedata set. 0 - 252 = binding available (when SID value reach data set) 253 - 254 = reserved for future use 255 = No binding provided. NMEA recommends whenever practical. DF53 Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: 1 bit Temperature Instance Byte Field Size: Request Para Command Pa DD128 Generic instance 0 = Instance 0 1 = Instance 0 1 = Instance 1 2 = Instance 2 n = Instance n, where n < 253 253 = Reserved 254 = Error 255 = Not available	DD056 Sequence ID An upward counting number that binds information transmit PGNs from a single source address. Identical SID values with different PGN transmissions identifies those PGN transmissions related data set. For example, identical SID values bind the in PGN 129026 to the Latitude and Longitude values in PGN data set. 0 - 252 = binding available (when SID value reaches 252, redata set) 253 - 254 = reserved for future use	DD056 Sequence ID An upward counting number that binds information transmitted in two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values within two or more different PGN transmissions identifies those PGN transmissions as a single related data set. For example, identical SID values bind the COG and SOG in PGN 129026 to the Latitude and Longitude values in PGN 129029 as a single related data set. 0 - 252 = binding available (when SID value reaches 252, resume with 0 on data set) 253 - 254 = reserved for future use 255 = No binding provided. NMEA recommends using binding SID values whenever practical. DF53 Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: 1 bit Unit-less number Temperature Instance Byte Field Size: Request Parameter Command Parameter: Note 1 0 = Instance 0 1 = Instance 0 1 = Instance 1 2 = Instance 1 2 = Instance 1 2 = Instance 2 n = Instance 1 2 = Instance 3 253 = Resolution: 1 bit Unit-less number DF53 Integer, 8 bit unsigned uint8 Range: 0 to 252 Resolution: 1 bit Unit-less number

Temperature, Extended Range

PGN: 130316 hex: 1FD0C

3	Temperature Source		Byte Field Size:	Request Parameter Optional
3	remperature deares		Bit Field Size: 8	Command Parameter: Optional
	DD291 Temperature Source		00 = Sea Temperat 01 = Outside Temp 02 = Inside Tempe 03 = Engine Room 04 = Main Cabin T 05 = Live Well Ter 06 = Bait Well Ter 07 = Refrigeration 08 = Heating Syste 09 = Dew Point Ter 10 = Wind Chill T 11 = Wind Chill T 12 = Heat Index Ter 13 = Freezer Temp 14 = Exhaust Gas 15 = Shaft Seal Ter 16 through 128 Rer 129 through 252 Cer 253 = Not Support	ature Imperature Imper
	DF52 Bit field	bit(n)	Range: Variable	Resolution: 1 Used to construct bit fields
4	Actual Temperature		Byte Field Size: 3 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD314 Temperature, extended rang	e and precis	sion	
	DF105 Temperature, extended ra	uint24	Range: 0 to 16,777.212 deg	g K Resolution: 0.001 deg K
5	Set Temperature		Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter: Optional
	DD130 Temperature, high			
	DF38 Temperature, high	uint16	Range: 0 to 6,553.2 deg K	Resolution: 1x10E-1 deg 0.01° Kelvin K

Tide Station Data PGN: 130320 hex: 1FD10

Tide station measurement data including station location, numeric identifier, and name.

Single Fra	ame: No	Priority Default: 6	Defaul	t Update R	ate: 1000	milliseconds	Frequency:	1.	cycles per second
Destination	n: Global	Query Support: Optional	C	ommand Sup	port: Optional	ACK Rqmnts:	None		
Field #	Field Na	ame							
1	Mode			•	eld Size: ield Size: 4		Request Par Command P		Optional Optional
	DD025	Mode, Data			0x0 = Autono 0x1 = Differo 0x2 = Estima 0x3 = Simula 0x4 = Manua 0x5 to 0xD = 0xE = Error, 0xF = Data n	ential, enhanced mo ated mode, ator mode, al mode, Reserved	de,		
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: <mark>1</mark>	Used to	construct bit fields
2	Tide Ten	dency		Byte Fie Bit Fi	eld Size: ield Size: 2		Request Par Command P		Optional Optional
	DD038	Tide direction			msb/lsb: 00 = Falling, 01 = Rising, 10 = Error, 11 = Unavail	able, Unknown			
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: 1	Used to	construct bit fields
3	NMEA R	eserved		Byte Fie Bit Fi					
	DD001	Reserved field			Variable nun	ber of reserved bits	, all set to logic '	'1"	
	DF52 Used to alig	Bit field gn subsequent data on a byte bou	bit(n) ndary.	Range:	Variable	Resolutio	n: <mark>1</mark>	Used to	construct bit fields
4	Measure	ment date		•	eld Size: 2		Request Par Command P		Optional Optional
	DD039	Generic date			Days since Ja	anuary 1, 1970, Da	te is relative to U	JTC Time.	
	DF41	Date, day count	uint16	Range:	0 to 65,532 day	s Resolutio	n: <mark>1 day</mark>	0 = Janu ~179 ye	nary 1, 1970, max = ars
5	Measure	ment time		•	eld Size: 4		Request Par Command P		Optional Optional
	DD158	Generic time of day			24 hour clock	x, 0 = midnight, tir	ne is in UTC		
	DF06	Time of day	uint32	Range:	0 to 86,401 s	Resolutio	n: 1x10E-4 s	range al	urs, 0 = midnight, lows for up to two onds per day

Tide Station Data PGN: 130320 hex: 1FD10

6	Station I	ocation, latitude		•	eld Size: 4		Request Param Command Para		Optional Optional	
	DD022	Latitude, WGS-84			Latitude referenced to	o WGS-84.				
	DF23	Latitude	int32	Range:	+/- 90 deg	Resolution.	1x10E-7 deg	"-" = So cm	outh, resolution ~1	.1
7	Station lo	ocation, longitude		•	eld Size: 4		Request Param Command Para		Optional Optional	
	DD023	Longitude, WGS-84			Longitude referenced	to WGS-84.				
	DF25	Longitude	int32	Range:	+/- 180 deg	Resolution.	1x10E-7 deg	"-" = W cm	est, resolution ∼1.	1
8	Tide leve	ıl		•	eld Size: 2		Request Param Command Para		Optional Optional	
	DD041	Tide Level			This value is relative	to mean lowe	er low water (MLL	.W).		
	DF46	Distance, signed, medium	int16	Range:	+/- 32.764 m	Resolution.	1x10E-3 m			
9	Tide leve	el standard deviation		•	eld Size: 2		Request Param Command Para		Optional Optional	
	DD040 Standard Deviation for tide level data				·					the ter
	DF13	Distance, short	uint16	Range:	0 to 655.32 m	Resolution.	1x10E-2 m			

Tide Station Data PGN: 130320 hex: 1FD10

Station ID String 10

Byte Field Size: 8 or 16 n Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD004 Generic name string, short

Name of place, route, waypoint, destination, vessel, vehicle, etc.

String, variable, short DF50

ch8or16(n)Range: 0 to 250 ASCII or 0 to 125 Unicode Characters

Resolution: 1 ASCII or

1 Unicode Character

15 characters maximum.

If this field is not specified in the "Command Request" or an ISO Request is made of this PGN, the response will with the unit's Station ID. Otherwise if this field is specified only the units with a matching Station ID will respond with this PGN.

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

11 **Station Name String**

DF50

50 characters maximum.

Byte Field Size: 8 or 16 n Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD004 Generic name string, short

Name of place, route, waypoint, destination, vessel, vehicle, etc.

String, variable, short

ch8or16(n) Range: 0 to 250 ASCII or 0 to 125 Unicode

Characters

Resolution: 1 ASCII or 1 Unicode Character

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

Salinity Station Data

PGN: 130321 hex: 1FD11

Salinity station measurement data including station location, numeric identifier, and name.

Single Fr	ame: No	Priority Default: 6	Default	Update R	<i>ate:</i> 1000 r	milliseconds	Frequency:	1.	cycles per	second
Destination	n: Global	Query Support: Optional	Co	ommand Sup	port: Optional	ACK Rqmnts: N	lone			
ield#	Field N	ame								
1	Mode			•	eld Size: ield Size: 4		Request Parame Command Param		Optional Optional	
	DD025	Mode, Data			0x0 = Autonor 0x1 = Differer 0x2 = Estimat 0x3 = Simulat 0x4 = Manual 0x5 to 0xD = 1 0xE = Error, 0xF = Data no	ntial, enhanced mode ed mode, or mode, mode, Reserved	e,			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	: 1	Jsed to	construct bit f	ields
2	NMEA R	eserved		•	eld Size: ield Size: resv 4	4	Request Parame Command Param			
	DD001	Reserved field			Variable numb	per of reserved bits,	all set to logic "1"			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	: 1	Jsed to	construct bit f	ields
	Used to ali	gn subsequent data on a byte bou	ndary.							
3	Measure	ment Date			eld Size: 2 ield Size:		Request Parame Command Param		Optional Optional	
	DD039	Generic date			Days since Jar	nuary 1, 1970, Date	e is relative to UTC	Time.		
	DF41	Date, day count	uint16	Range:	0 to 65,532 days	Resolution		= Janu 179 ye	ary 1, 1970, n ars	nax =
4	Measure	ment time		•	eld Size: 4		Request Parame Command Param		Optional Optional	
	DD158	Generic time of day			24 hour clock,	0 = midnight, time	e is in UTC			
	DF06	Time of day	uint32	Range:	0 to 86,401 s	Resolution	r	ange al	ers, 0 = midnig lows for up to onds per day	
5	Station I	ocation, latitude			eld Size: 4		Request Parame Command Param		Optional Optional	
	DD022	Latitude, WGS-84			Latitude refere	enced to WGS-84.				
	DF23	Latitude	int32	Range:	+/- 90 deg	Resolution	IIII o E , a o g	-" = So m	uth, resolution	ı ~1.1
6	Station I	ocation, longitude			eld Size: 4		Request Parame Command Param		Optional Optional	
	DD023	Longitude, WGS-84			Longitude refe	erenced to WGS-84.				
	DF25	Longitude	int32	Range:	+/- 180 deg	Resolution		-" = W m	est, resolution	~1.1

Salinity Station Data PGN: 130321 hex: 1FD11

7	Salinity			Byte Fi	eld Size:	4		Request Parameter		Optional	
				Bit F	ield Size:			Command Para	ameter:	Optional	
	DD042	Salinity measure						er is about 35 gran ppt which is read		ts per kilogram of se arts per thousand.	a
	DF49	Ratio, Relative measure	float32	Range:	Variable	;	Resolution.	Floats	Unit-le	ss number	
8	Water Te	emperature	Byte Field Size: 2 Bit Field Size:					Request Parameter Command Parameter:		Optional Optional	
	DD043	Generic Temperature									
	DF39	Temperature, low	uint16	Range:	0 to 655	.32 deg K	Resolution	1x10E-2 deg K			
9	Station I	D String		•	eld Size: ield Size:	8 or 16 n		Request Paran Command Para		Optional Optional	
	DD004	Generic name string, short			Nam	e of place, route,	waypoint, de	estination, vessel,	vehicle,	etc.	
	DF50	String, variable, short	ch8or16(n) Range:		ASCII or Unicode	Resolution.	1 ASCII or 1 Unicode Character	string (2 bytes. First byte in uint8) is the Count dicating the number	
	15 characte	ers maximum.						of bytes includir		s in the string, ng the Count and	
		is not specified in the "Comma on ID. Otherwise if this field is							in string The Co the strin charact Unicod Control charact Control charact A string (total le	byte = 1 => ASCII	ii I 6)

Salinity Station Data

PGN: 130321 hex: 1FD11

10 **Station Name String**

50 characters maximum.

Byte Field Size: 8 or 16 n Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD004 Generic name string, short

Name of place, route, waypoint, destination, vessel, vehicle, etc.

DF50 String, variable, short

ch8or16(n) Range: 0 to 250 ASCII or 0 to 125 Unicode Characters

Resolution: 1 ASCII or 1 Unicode Character

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = 0 => Unicode characters

Control byte = 1 => ASCII characters

A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

Current Station Data PGN: 130322 hex: 1FD12

Current station measurement data including station location, numeric identifier, and name.

Single Fra	ame: No	Priority Default: 6	Default	t Update R	ate: 1000	milliseconds	Frequency:	1.	cycles per se	econd
Destinatio	n: Global	Query Support: Optional	Co	ommand Sup	port: Optional	ACK Rqmnts:	None			
ield#	Field Na	ame								
1	Mode			Byte Fie Bit Fi	eld Size: eld Size: 4		Request Para Command Pa		Optional Optional	
	DD025	Mode, Data			0x0 = Autono 0x1 = Differo 0x2 = Estima 0x3 = Simula 0x4 = Manua 0x5 to 0xD = 0xE = Error, 0xF = Data n	ential, enhanced mo ated mode, ator mode, al mode, Reserved	de,			
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: <mark>1</mark>	Used to	construct bit fie	lds
2	State			Byte Fie Bit Fi	eld Size: feld Size: 3		Request Para Command Pa		Optional Optional	
	DD046	Water Current State			000 = Flood, 001 = Slack, 010 = Ebb, 011 = Reserv 100 = Reserv 101 = Reserv 110 = Error, 111 = Unava	red,				
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: 1	Used to	construct bit fie	lds
3	NMEA R	eserved		Byte Fie Bit Fi	eld Size: ield Size: resv	1	Request Para Command Pa			
	DD001	Reserved field			Variable nun	nber of reserved bits	s, all set to logic "1	"		
	DF52 Used to alig	Bit field gn subsequent data on a byte bou	bit(n) ndary.	Range:	Variable	Resolutio	n: <u>1</u>	Used to	construct bit fie	lds
4	Measure	ment date			eld Size: 2		Request Para Command Pa		Optional Optional	
	DD039	Generic date			Days since Ja	anuary 1, 1970, Da	te is relative to U	ΓC Time.		
	DF41	Date, day count	uint16	Range:	0 to 65,532 day	s Resolutio	n: <mark>1 day</mark>	0 = Jan ~179 ye	uary 1, 1970, ma ears	ıx =
5	Measure	ment time			eld Size: 4		Request Para Command Pa		Optional Optional	
	DD158	Generic time of day			24 hour clock	x, $0 = midnight$, tin	me is in UTC			
	DF06	Time of day	uint32	Range:	0 to 86,401 s	Resolutio	n: 1x10E-4 s	range a	urs, 0 = midnight llows for up to two conds per day	,

Current Station Data PGN: 130322 hex: 1FD12

6	Station I	ocation, latitude		-	eld Size: 4 ield Size:		Request Parameter Command Paramet	- p	
	DD022	Latitude, WGS-84			Latitude	referenced to	WGS-84.		
	DF23	Latitude	int32	Range:	+/- 90 deg		Resolution:	1x10E-7 deg "-" = cm	= South, resolution ~1.1
7	Station I	ocation, longitude		-	eld Size: 4 ield Size:			Request Parameter Command Paramet	O p 1.01.101.
	DD023	Longitude, WGS-84			Longitu	de referenced	to WGS-84.		
	DF25	Longitude	int32	Range:	+/- 180 deg	Ţ	Resolution:	1x10E-7 deg "-"	= West, resolution ∼1.1
		Values 0x0 – 0x4 may be used, I Type PGN 128xxx with same SID							
8	Measure	ment depth		-	eld Size: 4 ield Size:			Request Parameter Command Paramet	- p
	DD047	Water Depth			Water d	epth measure	d from the wa	ter surface	
	DF09	Distance	uint32	Range:	0 to ~4.295	x10E+7 m	Resolution:	1x10E-2 m	
9	Current speed			•	eld Size: 2			Request Parameter Command Paramet	O p 1.01.101.
	DD044	Generic Speed							
	DF35	Speed	uint16	Range:	0 to 655.32	m/s	Resolution:	1x10E-2 m/s 1 K	not = 0.5144 m/s
10	Current	flow direction		-	eld Size: 2 ield Size:			Request Parameter Command Paramet	
	DD048	Current flow direction			Directio	n towards wh	ich current fle	ows. Degrees relative	to True North.
	DF02	Angle	uint16	Range:	0 to 2Pi rad	I	Resolution:		olution ~0.0057deg, 1 = .01745 rad
11	Water Te	emperature		•	eld Size: 2			Request Parameter Command Paramet	- J
	DD043	Generic Temperature							
	DF39	Temperature, low	uint16	Range:	0 to 655.32	deg K	Resolution:	1x10E-2 deg K	

Current Station Data PGN: 130322 hex: 1FD12

Byte Field Size: 8 or 16 n Station ID String Request Parameter 12 Optional Bit Field Size: Command Parameter: Optional

DD004 Generic name string, short Name of place, route, waypoint, destination, vessel, vehicle, etc.

String, variable, short ch8or16(n)Range: 0 to 250 ASCII or Resolution: 1 ASCII or

0 to 125 Unicode 1 Unicode Characters Character

15 characters maximum.

50 characters maximum

DF50

If this field is not specified in the "Command Request" or an ISO Request is made of this PGN, the response will with the unit's Station ID. Otherwise if this field is specified only the units with a matching Station ID will respond with this PGN.

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e.

Count = 2) is a null string.

Byte Field Size: 8 or 16 n 13 **Station Name String** Request Parameter Optional Command Parameter: Optional Bit Field Size:

DD004 Generic name string, short Name of place, route, waypoint, destination, vessel, vehicle, etc.

Resolution: 1 ASCII or ch8or16(n) Range: DF50 String, variable, short 0 to 250 ASCII or 0 to 125 Unicode

1 Unicode Characters Character

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e.

Count = 2) is a null string.

Meteorological Station Data

PGN: 130323 hex: 1FD13

Meteorological station measurement data including station location, numeric identifier, and name.

Mode Byte Field Size: Request Parameter Optional	Single Fr	ame: No	Priority Default: 6	Default	Update Ra	ate: 1000	milliseconds	Frequency:	1.	cycles per s	second
DD025 Mode, Data Byte Field Size: Request Parameter Command Parameter.	Destinatio	n: Global	Query Support: Optional	Co	mmand Sup	port: Optional	ACK Rqmnts: N	one			
DD025 Mode, Data D026 Mode, Data	ield#	Field N	ame								
DD025 Mode, Data D026	1	Mode			•					•	
Byte Field Size: Request Parameter Command Parameter:		DD025	Mode, Data			0x0 = Autono 0x1 = Differe 0x2 = Estima 0x3 = Simula 0x4 = Manua 0x5 to 0xD = 0xE = Error,	ntial, enhanced mode ted mode, tor mode, l mode, Reserved			ориона.	
DD001 Reserved field Variable number of reserved bits, all set to logic "1" DF52 Bit field bit(n) Range: Variable Resolution: Used to construct bit Used to align subsequent data on a byte boundary. 3 Measurement date Byte Field Size: Request Parameter Command Parameter: Optional DD039 Generic date Days since January 1, 1970, Date is relative to UTC Time. DF41 Date, day count uint16 Range: 0 to 65,532 days Resolution: 1 day 0 = January 1, 1970, -179 years 4 Measurement time Byte Field Size: Request Parameter Optional DD158 Generic time of day 24 hour clock, 0 = midnight, time is in UTC DF06 Time of day uint32 Range: 0 to 86,401 s Resolution: 1x10E-4 s -24 hours, 0 = midn range allows for up t leap seconds per day 5 Station location, latitude Byte Field Size: Request Parameter Optional DD022 Latitude, WGS-84 Latitude referenced to WGS-84. DF23 Latitude int32 Range: 4-90 deg Resolution: 1x10E-7 deg "-" = South, resolution Bit Field Size: Command Parameter: Optional Sit Field Size: Command Parameter: Optional DD023 Longitude, WGS-84 Longitude referenced to WGS-84. DF25 Longitude int32 Range: 4-180 deg Resolution: 1x10E-7 deg "-" = West, resolution DD021 Longitude int32 Range: +1-180 deg Resolution: 1x10E-7 deg "-" = West, resolution DD022 Longitude int32 Range: +1-180 deg Resolution: 1x10E-7 deg "-" = West, resolution DD023 Longitude int32 Range: +1-180 deg Resolution: 1x10E-7 deg "-" = West, resolution DD023 Longitude int32 Range: +1-180 deg Resolution: 1x10E-7 deg "-" = West, resolution DD023 Longitude int32 Range: +1-180 deg Resolution: 1x10E-7 deg "-" = West, resolution DD024 Longitude int32 Range: +1-180 deg Resolution: 1x10E-7 deg "-" = West, resolution DD025 Longitude int32 Range: +1-180 deg Resolution: 1x10E-7 deg "-" = West, resolution DD026 DD026 DD027 Longitude int32 Range: +1-180 deg Resolution: 1x10E-7 deg "-" = West, resolution DD027 DD028 DD029		DF52	Bit field	bit(n)	Range:	Variable	Resolution.	1	Used to	construct bit f	ields
DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit Used to align subsequent data on a byte boundary. 3 Measurement date Byte Field Size: 2 Request Parameter Command Parameter: Optional DD039 Generic date Days since January 1, 1970, Date is relative to UTC Time. DF41 Date, day count uint16 Range: 0 to 65,532 days Resolution: 1 day 0 = January 1, 1970, ~179 years 4 Measurement time Byte Field Size: 4 Request Parameter Command Parameter: Optional Bit Field Size: Command Parameter: Optional DD158 Generic time of day DD158 Generic time of day uint32 Range: 0 to 86,401 s Resolution: 1x10E-4 s ~24 hours, 0 = midnight, time is in UTC DF06 Time of day uint32 Range: 4 Request Parameter Command Parameter: Optional Resolution, latitude Byte Field Size: 4 Request Parameter Command Parameter: Optional Bit Field Size: Command Parameter: Optional Resolution, latitude, WGS-84 DD022 Latitude, WGS-84 DF23 Latitude Byte Field Size: 4 Request Parameter Command Parameter: Optional Resolution, latitude referenced to WGS-84. DF23 Latitude Byte Field Size: 4 Request Parameter Command Parameter: Optional Resolution, longitude Byte Field Size: 4 Request Parameter Command Parameter: Optional Resolution, longitude Request Parameter Command Parameter: Optional Resolution, longitude Request Parameter Command Parameter: Optional Resolution Resolution, longitude Request Parameter Command Parameter: Optional Resolution Resolution, longitude Request Parameter Command Parameter: Optional Resolution R	2	NMEA R	eserved		•		4	•			
Used to align subsequent date Byte Field Size: 2 Request Parameter Command Parameter: Optional DD039 Generic date Days since January 1, 1970, Date is relative to UTC Time. DF41 Date, day count uint16 Range: 0 to 65,532 days Resolution: 1 day 0 = January 1, 1970, ~179 years 4 Measurement time Byte Field Size: 4 Request Parameter Optional DD158 Generic time of day 24 hour clock, 0 = midnight, time is in UTC DF06 Time of day uint32 Range: 0 to 86,401 s Resolution: 1x10E-4 s ~24 hours, 0 = midnight and range allows for up t leap seconds per day 5 Station location, latitude Byte Field Size: 4 Request Parameter Optional DD022 Latitude, WGS-84 Latitude referenced to WGS-84. DF23 Latitude int32 Range: +/- 90 deg Resolution: 1x10E-7 deg "-" = South, resolution Bit Field Size: Command Parameter: Optional DD023 Longitude, WGS-84 DD023 Longitude, WGS-84 Longitude Request Parameter Command Parameter: Optional DD023 Longitude, WGS-84 Longitude referenced to WGS-84. DF25 Longitude int32 Range: +/- 180 deg Resolution: 1x10E-7 deg "-" = West, resolution optional "-" = West, resolution: 1x10E-7 deg "-" = West, resolution: 1x10E-7 deg "-" = West, resolution: 1x10E-7 deg "-" = West, resolution optional optional int32 Range: +/- 180 deg Resolution: 1x10E-7 deg "-" = West, resolutio		DD001	Reserved field			Variable num	ber of reserved bits,	all set to logic "1	."		
Measurement date Byte Field Size: Quint Dpus since January 1, 1970, Date is relative to UTC Time.		DF52	Bit field	bit(n)	Range:	Variable	Resolution.	1	Used to	construct bit f	ields
DD039 Generic date Days since January 1, 1970, Date is relative to UTC Time. DF41 Date, day count uint16 Range: 0 to 65,532 days Resolution: 1 day 0 = January 1, 1970, ~179 years 4 Measurement time Byte Field Size: 4 Request Parameter Command Parameter: Optional Optional DD158 Generic time of day DF06 Time of day uint32 Range: 0 to 86,401 s Byte Field Size: 4 Request Parameter Command Parameter: Optional Resolution: 1x10E-4 s -24 hours clock, 0 = midnight, time is in UTC DF06 Time of day Byte Field Size: 4 Request Parameter Command Parameter: Optional Regulation Regulations for up to leap seconds per day 5 Station location, latitude Byte Field Size: 4 Request Parameter Command Parameter: Optional Regulation Regul		Used to ali	gn subsequent data on a byte bou	ndary.							
DF41 Date, day count uint16 Range: 0 to 65,532 days Resolution: 1 day 0 = January 1, 1970, ~179 years 4 Measurement time Byte Field Size: 4 Request Parameter Optional Command Parameter: Optional Optional DD158 Generic time of day 24 hour clock, 0 = midnight, time is in UTC DF06 Time of day uint32 Range: 0 to 86,401 s Resolution: 1x10E-4 s ~24 hours, 0 = midnight, time is in UTC 25 Station location, latitude Byte Field Size: 4 Request Parameter Command Parameter: Optional DD022 Latitude, WGS-84 DF23 Latitude Byte Field Size: 4 Resolution: 1x10E-7 deg "-" = South, resolution cm Byte Field Size: 4 Request Parameter Command Parameter: Optional Optional DD023 Longitude, WGS-84 DD023 Longitude, WGS-84 DF25 Longitude Int32 Range: +/- 180 deg Resolution: 1x10E-7 deg "-" = West, resolution	3	Measure	ment date		•			•			
A Measurement time Byte Field Size: 4 Request Parameter Command Parameter: Optional Command Parameter: Optional Optional Optional Parameter: Optional Optional Optional Optional Parameter: Optional Optional Optional Optional Optional Parameter: Optional Optional Optional Optional Optional Parameter: Optional		DD039	Generic date			Days since Ja	nuary 1, 1970, Date	is relative to U	ΓC Time.		
Bit Field Size: Command Parameter: Optional 24 hour clock, 0 = midnight, time is in UTC DF06 Time of day uint32 Range: 0 to 86,401 s Resolution: 1x10E-4 s -24 hours, 0 = midnight, time is in UTC 1x10E-4 s -24 hours, 0 = midnight, time is in UTC 0 to 86,401 s Resolution: 1x10E-4 s -24 hours, 0 = midnight, time is in UTC -24 hours, 0 = midnight, time is in UTC -24 hours, 0 = midnight, time is in UTC -24 hours, 0 = midnight, time is in UTC -24 hours, 0 = midnight, time is in UTC -24 hours, 0 = midnight, time is in UTC -24 hours, 0 = midnight, time is in UTC -24 hours, 0 = midnight, time is in UTC -24 hours, 0 = midnight		DF41	Date, day count	uint16	Range:	0 to 65,532 days	Resolution.	1 day		• .	nax =
DF06 Time of day uint32 Range: 0 to 86,401 s Resolution: 1x10E-4 s -24 hours, 0 = midnrange allows for up t leap seconds per day Byte Field Size: 4 Request Parameter Command Parameter: Optional Optional DD022 Latitude, WGS-84 DF23 Latitude int32 Range: +/- 90 deg Resolution: 1x10E-7 deg "-" = South, resolution Byte Field Size: 4 Request Parameter Command Parameter: Optional DD023 Longitude Byte Field Size: 4 Request Parameter Command Parameter: Optional DD024 Longitude, WGS-84 Longitude referenced to WGS-84. Longitude referenced to WGS-84. Longitude referenced to WGS-84.	4	Measure	ment time					•			
5 Station location, latitude Byte Field Size: 4 Request Parameter Command Parameter: Optional Optional DD022 Latitude, WGS-84 Latitude referenced to WGS-84. DF23 Latitude int32 Range: +/- 90 deg Resolution: 1x10E-7 deg "-" = South, resolution: DD023 Longitude Byte Field Size: 4 Request Parameter Command Parameter: Optional DD023 Longitude, WGS-84 Longitude referenced to WGS-84. DF25 Longitude int32 Range: +/- 180 deg Resolution: 1x10E-7 deg "-" = West, resolution: 1x10E-7 deg "-" = West		DD158	Generic time of day			24 hour clock	x, $0 = midnight$, time	is in UTC			
Bit Field Size: Command Parameter: Optional DD022 Latitude, WGS-84 DF23 Latitude int32 Range: +/- 90 deg Resolution: 1x10E-7 deg cm Byte Field Size: Request Parameter Command Parameter: Optional Bit Field Size: Command Parameter: Optional DD023 Longitude, WGS-84 DF25 Longitude int32 Range: +/- 180 deg Resolution: 1x10E-7 deg "-" = West, resolutio		DF06	Time of day	uint32	Range:	0 to 86,401 s	Resolution.	1x10E-4 s	range al	llows for up to	
DF23 Latitude int32 Range: +/- 90 deg Resolution: 1x10E-7 deg "-" = South, resolution cm Byte Field Size: 4 Request Parameter Command Parameter: Optional Optional DD023 Longitude, WGS-84 DF25 Longitude int32 Range: +/- 180 deg Resolution: 1x10E-7 deg "-" = West, resolution	5	Station I	ocation, latitude		-					•	
6 Station location, longitude Byte Field Size: 4 Request Parameter Command Parameter: Optional Optional DD023 Longitude, WGS-84 DF25 Longitude int32 Range: +/- 180 deg Resolution: 1x10E-7 deg "-" = West, resolution		DD022	Latitude, WGS-84			Latitude refer	renced to WGS-84.				
DD023 Longitude, WGS-84 Longitude referenced to WGS-84. DF25 Longitude int32 Range: +/- 180 deg Resolution: 1x10E-7 deg "-" = West, resolution		DF23	Latitude	int32	Range:	+/- 90 deg	Resolution.	1x10E-7 deg		outh, resolution	~1.1
DF25 Longitude int32 Range: +/- 180 deg Resolution: 1x10E-7 deg "-" = West, resolution	6	Station I	ocation, longitude					•		•	
DF25 Longitude int32 Range: +/- 180 deg Resolution: 1x10E-7 deg "-" = West, resolution		DD023	Longitude, WGS-84			Longitude ref	Ferenced to WGS-84.				
				int32	Range:	+/- 180 deg	Resolution.	1x10E-7 deg		est, resolution	~1.1

PGN: 130323

hex: 1FD13 Byte Field Size: 2 Request Parameter 7 Wind Speed Optional Bit Field Size: Command Parameter: Optional **DD044** Generic Speed Range: 0 to 655.32 m/s Resolution: 1x10E-2 m/s 1 Knot = 0.5144 m/sDF35 Speed uint16 **Wind Direction** Byte Field Size: 8 Request Parameter Optional Bit Field Size: Command Parameter: Optional **DD045** Wind Direction Resolution ~0.0057deg, 1 uint16 Range: 0 to 2Pi rad Resolution: 1x10E-4 rad DF02 Angle deg = .01745 radByte Field Size: 9 Wind Reference Request Parameter Optional Bit Field Size: 3 Command Parameter: Optional **DD205** Wind Reference 0x00 = Theoretical Wind (ground referenced, referenced to True North; calculated using COG/SOG) 0x01 = Theoretical Wind (ground referenced, referenced to Magnetic North; calculated using COG/SOG) 0x02 = Apparent Wind (relative to the vessel centerline) 0x03 = Theoretical (Calculated to Centerline of the vessel, referenced to ground; calculated using COG/SOG) 0x04 = Theoretical (Calculated to Centerline of the vessel, referenced to water; calculated using Heading/Speed through Water) 0x05 = Reserved0x06 = Error0x07 = NullDF52 Bit field Range: Variable Resolution: 1 Used to construct bit fields bit(n) Byte Field Size: Request Parameter 10 **NMEA Reserved** Bit Field Size: resv 5 Command Parameter: Variable number of reserved bits, all set to logic "1" **DD001** Reserved field Resolution: 1 Used to construct bit fields DF52 Bit field bit(n) Range: Variable Used to align subsequent data on a byte boundary. 11 **Wind Gusts** Byte Field Size: Request Parameter Optional Bit Field Size: Command Parameter: Optional Peak wind gust speed. Sustained wind over an interval of 5 seconds. **DD053** Wind gusts uint16 Range: 0 to 655.32 m/s Resolution: 1x10E-2 m/s 1 Knot = 0.5144 m/sDF35 Speed Byte Field Size: Request Parameter 12 **Atmospheric Pressure** Optional Bit Field Size: Command Parameter: Optional **DD049** Generic Pressure Range: 0 to 6,553,200 Pa Resolution: 1x10E+2 Pa DF47 Pressure, medium uint16 Byte Field Size: 2 Air Temperature Request Parameter Optional 13 Bit Field Size: Command Parameter: Optional **DD043** Generic Temperature Resolution: 1x10E-2 deg DF39 Temperature, low uint16 Range: 0 to 655.32 deg K

Meteorological Station Data

Licensee: Maretron| Document ID: C0EE241|Purchased: February 21, 2023 4:00 GMT|

Meteorological Station Data

15 characters maximum.

PGN: 130323 hex: 1FD13

Station ID String 14

Byte Field Size: 8 or 16 n Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD004 Generic name string, short

Name of place, route, waypoint, destination, vessel, vehicle, etc.

String, variable, short DF50

ch8or16(n)Range: 0 to 250 ASCII or 0 to 125 Unicode Characters

Resolution: 1 ASCII or 1 Unicode

Character

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters A string with no characters

(total length of 2 bytes, i.e. Count = 2) is a null string.

15 **Station Name String**

DF50

Byte Field Size: 8 or 16 n Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD004 Generic name string, short

Name of place, route, waypoint, destination, vessel, vehicle, etc.

String, variable, short

ch8or16(n)Range: 0 to 250 ASCII or

0 to 125 Unicode Characters

Resolution: 1 ASCII or 1 Unicode Character

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters

A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

50 characters maximum.

Moored Buoy Station Data

PGN: 130324 hex: 1FD14

Moored buoy measurement data including station location and numeric identifier.

Single Fr	ame: No	Priority Default: 6	Defau	ılt Update Ra	ate: 1000	milliseconds	Frequency:	1.	cycles per second
Destinatio	n: Global	Query Support: Optiona	ıl (Command Supp	oort: Optional	ACK Rqmnts: N	one		
ield#	Field N	ame							
1	Mode			Byte Fie Bit Fie	eld Size: eld Size: 4		Request Parame Command Param		Optional Optional
	DD025	Mode, Data			0x0 = Auton 0x1 = Differ 0x2 = Estima 0x3 = Simula 0x4 = Manua 0x5 to 0xD = 0xE = Error, 0xF = Data m	ential, enhanced mode ated mode, ator mode, al mode, • Reserved	;,		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
2	NMEA R	eserved		Byte Fie Bit Fie	eld Size: eld Size: resv	4	Request Parame Command Param		Optional
	DD001	Reserved field			Variable nun	nber of reserved bits,	all set to logic "1"		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution.	1	Used to	construct bit fields
	Used to ali	gn subsequent data on a byte bo	undary.						
3	Measure	ment date		Byte Fie Bit Fie	eld Size: 2 eld Size:		Request Parame Command Param		Optional Optional
	DD039	Generic date			Days since Ja	anuary 1, 1970, Date	is relative to UTC	Time.	
	DF41	Date, day count	uint10	6 Range:	0 to 65,532 day	s Resolution.	1 day	0 = Jan ~179 ye	uary 1, 1970, max = ears
4	Measure	ment time		Byte Fie Bit Fie	eld Size: 4		Request Parame Command Param		Optional Optional
	DD158	Generic time of day			24 hour clock	x, $0 = midnight$, time	e is in UTC		
	DF06	Time of day	uint32	2 Range:	0 to 86,401 s	Resolution.		range a	ars, 0 = midnight, flows for up to two conds per day
5	Station I	ocation, latitude		Byte Fie	eld Size: 4		Request Parame		Optional Optional
	DD022	Latitude, WGS-84			Latitude refe	renced to WGS-84.			
	DF23	Latitude	int32	Range:	+/- 90 deg	Resolution.		"-" = So cm	outh, resolution ~1.1
6	Station I	ocation, longitude		Byte Fie	eld Size: 4		Request Parame		Optional Optional
	DD023	Longitude, WGS-84			Longitude re	ferenced to WGS-84.			
	DF25	Longitude	int32	Range:	+/- 180 deg	Resolution.		"-" = W	est, resolution ~1.1

PGN: 130324

hex: 1FD14 Byte Field Size: 2 7 Wind Speed Request Parameter Optional Bit Field Size: Command Parameter: Optional DD044 Generic Speed Range: 0 to 655.32 m/s Resolution: 1x10E-2 m/s 1 Knot = 0.5144 m/sDF35 Speed uint16 **Wind Direction** Byte Field Size: 8 Request Parameter Optional Bit Field Size: Command Parameter: Optional **DD045** Wind Direction uint16 Range: 0 to 2Pi rad Resolution: 1x10E-4 rad Resolution ~0.0057deg, 1 DF02 Angle deg = .01745 radByte Field Size: 9 Wind Reference Request Parameter Optional Command Parameter: Optional Bit Field Size: 3 0x00 = Theoretical Wind (ground referenced, referenced to True North; calculated **DD205** Wind Reference using COG/SOG) 0x01 = Theoretical Wind (ground referenced, referenced to Magnetic North; calculated using COG/SOG) 0x02 = Apparent Wind (relative to the vessel centerline) 0x03 = Theoretical (Calculated to Centerline of the vessel, referenced to ground; calculated using COG/SOG) 0x04 = Theoretical (Calculated to Centerline of the vessel, referenced to water; calculated using Heading/Speed through Water) 0x05 = Reserved0x06 = Error0x07 = NullDF52 Bit field Range: Variable Resolution: 1 Used to construct bit fields bit(n) Byte Field Size: Request Parameter 10 **NMEA Reserved** Bit Field Size: resv 5 Command Parameter: Variable number of reserved bits, all set to logic "1" **DD001** Reserved field DF52 Bit field Resolution: 1 Used to construct bit fields bit(n) Range: Variable Used to align subsequent data on a byte boundary. 11 **Wind Gusts** Byte Field Size: Request Parameter Optional Bit Field Size: Command Parameter: Optional Peak wind gust speed. Sustained wind over an interval of 5 seconds. DD053 Wind gusts uint16 Range: 0 to 655.32 m/s Resolution: $1 \times 10E-2 \text{ m/s}$ 1 Knot = 0.5144 m/s **DF35** Speed

Moored Buoy Station Data

Moored Buoy Station Data PGN: 130324 hex: 1FD14 Byte Field Size: 2 Request Parameter **Wave Height** 12 Optional Bit Field Size: Command Parameter: Optional **DD050** Wave Height Wave height is calculated as the highest one-third of all of the wave heights during a 20-minute sampling period. Note: Accelerometers or inclinometers on board the buoys measure the heave acceleration or the vertical displacement of the buoy hull during the wave acquisition time. A Fast Fourier Transform (FFT) is applied to the data by the processor on board the buoy to transform the data from the temporal domain into the frequency domain. Note that the raw acceleration or displacement measurements are not transmitted shore-side. Response amplitude operator (RAO) processing is then performed on the transformed data to account for both hull and electronic noise. It is from this transformation that nondirectional spectral wave measurements (i.e., wave energies with their associated frequencies) are derived. Along with the spectral energies, measurements such as significant wave height (WVHGT), average wave period (AVGPD), and dominant period (DOMPD) are also derived from the transformation. Resolution: 1x10E-2 m DF13 Range: 0 to 655.32 m Distance, short uint16 Byte Field Size: 13 **Dominate Wave Period** Request Parameter Optional Bit Field Size: Command Parameter: Optional **DD051** Wave Period in seconds Average wave period of all waves during a 20-minute period. Dominant wave period is the period with the maximum wave energy. Note: See DD50 note. **DF66** Time interval, .01sec uint16 Range: 0 to 655.32s Resolution: 1x10E-2sec **Atmospheric Pressure** Byte Field Size: Request Parameter 14 Optional Bit Field Size: Command Parameter: Optional **DD049** Generic Pressure uint16 Range: 0 to 6,553,200 Pa Resolution: 1x10E+2 Pa Pressure, medium **DF47** Byte Field Size: **Pressure Tendency Rate** Request Parameter Optional 15 Bit Field Size: Command Parameter: Optional **DD052** Pressure Rate Positive value indicates Rising, Negative value indicates Falling. DF48 int16 Range: +/- 327,640 Pa/hr Resolution: $1 \times 10E + 1$ Pa/hr + = increasing rate Pressure rate Byte Field Size: Request Parameter 16 Air temperature Optional Bit Field Size: Command Parameter: Optional **DD043** Generic Temperature uint16 Range: 0 to 655.32 deg K Resolution: 1x10E-2 deg DF39 Temperature, low

Byte Field Size: 2

Bit Field Size:

uint16 Range: 0 to 655.32 deg K

Request Parameter

Resolution: 1x10E-2 deg

Command Parameter:

Optional

Optional

Water temperature

DF39

DD043 Generic Temperature

Temperature, low

17

Moored Buoy Station Data

PGN: 130324 hex: 1FD14

Station ID String 18

Byte Field Size: 8 or 16 n Bit Field Size:

Request Parameter Command Parameter: Optional

Required

DD004 Generic name string, short

Name of place, route, waypoint, destination, vessel, vehicle, etc.

DF50 String, variable, short

ch8or16(n)Range: 0 to 250 ASCII or 0 to 125 Unicode Characters

Resolution: 1 ASCII or 1 Unicode

Character

15 characters maximum.

If this field is not specified in the "Command Request" or an ISO Request is made of this PGN, the response will with the unit's Station ID. Otherwise if this field is specified only the units with a matching Station ID will respond with this PGN.

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

Lighting System Settings

PGN: 130330 hex: 1FD1A

This PGN provides a lighting controller settings and number of supported capabilities.

This PGN will be sent upon change or in response to a request.

This PGN allows for powering on and off the system, resetting it back to factory defaults, and changing the name of the lighting controller.

Message Length Upper bound of Max values are max user editable/changeable.:

- By the Data Payload Field
- Current Max values set below for NMEA Fast Packet
- Max Scenes values are determined by the Vendor
 - Max Scenes upper bound of 219
- Max Color Sequences values are determined by the Vendor
 - Max Color Sequences upper bound of 219
 - Max values user configurable.
- Max Program values are based on the current defined programs in the spec
 - Max Programs current of 7
- Controller Capabilities
 - Local Storage signifies the controller supports storing its state internally

Requests for all Zones/Scenes/Color Sequences may return more than the max values. Only less than max values can be changed by the user.

Begin Request Support:

Global ISO requests (PGN 059904) and Global NMEA Requests (PGN 126208) for this Parameter Group shall be ignored. An addressed ISO Request will result in a Negative Acknowledgement (PGN 059392) with Field 1 0x01 = Negative Acknowledgment.

If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

- If the Request Group Function (PGN 126208) includes the Field 1(Global Enable), then the response shall be filtered by this field.
- If the Request Group Function (PGN 126208) includes the Field 11 (Controller Capabilities) then the response shall be filtered by this field.

End Request Support.

Begin Command Support:

If a Command Group Function (PGN 126208) commanding this PGN is received, the receiving device shall respond in the following manner:

- If the Command Group Function (PGN 126208) is received containing a value for Field 1 (Global Enable) then the response shall be to transmit this PGN with a corresponding value in field 1 and the controller shall take the commanded action.
- If the Command Group Function (PGN 126208) containing Field 2 (Default Setting/Commands), then the controller will Transmit the change and take the commanded action. Upon reboot or factory reset the response is to be sent prior to change taking effect.
- If the Command Group Function (PGN 126208) containing Field 4(Name of the Lighting Controller) Name length is greater than the 32 ascii / 16 Unicode characters then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported". And the corresponding field error will contain "0x3 = Request or command parameter out-of-range.

Lighting System Settings

PGN: 130330 hex: 1FD1A

• If the Command Group Function (PGN 126208) containing Field 4 (Name of the Lighting Controller), then the controller will Transmit the change and take the commanded action.

End Command Support.

Further details can be found in the NMEA2000 Lighting Application Notes in Appendix D

Single Fra	ame: N	Priority Default: 7	Default	Update Ra	ite:	milliseconds	Frequency:	NA	cycles per	second
Destinatio	n: Global	Query Support: Required	Co	mmand Supp	ort: Required	ACK Rqmnts: N				
ield#	Field Na	ame								
1	Global E	nable		Byte Fiel Bit Fie	ld Size: eld Size: 2		Request Parar Command Par		Required Required	
	DD002	Generic status pair	MSB/LSB: 00 = [No, Off, Disabled, Reset, "0 01 = [Yes, On, Enabled, Set, "1"], 10 = Error, 11= [Unavailable, Unknown]				"],			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit f	fields
	Power state	e of connected lighting devices								
2	2 Default Settings/Commands			Byte Fie Bit Fie	ld Size: eld Size: 3		Request Parar Command Par		Optional Required	
	DD513	Lighting Device Commands			0= Idle 1= Detect De 2= Reboot 3= Factory R 4= Powering 5 -7= Reserv	leset Up				
	Option 0 Co	Bit field ue commands to the controller ommanding Idle has no effect. ommanding Powering up has no effect.	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit t	fields
3	NMEA Re	eserved		Byte Fie Bit Fie	ld Size: eld Size: resv	3	Request Parar Command Par			
	DD001	Reserved field			Variable nun	nber of reserved bits,	all set to logic "1'	•		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit f	fields

Lighting System Settings PGN: 130330

hex: 1FD1A

4	Name of the lighting controller	Byte Field Size:	8 or 16 n	Request Parameter	Optional
		Bit Field Size:		Command Parameter:	Optional

DD504 Name of Device

DF130 String, variable, very shor **ch8or16(n)** Range: 0 to 32 ASCII or 0 to Resolution: 1 ASCII or 16 Unicode Characters 1 Unicode Character

Name of Lighting Controller

Name shall consist of no more than 32 ACSII or 16 Unicode Characters.

2 to 34 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

5	Max Scenes		Byte Field Size: 1 Bit Field Size:		Request Parame Command Param	O P 1. 0
	DD005 Generic numeric ID, short		Number of route	, waypoint, event,	mark, etc.	
	DF53 Integer, 8 bit unsigned	uint8	Range: 0 to 252	Resolution:	1 bit	Unit-less number
6	Max Scene Configuration Count		Byte Field Size: Bit Field Size:		Request Parame Command Paran	
	DD005 Generic numeric ID, short		Number of route	, waypoint, event,	mark, etc.	
	DF53 Integer, 8 bit unsigned	uint8	Range: 0 to 252	Resolution:	1 bit	Unit-less number
7	Max Zones		Byte Field Size: Bit Field Size:		Request Parame Command Param	· ·
	DD005 Generic numeric ID, short		Number of route	, waypoint, event,	mark, etc.	
	DF53 Integer, 8 bit unsigned	uint8	Range: 0 to 252	Resolution:	1 bit	Unit-less number
8	Max Color Sequences		Byte Field Size: Bit Field Size:		Request Parame Command Param	. 10 4 0
	DD005 Generic numeric ID, short		Number of route	, waypoint, event,	mark, etc.	
	DF53 Integer, 8 bit unsigned	uint8	Range: 0 to 252	Resolution:	1 bit	Unit-less number
	For requesting all may return more than max	values. N	lax vakues are user configurable.			
9	Max Color Sequence Color Count		Byte Field Size: Bit Field Size:		Request Parame Command Paran	- p
	DD005 Generic numeric ID, short		Number of route	, waypoint, event,	mark, etc.	
	DF53 Integer, 8 bit unsigned	uint8	Range: 0 to 252	Resolution:	1 bit	Unit-less number

PGN: 130330

Command Parameter: Required

Unit-less number

					hex: 1FD1A	
10	Number of Programs	•	eld Size: 1	Request Paran Command Para		
	DD005 Generic numeric ID, short		Number of r	route, waypoint, event, mark, etc.		
	DF53 Integer, 8 bit unsigned uint8 Max Custom Program values are determined by the V	_	0 to 252	Resolution: 1 bit	Unit-less number	
11	Controller Capabilities	•	eld Size:	Request Paran Command Para	- ·	
	DD515 Lighting Controller Capabilities		xxxx xx0x = xxxx x0xx = xxxx 0xxx = xxx0 xxxx = xx0x xxxx = x0xx xxxx = 0xxx xxxx =	E Local Storage, E Reserved for future use E Reserved for future use E Reserved for future use Reserved for future use E Reserved for future use O Reserved for future use U Reserved for future use O Reserved for future use O Reserved for future use	be transmitted as 0.	
	DF52 Bit field bit(n)	Range:	Variable	Resolution: 1	Used to construct bit fields	3
12	Identify Device	Byte Fi	eld Size: 4	Request Paran	neter Optional	

Bit Field Size:

uint32 Range: 0 to 4,294,967,292

Commanding a lighting device ID will instruct the controller to take action to visually indicate the specified lighting device.

Number of route, waypoint, event, mark, etc.

Resolution: 1 bit

Lighting System Settings

DD010 Generic numeric ID, large

Integer, 32 bit unsigned

4,294,967,295 = Data not available or Do Not Change;

Payload Mass PGN: 130560 hex: 1FE00

The Payload Mass parameter group is used to transmit the mass associated with vessel payloads. Since the SI units of mass (kilogram) are commonly understood by end users as the weight at standard gravitational acceleration, devices receiving this parameter group may display the transmitted value as either mass or weight.

Measurement status includes a 'Locked' status in addition to the stable status. Some scales may have the ability to filter out small changes to the measurement due to vessel motion or other influences. These scales may use the 'Locked' status to indicate that the transmitted Payload Mass will remain fixed until a significant change in mass is detected. The value for 'significant' may vary by manufacturer, but is usually 10% to 20% or more of the current mass measurement.

Applications for this PGN vary from recreational to commercial use. This may include, but is not limited to weighing fish, or weighing cargo. Response to Requests: Field #4, Measurement ID, is identified as a request parameter for this Parameter Group. All providers of this PGN may accept and process requests based upon the requested value of Field # 4. A device receiving an ISO Request (PGN 059904) for this PGN, shall respond by providing as many of these PGNs as necessary for every Measurement ID that has associated data fields.

- If a Complex Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:
- If no requested fields have been included with the Complex Request, than the response is to return one or more PGNs, just like responding to the ISO Request (PGN 059904) described above.
- If the Complex Request (PGN 126208) includes the Measurement ID field, then the response shall be filtered by the field (Field #4) and field value (Measurement ID) contained within the request.

For example, if the Complex Request for this PGN contained a value of 2 for field 4, the Measurement ID, and this was a measurement channel that the device was operating with or had information about, than the device would respond by providing a single PGN with measurement data associated with the Measurement ID channel value requested.

If the Measurement ID requested is considered valid by the device, but the device was not operating on that measurement channel, or had no data associated with the measurement channel requested, there are two possible responses:

- 1 The device responds with the PGN containing the measurement channel requested and all other fields set to the value indicating "Data not available".
- 2 The device responds with the Acknowledge Group PGN (126208) containing the error state of "0x2 = Temporarily unable to comply".

If the request was global no response would be required. If the request was addressed to the device, than either response 1 or 2 would apply.

If the Measurement ID requested is not considered a valid measurement channel by the receiving device, then the appropriate response would be the Acknowledge Group PGN (126208), containing the error state for the requested measurement ID field of "0x3 = Request or command parameter out-of-range;".

Examples of equipment that might report Payload Mass include loading/unloading equipment and scales.

Single Frame: Yes Priority Default: 5 Default Update Rate: 1000 milliseconds Frequency: 1. cycles per second
Destination: Global Query Support: Optional Command Support: Optional ACK Rqmnts: None

Paylo	oad Mass		PGN: 130560 hex: 1FE00
1	Sequence ID	Byte Field Size: 1 Bit Field Size:	Request Parameter Command Parameter: Optional
	DD056 Sequence ID	PGNs from a single so different PGN transm related data set. For e	number that binds information transmitted in two or more ource address. Identical SID values within two or more issions identifies those PGN transmissions as a single example, identical SID values bind the COG and SOG values Latitude and Longitude values in PGN 129029 as a single
		0 - 252 = binding avadata set)	ilable (when SID value reaches 252, resume with 0 on next
		253 - 254 = reserved f	for future use
		255 = No binding pro whenever practical.	vided. NMEA recommends using binding SID values
	ε, ε	nt8 Range: 0 to 252	Resolution: 1 bit Unit-less number
	Sequence number used to associate Payload Matthe same source address.	ss transmissions with other parameter grou	ps being transmitted from
2	Measurement Status	Byte Field Size:	Request Parameter Optional
		Bit Field Size: 3	Command Parameter: Optional
	DD312 Scale Measurement Status	0x00 = Current Chang 0x01 = Current Stable 0x02 = Measurement significant mass chan	ndicate measurement status ging – the payload acceleration is changing e – the payload acceleration has reached equilibrium Locked – the payload measurement is fixed until a ge occurs (see description) s – the payload mass is being transmitted from memory ttus
	DF52 Bit field bit	(n) Range: Variable	Resolution: 1 Used to construct bit fields
	Indicates if the measurement provided is current,	and whether the measurement is stable.	
3	NMEA Reserved	Byte Field Size: Bit Field Size: resv 5	Request Parameter Command Parameter:
	DD001 Reserved field	Variable number of re	eserved bits, all set to logic "1"
	DF52 Bit field bit Used to align subsequent data on byte boundary.	(n) Range: <mark>Variable</mark>	Resolution: 1 Used to construct bit fields
			Desired Personator Outland
4	Measurement ID	Byte Field Size: 1 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD005 Generic numeric ID, short		point, event, mark, etc.
	DF53 Integer, 8 bit unsigned uir		Resolution: 1 bit Unit-less number
	Unique measurement identifier. May be used to c equipment or scale.	differentiate between multiple channels of in	tormation on the same
5	Payload Mass	Byte Field Size: 4 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD313 Mass		

uint32 Range: 0 - 429,496.7292

kilograms

Resolution: 1x10E-4 kg

Payload mass in kilograms. Corrected for gravitational acceleration.

DF104 Mass

Payload Mass

Payload Mass PGN: 130560

hex: 1FE00

6 NMEA Reserved Byte Field Size:

Bit Field Size: resv 8

bit(n)

Request Parameter
Command Parameter:

DD001 Reserved field

Variable number of reserved bits, all set to logic "1"

DF52 Bit field

Range: Variable

Resolution: 1 Used to

Used to construct bit fields

Used to align subsequent data on byte boundary.

Lighting Zone PGN: 130561 hex: 1FE01

This PGN is used to report or configure a name for a given zone. A zone is a grouping of devices that are controlled by a Scene. This PGN will be sent upon change or in response to a request.

The Maximum number of zones supported is reported by the Lighting System Settings (130330)

Notes:

If zone is using component settings in fields 3-7, the (Field 8) Program ID is reported as (254) Out of Range. Otherwise, the zone is using the Program setting fields 8-12.

Returning the device's current component colors is optional when zone is controlled by a program.

White can be controlled either through the K or setting R=G=B. Only RGB or Kelvin should be used at one time.

Begin Request Support:

Global ISO requests (PGN 059904) and Global NMEA Requests (PGN 126208) for this Parameter Group shall be ignored. An addressed ISO Request will result in a Negative Acknowledgement (PGN 059392) with Field 1 0x01 = Negative Acknowledgment.

If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

- If no requested fields have been included with the Request Group Function, then the response is to return one or more PGNs
- If the Request Group Function (PGN 126208) includes the (Field 1) Zone Index, then the response shall be filtered by this field
- If the Request Group Function (PGN 126208) includes the (Field 1) Zone Index that is greater than the Max Zones then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported". And the corresponding field error will contain "0x3 = Request or command parameter out-of-range"

End Request Support.

Begin Command Support:

If a Command Group Function (PGN 126208) commanding this PGN is received, the receiving device shall respond in the following manner:

Command Support is Required for fields: 1, 2, 13

Command Support is Optional for fields: 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

If the application requires Red, Green, Black, Kelvin, or Intensity settings use fields 3-7.

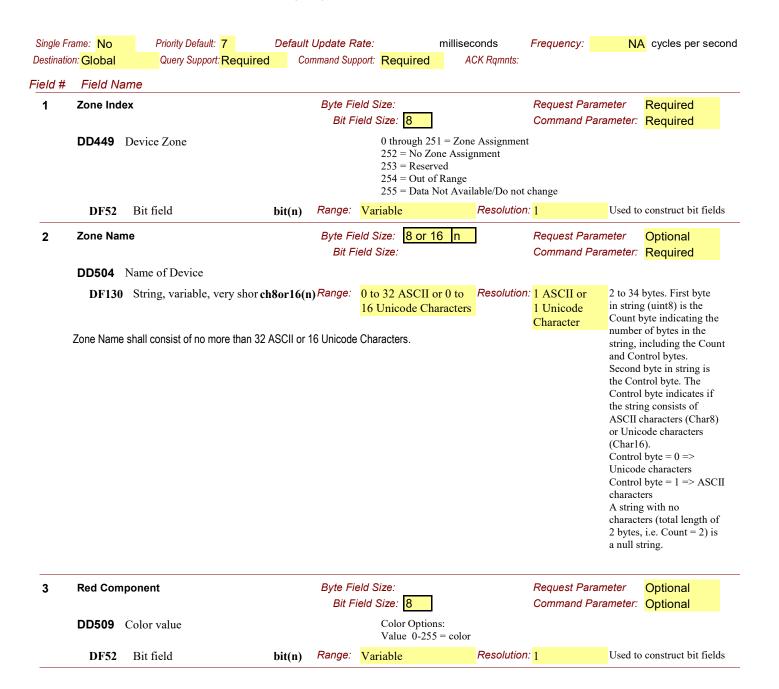
For Programs use fields 8-12.

- Every Command Group Function (PGN 126208) transmitted for this PGN shall contain a value for (Field 1) Zone Index and the commanded value shall identify which zone the remaining commanded fields apply to.
- If the Command Group Function (PGN 126208) containing (Field 1) Zone Index is not included then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported".
- If the Command Group Function (PGN 126208) containing (Field 1) Zone Index is 252 (No Zone Assignment), Acknowledge Group Function (PGN 126208), containing the state.
- If the Command Group Function (PGN 126208) includes a valid index value (Field 1) and a valid Name (field 2), then the zone will be assigned that name.
- If the Command Group Function (PGN 126208) containing (Field 2) Name length is greater than the 32 ascii / 16 Unicode characters then the appropriate response would be the Acknowledge Group Function (PGN126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported". And the corresponding field error will contain "0x3 = Request or command parameter out-of-range"
- If (Fields 3 through 7) are commanded, then they will be changed to the active state of the zone
- If (Fields 3 through 7) are commanded, then the active state will use these fields and (Field 8) Program ID will also change to (254) Out of Range.

Lighting Zone PGN: 130561 hex: 1FE01

End Command Support.

Further details can be found in the NMEA2000 Lighting Application Notes in Appendix D



Lighting Zone	PGN: 130561
	hex: 1FF01

4	Green Compoenent		•	eld Size: ield Size: <mark>8</mark>		Request Parameter Command Parameter	Optional Optional
	DD509 Color value			Color Options: Value 0-255 = color			
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1 Used	to construct bit fields
5	Blue Component		•	eld Size: ield Size: <mark>8</mark>		Request Parameter Command Parameter	Optional Optional
	DD509 Color value			Color Options: Value 0-255 = color			
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1 Used	to construct bit fields
6	Color Temperature			eld Size: 2		Request Parameter Command Parameter	Optional Optional
	DD511 Kelvin based color			A value covering the	visible Kelvir	n range for lighting	
	DF124 Temperature, Very High The color temperature component	Uint16	Range:	0-65532 deg K	Resolution:	_	ue covering the visible n range for lighting
7	Intensity		•	eld Size: 1		Request Parameter Command Parameter	Optional Optional
	DD512 Medium Absolute Percentage	$0 - 100^{\circ}$	½	0-100%			
	DF120 Percent, Restricted Range The color intensity	uint8	Range:	0 - 100%	Resolution:	$ \begin{array}{c} 5x10E-1 & 0 = 09 \\ 100\% \end{array} $	%, 100 = 50%, 200 =
8	Program ID		•	eld Size: 1		Request Parameter Command Parameter	Optional Optional
	DD005 Generic numeric ID, short			Number of route, way	point, event,	mark, etc.	
	DF53 Integer, 8 bit unsigned The Program Index	uint8	Range:	0 to 252	Resolution:	1 bit Unit-l	ess number
9	Program Color Sequence Index		•	eld Size: 1		Request Parameter Command Parameter	Optional Optional
	DD005 Generic numeric ID, short			Number of route, way	point, event,	mark, etc.	
	DF53 Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit Unit-l	ess number
10	Program Intensity			eld Size: 1		Request Parameter Command Parameter	Optional Optional
	DD512 Medium Absolute Percentage	$0 - 100^{\circ}$	%	0-100%			
	DF120 Percent, Restricted Range The Intensity Field controls the overall intensi	uint8 ity brightn		0 - 100% the RGB and Kelvin value	Resolution:	$ \begin{array}{c} 5 \times 10 \text{E} - 1 \\ 100 \% \end{array} $	%, 100 = 50%, 200 =

Lighting Zone	PGN: 130561
	hex: 1FE01

11	Program Rate			Byte Field Size: 1 Bit Field Size:			Request Param Command Para		Optional Optional
	DD512 Medium Absolute Percentage 0 – 100			%	0-100%				
	DF120	Percent, Restricted Range	uint8	Range:	0 - 100%	Resolution	5x10E-1	0 = 0%, 100%	100 = 50%, 200 =
12	Program	Color Sequence		•	eld Size: 1 ield Size:		Request Param Command Para		Optional Optional
	DD512	Medium Absolute Percentage	$0 - 100^{\circ}$	%	0-100%				
	DF120	Percent, Restricted Range	uint8	Range:	0 - 100%	Resolution	5x10E-1	0 = 0%, 100%	100 = 50%, 200 =
13	Zone Ena	abled		,	eld Size: ield Size: <mark>2</mark>		Request Param Command Para		Optional Required
	DD002	Generic status pair			01 = [Yes, On, 10 = Error,	Disabled, Reset, "0, Enabled, Set, "1"], ble, Unknown]	"],		
	DF52 Used to En	Bit field able Zone	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields
14	4 NMEA Reserved			Byte Field Size: Bit Field Size: resv 6			Request Param Command Para		
	DD001	Reserved field			Variable numb	per of reserved bits,	all set to logic "1"		
	DF52 Used to alig	Bit field gn subsequent data on a byte bou	bit(n) ndary.	Range:	Variable	Resolution	1	Used to	construct bit fields

Lighting Scene PGN: 130562 hex: 1FE02

This PGN provides a sequence of zone program configurations. Each zone can execute a single program. Each program has various parameters. A program may not make use of all parameters and unused parameters can be set to 0. This PGN will be sent upon change or in response to a request.

Notes:

An invalid / unused scene has Config Count = 0

Only Zones or Devices included in the scene will be changed when playing a scene.

Intensity is a program variable; this generally would be a global intensity scaling of the color sequence intensity

A (Field 6) Zone Index value of 255 indicates the configuration is a Device ID.

If (Field 6) Zone Index is valid then (Field 7) Device ID should be 4,294,967,295.

If (Field 7) specifies a Device ID of a device that does not support programs nothing will happen.

When commanding a scene either (Field 6) Zone index or (Field 7) Device ID should be specified in a configuration.

Example:

If Color is 100% and Scene is 50% output is 50%

Color is 50% Scene is 50% output is 25%.

Rate is a program variable; this is a Min to Max setting

Ex: 0 = Slowest Fade, 100 = Fastest Fade

Custom programs may change this definition.

Scene Indexes 220-252 are Reserved

220 - All Zones On (White)

221 - All Zones Off

222 - 252 Reserved for future use by NMEA

See Lighting System Settings (PGN 130330) for Max Values

Begin Request Support:

Global ISO requests (PGN 059904) and Global NMEA Requests (PGN 126208) for this Parameter Group shall be ignored. An addressed ISO Request will result in a Negative Acknowledgement (PGN 059392) with Field 1 0x01 = Negative Acknowledgment.

If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

- If no requested fields have been included with the Request Group Function, then the response is to return all scene information on the lighting controller. It may be one or multiple PGNs.
- If the Request Group Function (PGN 126208) includes the (Field 1) Scene Index, then the response shall be filtered by this field.
- If the Request Group Function (PGN 126208) includes the (Field 1) Scene Index that is greater than the Max Scenes, then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported". And the corresponding field error will contain "0x3 = Request or command parameter out-of-range"
- Control (Field 3) will be returned as invalid when reading.

End Request Support.

Begin Command Support:

If a Command Group Function (PGN 126208) commanding this PGN is received, the receiving device shall respond in the following manner:

Every Command Group Function (PGN 126208) transmitted for this PGN shall contain (Field 1) Scene Index the commanded shall identify which scene the remaining commanded fields apply to.

- If the Command Group Function (PGN 126208) containing (Field 1) Scene Index is greater than the Max Scenes and not equal to a valid reserved value then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported". And the corresponding field error will contain "0x3 = Request or command parameter out-of-range"
- If the Command Group Function (PGN 126208) containing (Field 2) Scene Name is sent then the scene will be assigned that

Lighting Scene PGN: 130562 hex: 1FE02

name.

• If the Command Group Function (PGN 126208) containing (Field 2) Scene Name length is sent greater than the 32 ascii / 16 Unicode characters then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported". And the corresponding field error will contain "0x3 = Request or command parameter out-of-range"

Every Command Group Function (PGN 126208) transmitted for this PGN shall contain (Field 3) Scene Control Note 1:

The meaning of the Scene Controls fields is as follows:

- Store: The scene will be stored on the controller in the specified Scene Index. The PGN will be transmitted with the updated changes.
- Play: The scene will be played, if only (Field 1) and (Field 3) then the scene will be played from memory. Otherwise, the PGN contents will be used.
- If Play is only specified, no PGN will be sent as the scene is not stored by the controller after it has been applied. For instance, Requesting the same index will return the last stored scene, not the Play only scene.
- If the Command Group Function (PGN 126208) containing (Field 4) Config Count is sent then the scene will be assigned sized to that number of Configurations.
- If the Command Group Function (PGN 126208) containing (Field 4) Config Count is sent greater than the Max Scene Configuration Count then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported". And the corresponding field error will contain "0x3 = Request or command parameter out-of-range" To set a configuration entry in a Scene Configuration slot then (Field 5) Configuration Index must be commanded.
- If the Command Group Function (PGN 126208) containing (Field 5) Configuration Index is sent greater than the Config Count then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported". And the corresponding field error will contain "0x3 = Request or command parameter out-of-range"
- If (Fields 6 through 12) are commanded, then they will be applied to the Configuration Slot of the last commanded (Field 5) Configuration Index.
- If (Field 6 through 12) are commanded without a previously commanded (Field 5) Configuration Index then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported". And the corresponding field error will contain "0x3 = Request or command parameter out-of-range"
- If the Command Group Function (PGN 126208) containing (Field 6 and 7 or repeated) are greater than their corresponding max values then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported". And the corresponding field error will contain "0x3 = Request or command parameter out-of-range"

Example:

Processing on the device shall be as follows:

- Commanded fields will be processed in order. Every time (Field 5) Configuration Index is processed the current Configuration slot will be set to this value.
- Any (Fields 6 through 12) after this will apply to the last commanded (Field 5) Configuration index
- This allows multiple slots to be sent as a group or single slots modified.
- If (Field 6 and 7 or repeated) are specified, they will set the other field to invalid. Only one should be sent when configuring a Configuration otherwise the last one commanded will be used.

End Command Support.

Further details can be found in the NMEA2000 Lighting Application Notes in Appendix D

Single Frame: No Priority Default: 7 Default Update Rate: milliseconds Frequency: NA cycles per second

Destination: Global Query Support: Optional Command Support: Required ACK Rapmts: None

Lighting Scene PGN: 130562 hex: 1FE02

eld ‡	# Field Name							
1	Scene Index		•	eld Size: 1		Request Para Command Pa		Required Required
	DD005 Generic numeric ID, short			Number of route, way	point, event,	mark, etc.		
	DF53 Integer, 8 bit unsigned Scene Index (220-252 are reserved)	uint8	Range:	0 to 252	Resolution:	1 bit	Unit-les	ss number
2	Scene Name		Byte Fi	eld Size: 8 or 16 n	1	Request Para	meter	Optional
			Bit F	ield Size:	-	Command Pa	rameter:	
	DD504 Name of Device							
	DF130 String, variable, very sho Scene Name shall consist of no more than	·		16 Unicode Characters		1 ASCII or 1 Unicode Character	in string Count be number	bytes. First byte g (uint8) is the byte indicating the of bytes in the including the Coun
							Second the Cor Control the strit ASCII or Unic (Char10 Control Unicod Control charact A string charact	byte = 0 => e characters byte = 1 => ASCI ers g with no ers (total length of , i.e. Count = 2) is
3	Control			eld Size:		Request Para		Optional
	DD514 Scene Control		Bit F	0000 0000 = Reserved xxxx xxx1 = Store xxxx xx1x = Play xxxx x0xx to 0xxx xx	xx = Reserve		Inactive s	tates shall be
				transmitted as 0. Reset transmitted as 0.	rved and uns	upported bits w	ithin the fi	ield shall be
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit field
4	Configuration Count			eld Size: 1		Request Para Command Pa		Optional Required
	DD005 Generic numeric ID, short			Number of route, way	point, event,	mark, etc.		
	DF53 Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit	Unit-les	ss number
5	Configuration Index			eld Size: 1		Request Para Command Pa		Optional Required
	DDOOF Comonic marrie ID 1			Number of route, way	moint event	mark etc		
	DD005 Generic numeric ID, short			Number of foute, way	point, event,	mark, etc.		

Lighting Scene	PGN: 130562
	h 4FE00

hex: 1FE02

6	Zone Index	Byte Field Size: 1 Bit Field Size:	Request Parameter Optional Command Parameter: Required
	DD005 Generic numeric ID, short	Number of route, waypoin	t, event, mark, etc.
	DF53 Integer, 8 bit unsigned uint8 Zone Index 252 = No Zone Assignement	Range: 0 to 252	Colution: 1 bit Unit-less number
7	Devices ID	Byte Field Size: 4 Bit Field Size:	Request Parameter Optional Command Parameter: Required
	DD010 Generic numeric ID, large	Number of route, waypoin	t, event, mark, etc.
	DF55 Integer, 32 bit unsigned uint32	Range: 0 to 4,294,967,292 Res	colution: 1 bit Unit-less number
8	Program Index	Byte Field Size: 1 Bit Field Size:	Request Parameter Optional Command Parameter: Required
	DD005 Generic numeric ID, short	Number of route, waypoin	t, event, mark, etc.
	$ \begin{tabular}{ll} \textbf{DF53} & Integer, 8 bit unsigned & \textbf{uint8} \\ \hline \textbf{The program Index} & \end{tabular} $	Range: 0 to 252	Colution: 1 bit Unit-less number
9	Program Color Sequence Index	Byte Field Size: 1 Bit Field Size:	Request Parameter Optional Command Parameter: Required
	DD005 Generic numeric ID, short	Number of route, waypoin	t, event, mark, etc.
	DF53 Integer, 8 bit unsigned uint8 Index of color sequence	Range: 0 to 252	Colution: 1 bit Unit-less number
10	Program Intensity	Byte Field Size: 1 Bit Field Size:	Request Parameter Optional Command Parameter: Required
	DD512 Medium Absolute Percentage 0 – 100	% 0-100%	
	DF120 Percent, Restricted Range uint8	Range: <mark>0 - 100% Res</mark>	0 = 0%, 100 = 50%, 200 = 100%
11	Program Rate	Byte Field Size: 1 Bit Field Size:	Request Parameter Optional Command Parameter: Required
	DD512 Medium Absolute Percentage 0 – 100	% 0-100%	
	DF120 Percent, Restricted Range uint8	Range: <mark>0 - 100% Res</mark>	0 = 0%, 100 = 50%, 200 = 100%
12	Program Color Sequence Rate	Byte Field Size: 1 Bit Field Size:	Request Parameter Optional Command Parameter: Required
	DD512 Medium Absolute Percentage 0 – 100	% 0-100%	
	DF120 Percent, Restricted Range uint8 This is always used for color transition changes	Range: 0 - 100% Res	0 = 0%, 100 = 50%, 200 = 100%

Light	ing Sce	ene						_	: 130562 ex: 1FE02
13	Repeat Fields 5-12 as needed based on value of Field #4			•	eld Size:		Request Parameter		
				Bit Field Size: <mark>n</mark>			Command Parameter:		
	DD000	Undefined							
	DF00	Undefined	Undefined	Range:	undefined	Resolution:	undefined	Applicat at time of	ion specific, defined f use.

Lighting Device PGN: 130563 hex: 1FE03

This PGN is used to provide status and capabilities of a lighting device. A lighting device may be a virtual device connected to a lighting controller or physical device on the network.

This PGN will be sent upon change or in response to a request.

Notes:

- The Device ID should be a unique identifier of this device on this controller, it should be independent of the assigned Name field, power state or connection state. The idea is this should be unique way to identify a lighting device on this controller across the lifetime of the system. Example: A switch is configured to control a light.
- There may be cases that cause this HID to change and the Manufacturer should call these out. Most common could possibly be a system reset.
- Possible ID types are a Hash or Serial Number. This is up to the controller and should not be interpreted to have some meaning outside of being a HID.
- If device is using component settings in fields 7-11, the (Field 12) Program ID is reported as (254) Out of Range. Otherwise, the device is using the Program setting fields 12-16.
- Returning the device's current colors is optional.
- Commands to the RGB Component, Kelvin and Intensity will set the devices current color, if the device is part of an active Scene Program or Zone these values may be ignored or overwritten.
- For non-dimmable lights an intensity of 0 is off and anything else is on.
- White can be controlled either through the K or setting R=G=B. Only RGB or Kelvin should be used at one time.
- See PGN Lighting System Settings 130330 for Max Values

Begin Request Support:

Global ISO requests (PGN 059904) and Global NMEA Requests (PGN 126208) for this Parameter Group shall be ignored. An addressed ISO Request will result in a Negative Acknowledgement (PGN 059392) with Field 1 0x01 = Negative Acknowledgment.

If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

- The Request Group Function (PGN 126208) shall always include (Field 1) Device ID, the response shall be filtered by this
- If the Request Group Function (PGN 126208) includes the Device ID that is not found then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x03 = Access Denied". "0x3 = Request or command parameter out-of-range"

End Request Support.

Begin Command Support:

If a Command Group Function (PGN 126208) commanding this PGN is received, the receiving device shall respond in the following manner:

Command Support is Required for Fields: 1, 4, 5, 17

Command Support is Optional for fields: 7,8,9,10,11,12,13,14,15,16

- If the application requires Red, Green, Black, Kelvin, or Intensity settings use fields 7-11.
- For Programs use fields 12-16.
- Every Command Group Function (PGN 126208) transmitted for this PGN shall contain (Field 1) Device ID to identify which device the remaining commands apply to.
- If the Command Group Function (PGN 126208) containing (Field 1) Device ID is not included then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported".
- If the Command Group Function (PGN 126208) contains a valid (Field 4) Zone Index the device will be assigned to that zone.
- If the Command Group Function (PGN 126208) containing (Field 4) Zone Index is greater than the Max Zones then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code

Lighting Device PGN: 130563 hex: 1FE03

(Field 3) "0x4 = Request or Command is not supported". And the corresponding field error will contain "0x3 = Request or command parameter out-of-range"

- If the Command Group Function (PGN 126208) contains a valid (Field 5) Name of Lighting Device will be assigned that name.
- If the Command Group Function (PGN 126208) containing (Field 5) Name of Lighting Device length is greater than the 32 ascii / 16 Unicode characters then the appropriate response would be the Acknowledge Group Function (PGN126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported". And the corresponding field error will contain "0x3 = Request or command parameter out-of-range"
- If (Fields 7 through 11) are commanded, then the active state will use these fields and (Field 12) Program ID will also change to (254) Out of Range.

End Command Support.

Application examples are located in NMEA 2000 Appendix D.

	ame: No	Priority Default: 7		Update R		milliseconds	Frequency:	N/	Cycles per seco
estinatio)	n: <mark>Global</mark>	Query Support: Require	e <mark>d</mark> Co	mmand Sup	pport: Required	ACK Rqmnts:			
ield#	Field Na	me							
1	Device ID			•	ield Size: 4		Request Para Command Pa		Required Required
	DD010	Generic numeric ID, large			Number of				
	DF55 This is a UI	Integer, 32 bit unsigned Of for this device on the network	uint32 and not an		0 to 4,294,967	Resolution	n: 1 bit	Unit-le	ss number
2	Device Ca	apabilities		•	eld Size: ield Size: 8		Request Para Command Pa		Optional Prohibited
	DD507	Lighting Device Functions			XXXX XX XXXX XX XXXX XIX XXXX IXX XXXI XXX XXIX XXX	XX = Default X1 = Dimmable, 1X = Programmable XX = Color Configura XX = Reserved for fut	ure use ure use ure use ure use		
		Bit field ne capabilities and functions of the swithin the field shall be transm		•	Variable	Resolution	n: <mark>1</mark>	Used to	o construct bit fields
3	Color Cap	pabilities		•	eld Size: ield Size: 8		Request Para Command Pa		Optional Optional
	DD508	Color Capabilities			XXXX XX XXXX XX XXXX 1XX XXXX 1XX XXXX XXX XXXX XXX	1X = G $XX = B$	ure use		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution	n: 1	Used to	o construct bit fields
		color capabilities for this Device s within the field shall be transm	Channel.						

Lighting Device PGN: 130563
hex: 1FE03

4	Zone Index			eld Size: ield Size:	1		Request Paran Command Para		Optional Required
	DD005 Generic numeric ID, short		Dit 1		nber of route, way	moint event		arriotor.	rtequired
	,	• 40	Pongo:		•			TT:4 1	1
	DF53 Integer, 8 bit unsigned Zone the devices is assigned to. Zone Index 252 = No Zone Assignement	uint8	Range.	0 to 252	2	Resolution:	I bit	Unit-le	ss number
5	Name of Lighting Device		-	eld Size: ield Size:	8 or 16 n]	Request Paran Command Para		Optional Required
	DD504 Name of Device								
	DF130 String, variable, very shor c	h8or16(n)Range:		ASCII or 0 to code Characters	Resolution:	1 ASCII or 1 Unicode Character	in string Count b	bytes. First byte g (uint8) is the byte indicating the of bytes in the
								and Co Second the Cor Control the strin ASCII or Unicod Control Unicod Control charact A string charact	byte = 0 => e characters byte = 1 => ASCII ers g with no ers (total length of i.e. Count = 2) is
6	Status		-	eld Size: ield Size:			Request Paran Command Para		Optional Prohibited
	DD510 Status of the light			0x0 0x0 0x0 0x0 0x0 0x0	0 = Detected / No 1 = Undetected 2 = General Error 3 = Temperature I 4 = Voltage Error 5 = Maintenance 6 = Over Current 7 - 0xFF = Reserv	Error Required Detected	use		
	DF53 Integer, 8 bit unsigned The current state of the light, detected,	uint8	Range:	0 to 252	2	Resolution:	1 bit	Unit-le	ss number
7	Red Component		•	eld Size: ield Size:			Request Paran Command Para		Optional Optional
	DD509 Color value				or Options: ue 0-255 = color				
	DF52 Bit field	bit(n)	Range:	Variabl	e	Resolution:	1	Used to	construct bit fields

Light	ting Device		PGN: 130563 hex: 1FE03
8	Green Component	Byte Field Size:	Request Parameter Optional

8	Green Component		•	ield Size: iield Size: <mark>8</mark>		Request Parameter Command Parameter:	Optional Optional	
	DD509 Color value			Color Options: Value 0-255 = color				
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	Used t	o construct bit fields	
9	Blue Component		•	ield Size: ield Size: <mark>8</mark>		Request Parameter Command Parameter:	Optional Optional	
	DD509 Color value			Color Options: Value 0-255 = color				
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1 Used t	o construct bit fields	
10	Color Temperature		•	ield Size: 2 iield Size:		Request Parameter Command Parameter:	Optional Optional	
	DD511 Kelvin based color			A value covering the	visible Kelvir	n range for lighting		
	DF124 Temperature, Very High The color temperature component	Uint16	Range:	0-65532 deg K	Resolution:	_	e covering the visible range for lighting	
11	Intensity DD512 Medium Absolute Percentag	e 0 – 100°	Bit F	ield Size: 1 iield Size: 0-100%		Request Parameter Command Parameter:	Optional Optional	
	DF120 Percent, Restricted Range The color intensity	uint8	Range:	0 - 100%	Resolution:	5x10E-1 0 = 0% 100%	6, 100 = 50%, 200 =	
12	Program ID			ield Size: 1		Request Parameter Command Parameter:	Optional Optional	
	DD005 Generic numeric ID, short			Number of route, way	point, event,	, mark, etc.		
	DF53 Integer, 8 bit unsigned The program ID	uint8	Range:	0 to 252	Resolution:	1 bit Unit-le	ess number	
13	Program Color Sequence Index		•	ield Size: 1		Request Parameter Command Parameter:	Optional Optional	
	DD005 Generic numeric ID, short			Number of route, way	point, event,	mark, etc.		
	DF53 Integer, 8 bit unsigned Index of colors sequence	uint8	Range:	0 to 252	Resolution:	1 bit Unit-le	ess number	
14	Program Intensity			ield Size: 1		Request Parameter Command Parameter:	Optional Optional	
	DD512 Medium Absolute Percentag	e 0 – 100°	6	0-100%				
	DF120 Percent, Restricted Range Intensity 0 – 100%	uint8	Range:	0 - 100%	Resolution:	0 = 0%	6, 100 = 50%, 200 =	

PGN: 130563

							h	ex: 1FE03	
15	Program Rate		•	ield Size: 1]		Request Parameter Command Parameter: Optional Optional		
	DD512 Medium Absolute Percentage	$0 - 100^{\circ}$	%	0-100%					
	DF120 Percent, Restricted Range	uint8	Range:	0 - 100%	Resolution	5x10E-1	0 = 0%, 100%	, 100 = 50%, 200 =	
16	Program Color Sequence Rate		•	ield Size: 1]	Request Parai Command Pai		Optional Optional	
	DD512 Medium Absolute Percentage	$0 - 100^{\circ}$	%	0-100%					
	DF120 Percent, Restricted Range	uint8	Range:	0 - 100%	Resolution	5x10E-1	0 = 0%, 100%	, 100 = 50%, 200 =	
17	Enabled		•	ield Size: ield Size: 2		Request Parai Command Pai		Optional Required	
	DD002 Generic status pair				Disabled, Reset, "0' Enabled, Set, "1"], le, Unknown]	"],			
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields	
	Enable the Device								
18	NMEA Reserved		•	ield Size: ield Size: resv 6]	Request Parai Command Pai			
	DD001 Reserved field		Variable number of reserved bits,			all set to logic "1"			
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields	

Used to align subsequent data on a byte boundary.

Lighting Device

Lighting Device Enumeration

PGN: 130564 hex: 1FE04

This PGN allows for enumeration of the lighting devices on a lighting controller.

This PGN will be sent upon change or in response to a request or when Status or Total Number of devices change.

Begin Request Support:

Global ISO requests (PGN 059904) and Global NMEA Requests (PGN 126208) for this Parameter Group shall be ignored. Response to an addressed ISO request (PGN 059904) for this Parameter Group shall be the transmission of this PGN once.

If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

• If no requested fields have been included in the Request Group Function, then the response is to return a single PGN

Note 1: This Request Parameter is required. Both "Index of the first device" (field 1) and "Number of devices" (field 3) are required when making a filtered request for this PGN with the Request Group Function (PGN 126208).

- If field 1 and field 3 have been included in the Request Group Function then the response is to return the PGN with field values based on the values of the requested parameters.
- If values for field 1 and field 3 result in the selection of an index greater than the total number of devices, then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x = Request or Command is not supported", and the corresponding field error will contain "0x3 = Request or command parameter out-of-range" for each invalid field.
- If any other fields are requested then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported".

End Request Support.

If a Command Group Function (PGN 126208) commanding this PGN is received, the receiving device shall respond in the following manner:

• If the Command Group Function (PGN 126208) contains any fields then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported".

End Command Support.

Further details can be found in the NMEA2000 Lighting Application Notes in Appendix D

Single Fra	ame: No	Priority Default: 7	Default	Update Ra	te:	<mark>0</mark> milliseconds	Frequency:	#Div/0!	cycles per secon
Destinatio	n: Global	Query Support: Required	d Co	mmand Supp	ort: Optional	ACK Rqmnts: N	lone		
Field#	Field Na	ame							
1	Index of	First Device		Byte Fie	d Size: 2		Request Parameter Required		
				Bit Fie	ld Size:		Command P	arameter:	Optional
	DD007	Generic numeric ID, medium	l		Number of	route, waypoint, event,	, mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resolution	1 bit	Unit-les	s number
	65,532= Da	ata Not Available							
2	Total Nu	mber of Devices		Byte Fie	d Size: 2		Request Par	rameter	Optional
				Bit Fie	ld Size:		Command P	arameter:	Optional
	DD007 Generic numeric ID, med				Number of	route, waypoint, event,	, mark, etc.		
	DF54	Integer, 16 bit unsigned	uint16	Range:	0 to 65,532	Resolution	1 bit	Unit-les	s number
	65,532= Da	ata Not Available							

Lighting Device Enumeration

PGN: 130564 hex: 1FE04

3	Number of D	Devices		Byte Field Size: 2 Bit Field Size:			Request Param Command Para		Optional Prohibited
	DD007 Ge	eneric numeric ID, medium			Number of route,	waypoint, event,	mark, etc.		
	DF54 In 65,532= Data N	<i>O</i> , <i>O</i> .	int16	Range:	0 to 65,532	Resolution:	1 bit	Unit-le	ss number
4	Device ID			•	eld Size: 4		Request Param Command Para		Optional Prohibited
	DD010 Ge	eneric numeric ID, large			Number of route,	, mark, etc.			
	DF55 In	nteger, 32 bit unsigned u	int32	Range:	0 to 4,294,967,292	Resolution:	1 bit	Unit-le	ss number
5	Status			•	eld Size: 1		Request Param Command Para		Optional Prohibited
	DD510 Sta	atus of the light			0x00 = Detected 0x01 = Undetected 0x02 = General E 0x03 = Temperation 0x04 = Voltage E 0x05 = Maintenant 0x06 = Over Curron 0x07 - 0xFF = Re	ed Cirror ure Error Cirror nce Required rent Detected	use		
	DF53 In 0xFF= Data No	8) - 8	uint8	Range:	0 to 252	Resolution:	1 bit	Unit-le	ss number

Lighting Color Sequence

PGN: 130565 hex: 1FE05

This PGN can be used to configure color sequences that are used by a scene.

This PGN will be sent upon change or in response to a request.

A color sequence is a list of colors that will be transitioned through by the running scene.

A sequence could be 1 to N number of colors.

The transition method is up to the program that is running.

A predefined set of color sequences. 1 to Max Color Sequence Color Count

Notes:

- An invalid / unset Color Sequence has a Color Count of 0.
- When specifying a color tuple if Kelvin = 0, then RGB is used; otherwise, the Kelvin value is used.
- The Intensity Field controls the overall intensity brightness of both the RGB and Kelvin values
- Sequence Indexes 220-252 are Reserved, these cannot be requested or commanded.

Preset definitions:

Sequence index has predefined values for various states.

Default Values 220-228

Values 0-219 configurable or provided by vendor.

A controller shall support the following sequence color values.

- 220 Red
- 221 Green
- 222 Blue
- 223 White
- 224 Cool White
- 225 Warm White
- 226 Blue, White
- 227 Red, Green, Blue, White
- 228 Full Spectrum
 - {0xFF, 0xFF, 0xFF}
 - {0xFF, 0xFF, 0x80}
 - {0xFF, 0xFF, 0x40}
 - {0xFF, 0x69, 0x50}
 - {0xFF, 0x14, 0x93}
 - {0xFF, 0x00, 0x00}
 - {0xFF, 0x80, 0x00}
 - {0xFF, 0x45, 0x00}
 - {0xFF, 0x80, 0x40}
 - {0xFF, 0xF0, 0x00}
 - {0x00, 0xFF, 0x00}
 - {0x32, 0xFF, 0x32}
 - {0x00, 0xFF, 0x80}
 - {0x00, 0xFF, 0xFF}
 - {0x00, 0x00, 0xFF}{0x00, 0xBF, 0xFF}
 - (0--4D, 0--00, 0--00)
 - {0x4B, 0x00, 0x82}
 - {0xFF, 0x00, 0x80}
 - {0xFF, 0x00, 0xBC}
 - {0xFF, 0x00, 0xFF}

See PGN Lighting - System Settings 130330 for Max Values.

Lighting Color Sequence

PGN: 130565 hex: 1FE05

Begin Request Support:

Global ISO requests (PGN 059904) and Global NMEA Requests (PGN 126208) for this Parameter Group shall be ignored. An addressed ISO Request will result in a Negative Acknowledgement (PGN 059392) with Field 1 0x01 = Negative Acknowledgment.

If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

- If no requested fields have been included with the Request Group Function, then the response is to return one or more PGNs
- If the Request Group Function (PGN 126208) includes the (Field 1) Sequence Index, then the response shall be filtered by this field
- If the Request Group Function (PGN 126208) includes the (Field 1) Sequence Index that is greater than the Max Color Sequences value of 219, then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported, And the corresponding field error will contain "0x3 = Request or command parameter out-of-range"
- If any other fields are requested then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported".

End Request Support.

Begin Command Support:

If a Command Group Function (PGN 126208) commanding this PGN is received, the receiving device shall respond in the following manner:

- Every Command Group Function (PGN 126208) transmitted for this PGN shall contain (Field 1) Sequence Index in the first commanded field, and if the commanded value shall identify which sequence the remaining commanded fields apply to.
- If the Command Group Function (PGN 126208) containing (Field 1) Sequence Index is not included or not the first commanded field then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported".
- If the Command Group Function (PGN 126208) containing (Field 1) Sequence Index is greater than the Max Color Sequences value of 219, then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported". And the corresponding field error will contain "0x3 = Request or command parameter out-of-range"
- To size a Color Sequence (Field 2) Color Count must be commanded
- If the Command Group Function (PGN 126208) (Field 2) Color Count is greater than Max Color Sequence Color Count, then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported". And the corresponding field error will contain "0x3 = Request or command parameter out-of-range"
- To set a color entry in a Color Sequence slot then (Field 3) Color Index must be commanded.
- If (Field 3) Color Index is greater than Color Count then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported". And the corresponding field error will contain "0x3 = Request or command parameter out-of-range"
- If (Fields 4 through 8) are commanded, then they will be applied to the Color Sequence Slot of the last commanded (Field 3) Color Index.
- If (Field 4 through 8) are commanded without a previously commanded (Field 3) Color Index then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported". And the corresponding field error will contain "0x3 = Request or command parameter out-of-range"

Example:

Processing on the device shall be as follows.

• Commanded fields will be processed in order. Every time (Field 3) Color Index is processed the current color slot will be set to this value.

Lighting Color Sequence

PGN: 130565 hex: 1FE05

- Any (Fields 4 through 8) after this will apply to the last commanded (Field 3) Color index
- This allows multiple slots to be sent as a group or single slots modified

Further details can be found in the NMEA2000 Lighting Application Notes in Appendix D

Single Fr	ame: No	Priority Default: 7		Update R		milliseconds	Frequency:	NA	cycles per second
Destinatio	n: <mark>Global</mark>	Query Support: Required	Co	mmand Sup	port: Required	ACK Rqmnts:			
Field#	Field Na	ame							
1	Sequenc	e Index			eld Size: 1		Request Par Command P		Required Required
	DD005	Generic numeric ID, short			Number of r	oute, waypoint, even	t, mark, etc.		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolutio	n: 1 bit	Unit-les	s number
	Sequence	Index							
2	Color Co	unt		•	eld Size: 1 ield Size:		Request Par Command P		Optional Required
	DD005	Generic numeric ID, short			Number of r	oute, waypoint, even	t, mark, etc.		
	DF53 Number of	Integer, 8 bit unsigned colors in this sequence	uint8	Range:	0 to 252	Resolutio	n: 1 bit	Unit-les	s number
3	Color Inc	dex		Byte Fi	eld Size: 1		Request Par	rameter	Optional
				Bit F	ield Size:	<u> </u>	Command P	arameter:	Required
	DD005	Generic numeric ID, short			Number of r	coute, waypoint, even	t, mark, etc.		
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolutio	n: 1 bit	Unit-les	s number
	Color Index	in the sequence							
4	Red Com	nponent		•	eld Size: ield Size: 8		Request Par Command P		Optional Optional
	DD509	Color value			Color Option Value 0-25:				
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: 1	Used to	construct bit fields
5	Green Co	omponent		-	eld Size: ield Size: 8		Request Par Command P		Optional Optional
	DD509	Color value			Color Option Value 0-25:				
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: 1	Used to	construct bit fields
6	Blue Cor	mponent		•	eld Size: ield Size: 8		Request Par Command P		Optional Optional
	DD509	Color value			Color Option Value 0-25:				
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: 1	Used to	construct bit fields

Tolor Temperature Byte Field Size: Request Parameter Command Parameter: Optional Optional A value covering the visible Kelvin range for lighting

DF124 Temperature, Very High Uint16 Range: 0-65532 deg K Resolution: 1 A value covering the visible Kelvin range for lighting

8 Intensity Byte Field Size: 1 Request Parameter Optional Bit Field Size: Command Parameter: Optional

DD512 Medium Absolute Percentage 0 - 100% 0-100%

DF120 Percent, Restricted Range **uint8** Range: 0 - 100% Resolution: 5x10E-1 0 = 0%, 100 = 50%, 200 = 100%

9 Fields 3-8 repeats as needed Byte Field Size: Request Parameter
Bit Field Size: Command Parameter:

DD000 Undefined

DF00 Undefined Undefined Range: undefined Resolution: undefined Application specific, defined at time of use.

Lighting Program PGN: 130566
hex: 1FE06

This PGN describes an available program on the controller.

Name of program

This PGN will be sent upon change or in response to a request.

The PGN generated by the Request, its (Field 1) Program Index will conform to the list below.

Program ID (Details for each Program ID located in Appendix D):

- 0 = Off
- 1 = Solid (Instant transition between colors in sequence, Program Color Sequence Rate controls time each color is shown).
- 2 = Fade (Transition through colors in sequence with fading to black in between, Program Rate controls time of transition)
- 3 = Strobe (Flashing quickly cycling through colors in sequence, Program Color Sequence Rate controls time each color is shown, Program Rate controls the strobe rate).
- 4 = Music Frequency (3 Frequency channels based on music input, Mapped to the first 3 colors in sequence).
- 5 = Music Intensity (Color intensity related to music intensity, Program Color Sequence Rate controls time each color is shown).
- 6 100 = NMEA reserved.
- 101 252 = Manufacturer specific Programs
- 253 = Reserved
- 254 = Out of Range
- 255 = Data not available or Do Not Change

Example: The controller returns Max Programs = 7. This Controller supports all NMEA programs and one extra custom program. Requesting (Field 1) Program Index = 6 will generate a PGN response with the (Field 1) Program Index set to 101 (the first custom program index).

Requesting (Field 1) Program Index = 3 will generate a PGN response with the (Field 1) Program Index set to 3 (NMEA Strobe).

Begin Request Support:

Global ISO requests (PGN 059904) and Global NMEA Requests (PGN 126208) for this Parameter Group shall be ignored. An addressed ISO Request will result in a Negative Acknowledgement (PGN 059392) with Field 1 0x01 = Negative Acknowledgment.

If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

- If no requested fields have been included with the Request Group Function, then the response is to return one or more PGNs shall be filtered by this field.
- If any other fields are requested then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported".

End Request Support.

Begin Command Support:

If a Command Group Function (PGN 126208) commanding this PGN is received, the receiving device shall respond in the following manner:

• If the Command Group Function (PGN 126208) contains any fields then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) "0x4 = Request or Command is not supported". And the corresponding field error will contain "0x3 = Request or command parameter out-of-range"

End Command Support.

Further details can be found in the NMEA2000 Lighting Application Notes in Appendix D

Lighting Program PGN: 130566 hex: 1FE06

Single Fr	ame: No	Priority Default: 7	Defaul	t Update R	Rate:	milliseco	nds	Frequency:	NA	cycles per secon
Destinatio	n: <mark>Global</mark>	Query Support: Required	d Co	ommand Sup	oport: Optional	ACK	K Rqmnts:			
ield#	Field Na	me								
1	Program I	ID		•	ield Size: 1		Request Paramet Command Param			Required Prohibited
	DD005	Generic numeric ID, short			Number of 1	route, wayp	mark, etc.	nark, etc.		
	DF53 See Progran	Integer, 8 bit unsigned m ID in PGN discription	uint8	Range:	0 to 252	F	Resolution:	1 bit	Unit-les	s number
2	Name of F	Program		•	ield Size: 8 or i	16 n		Request Par Command P		Optional Prohibited
	DD504	Name of Device								
	DF130	String, variable, very shor c	h8or16(n) Range:	0 to 32 ASCII 16 Unicode Ch			1 ASCII or 1 Unicode Character	in string Count b	bytes. First byte g (uint8) is the byte indicating the of bytes in the
	Name of Pro	ogram shall consist of no more th	an 32 AS	CII or 16 U	nicode Characters	i.			and Cor Second the Con Control the strin ASCII c or Unic. (Charle Control Unicode Control characte A string characte	byte = 0 => e characters byte = 1 => ASCII ers g with no ers (total length of i.e. Count = 2) is

Lighting Program PGN: 130566 hex: 1FE06

3 Description

Byte Field Size: 8 or 16 n

Request Parameter Optional

Bit Field Size: Command Parameter: Prohibited

DD004 Generic name string, short Name of place, route, waypoint, destination, vessel, vehicle, etc.

DF50 String, variable, short ch8or16(n) Range: 0 to 250 ASCII or Resolution: 1 ASCII or 2 to 252 by

0 to 125 Unicode
Characters

1 Unicode
Character

Contains the text of the label. If this field is programmable, the device should be able to store a Label with a minimum length of 32 ASCII or 16 Unicode characters. If the field is not programmable, labels should not exceed more than 200 ASCII or 100 Unicode characters.

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

4	Program Capabilities	Byte Field Size:	Request Parameter	Required
		Bit Field Size: 4	Command Parameter:	Prohibited

DD529 Program Capabilities MSB/LSB:

xxx1 = Program Color sequence xx1x = Program Intensity x1xx = Program Rate 1xxx = Program Color Rate

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

5 NMEA Reserved Byte Field Size: Request Parameter

Bit Field Size: resv 4 Command Parameter:

DD001 Reserved field Variable number of reserved bits, all set to logic "1"

DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields

Used to align subsequent data on a byte boundary.

Watermaker Input Setting and Status

PGN: 130567 hex: 1FE07

This PGN may be requested or used to command and configure a number of Watermaker controls. The Command Group Function PGN 126208 is used perform the following: start/stop a production, start/stop rinse or flush operation, start/stop low and high pressure pump and perform an emergency stop.

The Request Group Function PGN 126208 or ISO Request PGN 059904 may be used to request this PGN. This PGN also provides Watermaker status and measurement information. The PGN is broadcast periodically.

Single Fra	ame: N	Priority Default: 6	Default	Update Ra	ate: 2500	milliseconds	Frequency:	.4 cycles per se	cond
Destinatio	n: Global	Query Support: Optional	Co	mmand Supp	oort: Required	ACK Rqmnts: N	one		
Field #	Field N	ame							
1	Waterma	ker Operating State		Byte Fie Bit Fie	eld Size:		Request Paramet	- I	
	DD363 Watermaker Operating State DF52 Bit field				0 = Stopped 1 = Starting 2 = Running 3 = Stopping 4 = Flushing 5 = Rinsing 6 = Initiating 7 = Manual M 62 = Error 63 = Unavail	Mode able			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution.	1 U	sed to construct bit fie	lds
2	Producti	on Start/Stop		Byte Fie Bit Fie	eld Size:		Request Paramet	- 1	
	DD002 Generic status pair				01 = [Yes, Otion 10 = Error,	f, Disabled, Reset, "0 n, Enabled, Set, "1"], able, Unknown]	'],		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution.	1 U	sed to construct bit fie	lds
		manding this field with PGN 12620 indicates the Production is ON and				rts the Production. W	hen this PGN		
3	Rinse St	art/Stop		Byte Fie Bit Fie	eld Size:		Request Paramet		
	DD002	Generic status pair			01 = [Yes, Otion 10 = Error,	f, Disabled, Reset, "0 n, Enabled, Set, "1"], able, Unknown]	'],		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution.	1 U	sed to construct bit fie	lds
		manding this field with PGN 12620 nt, 01 indicates the Rinse/Flush fur		•			When this		

Watermaker Input Setting and Status

PGN: 130567 hex: 1FE07

4	Low Pres	ssure Pump Status		•	eld Size: ield Size: 2		Request Parameter Command Parameter:	Optional Required
	DD002	Generic status pair			01 = [Yes 10 = Erro	Off, Disabled, Reset, "0", On, Enabled, Set, "1"],],	
	DF52	Bit field	bit(n)		Variable	Resolution:	•	construct bit fields
		manding this field with PGN 1262 en this PGN is sent, 00 indicates						
5	High Pre	ssure Pump Status		•	eld Size: ield Size: 2		Request Parameter Command Parameter:	Optional Required
	DD002	Generic status pair			01 = [Yes $10 = Erro$	Off, Disabled, Reset, "0", On, Enabled, Set, "1"],],	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
		manding this field with PGN 1262 en this PGN is sent, 00 indicates						
6	Emerger	cy Stop		•	eld Size:	_	Request Parameter	Optional
				Bit F	ield Size: 2		Command Parameter:	Required
	DD002	Generic status pair			01 = [Yes 10 = Erro	Off, Disabled, Reset, "0", On, Enabled, Set, "1"],],	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
	values are	manding this field with PGN 1262 ignored. Emergency Stop can or l by the value 00 which means the	ly be activ	ated by the	e value of 01. V			
7	Product	Solenoid Valve Status		•	eld Size: ield Size: 2		Request Parameter Command Parameter:	Optional Optional
	DD364	Sensor Status			MSB/LSF 00 = OK 01 = War 10 = Erro 11= [Una	ning		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
8	Flush Mo	ode Status		•	eld Size: ield Size: 2		Request Parameter Command Parameter:	Optional Optional
	DD002	Generic status pair			01 = [Yes 10 = Erro	Off, Disabled, Reset, "0", On, Enabled, Set, "1"],],	
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields

Watermaker Input Setting and Status

PGN: 130567 hex: 1FE07

9	Salinity S	Status		Byte Fie			Request Parameter	Optional
	DD364	Sensor Status		Bit Fi	MSB/LSB: 00 = OK 01 = Warning 10 = Error 11 = [Unavailable, U	(nknown)	Command Parameter	©ptional
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used	to construct bit fields
10	Feed Pre	essure Status		Byte Fie Bit Fi	eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter	Optional Optional
	DD364	Sensor Status			MSB/LSB: 00 = OK 01 = Warning 10 = Error 11= [Unavailable, U	nknown]		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used	to construct bit fields
11	Oil Chan	ge Indicator Status		Byte Fie Bit Fi	eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter	Optional Optional
	DD364	Sensor Status			MSB/LSB: 00 = OK 01 = Warning 10 = Error 11= [Unavailable, U	nknown]		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used	to construct bit fields
12	Filter Sta	Sensor Status		Byte Fie Bit Fi	eld Size: ield Size: MSB/LSB: 00 = OK		Request Parameter Command Parameter	Optional Optional
				_	01 = Warning 10 = Error 11= [Unavailable, U	-		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:		to construct bit fields
13	System S	Status		Byte Fie Bit Fi	eld Size: ield Size: <mark>2</mark>		Request Parameter Command Parameter	Optional Optional
	DD364	Sensor Status			MSB/LSB: 00 = OK 01 = Warning 10 = Error 11= [Unavailable, U	nknown]		
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1 Used	to construct bit fields
14	NMEA R	eserved			eld Size: ield Size: resv 2		Request Parameter Command Parameter	-
	DD001	Reserved field			Variable number of 1	reserved bits, a	all set to logic "1"	
	DF52 Bit field bit(n) Used to align subsequent data on a byte boundary.			Range:	Variable	Resolution:	1 Used	to construct bit fields

Watermaker Input Setting and Status PGN: 130567 hex: 1FE07

15	Salinity		Byte Field Size: 2 Bit Field Size:		Request Parameter Command Parameter:	Optional Optional
	DD365 Salinity, Watermaker					
	DF112 Salinity	uint16	Range: 0 to 65,535 ppm	Resolution	1 ppm	
16	Product Water Temperature		Byte Field Size: 2 Bit Field Size:		Request Parameter Command Parameter:	Optional Optional
	DD043 Generic Temperature					
	DF39 Temperature, low	uint16	Range: 0 to 655.32 deg K	Resolution	1x10E-2 deg K	
17	Pre-filter Pressure		Byte Field Size: 2 Bit Field Size:		Request Parameter Command Parameter:	Optional Optional
	DD049 Generic Pressure					
	DF47 Pressure, medium	uint16	Range: 0 to 6,553,200 Pa	Resolution	1x10E+2 Pa	
18	Post-filter Pressure		Byte Field Size: 2 Bit Field Size:		Request Parameter Command Parameter:	Optional Optional
	DD049 Generic Pressure					
	DF47 Pressure, medium	uint16	Range: 0 to 6,553,200 Pa	Resolution	1x10E+2 Pa	
19	Feed Pressure		Byte Field Size: 2 Bit Field Size:		Request Parameter Command Parameter:	Optional Optional
	DD366 Pressure, Watermaker					
	DF113 Pressure, Compound	int16	Range: +/- 32,764 Kpa	Resolution	1 Kpa	
20	System High Pressure		Byte Field Size: 2 Bit Field Size:		Request Parameter Command Parameter:	Optional Optional
	DD225 Generic Pressure High					
	DF29 Pressure	uint16	Range: 0 to 65,532,000 Pa	Resolution	1x10E+3 Pa	
21	Product Water Flow		Byte Field Size: 2 Bit Field Size:		Request Parameter Command Parameter:	Optional Optional
	DD131 Flow rate, low					
	DF18 Flow rate, low	int16	Range: +/-3.2764 cu-m/hr	Resolution	1x10E-4 cu- m/hr	
22	Brine Water Flow		Byte Field Size: 2 Bit Field Size:		Request Parameter Command Parameter:	Optional Optional
	DD131 Flow rate, low					
	DF18 Flow rate, low	int16	Range: +/-3.2764 cu-m/hr	Resolution	1x10E-4 cu- m/hr	
23	Run Time		Byte Field Size: 4 Bit Field Size:		Request Parameter Command Parameter:	Optional Optional
	DD132 Run time, Engine					
	DF67 Time interval, large	uint32	Range: 0 to ~4.295x10E+9 s	Resolution	1 sec	
	· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·			

Entertainment – Diagnostic Status

PGN: 130568 hex: 1FE08

Details the diagnostic status of any Audio/Video Source. This PGN is sent upon change, in response to a request or periodically while diagnostic mode is enabled.

This PGN cannot be requested with the ISO request (PGN 059904).

Begin Request Group Function:

If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner :

IMPORTANT: The error codes specified in this PGN description for the Acknowledgement response shall take precedence.

This variation is specified to be consistent with the previously published suite of Entertainment PGNs, as the suite of entertainment PGNs contain an unusual response to Request Group Functions.

- If no requested fields have been included with the Request Group Function then the response is to return the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) of "0x3 = Access denied".
- If the Request Group Function (PGN 126208) includes the Audio/Video Source Type, Audio/Video Source Number field then the response shall be filtered by these fields contained within this request resulting in one response. If the fields requested are not valid then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) of "0x3 = Access denied".
- If an individual field is invalid the field parameter error code for that field shall be "0x3 = Requested or command parameter out-of-range".

End Request Group Function.

Begin Command Group Function:

- A NMEA Command Group Function (PGN 126208) is used to enable or disable diagnostic mode (Field 3).
- To change the diagnostic mode, the Command Group Function shall include the Audio/Video Source Type (Field 1), Audio/Video Source Number (Field 2) and Diagnostic Mode (Field 3).

End Command Group Function.

Further details can be found in the NMEA2000 Entertainment Application Notes in Appendix D.

Single Frame: No	Priority Default: 6	Def	fault Update Rate:	1000	milliseconds	Frequency:	1.	cycles per s	second
Destination: Global	Query Support: Requ	uired	Command Support:	Required	ACK Rqmnts:	Yes			
Field # Field Name									

Entertainment – Diagnostic Status

PGN: 130568 hex: 1FE08

1	Audio/Video Source Type		•	eld Size: ield Size: 8		Request Paramete	•
	DD389 Audio/Video Source Type			0 = Vessel Ala 1 = AM 2 = FM 3 = Weather 4 = DAB 5 = Aux 6 = USB 7 = CD 8 = MP3 9 = Apple iOS 10 = Android 11 = Bluetootl 12 = Sirius XI 13 = Pandora 14 = Spotify 15 = Slacker 16 = Songza 17 = Apple Ra 18 = Last FM 19 = Ethernet 20 = Video M 21 = Video M 21 = Video D' 22 = Video BI 23 = HDMI 24 = Video 25 - 252 = Use 253 = Reserve 254 = Error	n M ndio P4 VD ueRay or Defined		oso. Required
	DF52 Bit field	bit(n)	Range:	255 = Not ava	Resolution.	1 U	sed to construct bit field
	Audio/Video Source Number			eld Size: 1]	Request Paramete	the state of the s
	DD005 Generic numeric ID, short			Number of rout	e, waypoint, event,	mark, etc.	
	DF53 Integer, 8 bit unsigned	uint8		0 to 252	Resolution.	1 bit U	nit-less number
	Audio/Video Source Number per Type. There Device (e.g. 3 USB Sources). Device (e.g. 3 USB Sources).	e can be n	ore than c	one of each type of au	idio source availabl	e on a A/V	
	Device (e.g. 3 USB Sources).	e can be n	Byte Fi	eld Size:	idio source availabl	e on a A/V Request Paramete Command Parame	- 1
<u></u>	Device (e.g. 3 USB Sources). Device (e.g. 3 USB Sources).	e can be n	Byte Fi	eld Size: ield Size: MSB/LSB: 00 = [No, Off,	Disabled, Reset, "0 Enabled, Set, "1"],	Request Paramete	- 1
3	Device (e.g. 3 USB Sources). Device (e.g. 3 USB Sources). Diagnostic Mode	bit(n)	Byte Fi Bit F	eld Size: ield Size: MSB/LSB: 00 = [No, Off, 01 = [Yes, On, 10 = Error,	Disabled, Reset, "0 Enabled, Set, "1"],	Request Paramete Command Parame	- 1

Entertainment – Diagnostic Status

PGN: 130568 hex: 1FE08

NMEA Reserved Byte Field Size: Request Parameter 4 Bit Field Size: resv 6 Command Parameter: Variable number of reserved bits, all set to logic "1" **DD001** Reserved field DF52 Bit field Range: Variable Resolution: 1 Used to construct bit fields bit(n) Used to align subsequent data on byte boundary. Byte Field Size: 8 or 16 n 5 **Diagnostic Data** Request Parameter Optional Command Parameter: Optional Bit Field Size: **DD004** Generic name string, short Name of place, route, waypoint, destination, vessel, vehicle, etc. **DF50** String, variable, short ch8or16(n) Range: 0 to 250 ASCII or Resolution: 1 ASCII or 2 to 252 bytes. First byte in string (uint8) is the Count 0 to 125 Unicode 1 Unicode byte indicating the number Characters Character of bytes in the string, 0 to 125 Unicode Characters or 0 to 250 ASCII Characters. Displays the diagnostic data to the user. including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = 0 => Unicode characters Control byte = $1 \Rightarrow ASCII$ characters A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

PGN: 130569 hex: 1FE09

Details the current file being played and the current play status by Audio/Video zone.

Sent on start up, upon any change, upon request and periodically while a Audio/Video device is playing a file. Fields can be commanded by a client using the NMEA Command Group Function (PGN 126208) to change the currently playing audio/video source, current file, adjust volume, change the playing status, save a favorite or tune a radio source.

A device receiving an ISO Request (PGN 059904) for this PGN, shall respond by providing as many of these PGNs as necessary for every Audio/Video zone.

If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner :

- If no requested fields have been included with the Request Group Function then the response is to return one or more PGNs, just like responding to the ISO Request (PGN 059904).
- If the Request Group Function (PGN 126208) includes the Zone Number, Audio/Video Source Type, Audio/Video Source Number or File ID fields, then the response shall be filtered by these fields contained within this request resulting in one or more responses.
- If the fields requested are not valid then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) of "0x3 = Access denied".
- If an individual field is invalid the field parameter error code for that field shall be "0x3 = Requested or command parameter out-of-range".
- If the individual fields are valid but the combination of fields together are invalid then just the error state for PGN error code (Field 3) of "0x3 = Access denied" would be in the Acknowledge Group Function (PGN 126208) response. PGN Transmit Frequency is 1 cycle per second per Audio/Video Zone.

Note 1:

When commanding Fields 6, 8, 9, 11, and 12: valid values for Fields 1, 2, and 3 shall be provided in the NMEA Command Group Function.

Note 2:

When commanding Fields 10, 14, 15, 16, 17: Valid values for Fields 1, 2, and 3 shall be provided and Field 1 shall be set to "zero" in the NMEA Command Group Function. Some "Audio / Video Source Types", (Field 2), may not support playing different "File IDs", (Field 4) in different zones simultaneously.

A change to Fields 4, 5, 6, 8, 9, 11, 14 and 15 in any zone will result in the same change in all zones from the same source. Further details can be found in the NMEA2000 Entertainment Application Notes in Appendix D.

Single Fra	ame: N	Priority Default: 6	Default	t Update Rate:	500 r	nilliseconds	Frequency:	2.	cycles per s	econd
Destinatio	n: <mark>Global</mark>	Query Support: Requir	ed Co	ommand Support:	Required	ACK Rqmnts:	Yes			
Field #	Field Na	me								
1	Zone Num	ber		Byte Field S Bit Field			Request Parai Command Pai		Required Required	
	DD396 Entertainment Zones				0 = All Zone: 1 = Zone 1 2 = Zone 2 3 = Zone 3 4 = Zone 4 5 - 252 = User 253 = Reserve 254 = Error 255 = Data No.	Defined d				
	DF52	Bit field	bit(n)	Range: Va	riable	Resolutio	on: 1	Used to	construct bit fi	ields
		deo zone is a room or area of and could play a different source			vill be distributed	I. Each zone can	be separately			

PGN: 130569 hex: 1FE09

2	Audio/Vi	deo Source Type		•	eld Size:		Request Parame		Required
				Bit F	ield Size: 8		Command Para	meter:	Required
	DD389	Audio/Video Source Type			0 = Vessel Alam 1 = AM 2 = FM 3 = Weather 4 = DAB 5 = Aux 6 = USB 7 = CD 8 = MP3 9 = Apple iOS 10 = Android 11 = Bluetooth 12 = Sirius XM 13 = Pandora 14 = Spotify 15 = Slacker 16 = Songza 17 = Apple Rac 18 = Last FM 19 = Ethernet 20 = Video MP 21 = Video MP 21 = Video BU 22 = Video BU 23 = HDMI 24 = Video 25 - 252 = User 253 = Reserved 254 = Error 255 = Not avail	I dio 4 D eRay Defined I			
	DF52	Bit field	bit(n)	Range:	Variable	Resolution:	1	Used to	construct bit fields
3	Audio/Vi	deo Source Number			ield Size: 1		Request Parame Command Para		Required Required
	DD005	Generic numeric ID, short			Number of route	e, waypoint, event,	mark, etc.		
	DF53	Integer, 8 bit unsigned	uint8 re can be m		0 to 252 one of each type of aud	Resolution:		Unit-le	ss number
		g. 3 USB Sources).							
4					ield Size: 4	ĺ	Request Parame		Required Required
4	Device (e.g				ield Size:	., waypoint, event,	Command Para		

PGN: 130569 hex: 1FE09

	Play Status		Byte Field Size:	Request Parameter Optional
5	. Tay Catao		Bit Field Size: 8	Command Parameter: Required
	DD390 Play Status		0 = Play (Normal function 1 = Pause 2 = Stop 3 = FF (1x) 4 = FF (2x) 5 = FF (3x) 6 = FF (4x) 7 = RW (1x) 8 = RW (2x) 9 = RW (3x) 10 = RW (4x) 11 = Skip Ahead 12 = Skip Back 13 = Jog Ahead 14 = Jog Back 15 = Seek Up 16 = Seek Down 17 = Scan Up 18 = Scan Down 19 = Tune Up 20 = Tune Down 21 = Slow Motion (.75x) 22 = Slow Motion (.5x) 24 = Slow Motion (.125x) 25 - 252 = User Defined 253 = Reserved	
			254 = Error 255 = Not available	
	DF52 Bit field	bit(n)	254 = Error 255 = Not available	solution: 1 Used to construct bit fields
.	DF52 Bit field Elapsed Track/Chapter Time	bit(n)	254 = Error 255 = Not available	Solution: 1 Used to construct bit fields Request Parameter Optional Command Parameter: Note 1
<u> </u>		bit(n)	254 = Error 255 = Not available Range: Variable Res Byte Field Size: 2	Request Parameter Optional Command Parameter: Note 1
6	Elapsed Track/Chapter Time	bit(n)	254 = Error 255 = Not available Range: Variable Res Byte Field Size: Bit Field Size: Time, 1 Second Resolution	Request Parameter Optional Command Parameter: Note 1
	Elapsed Track/Chapter Time DD391 Time, Standard		254 = Error 255 = Not available Range: Variable Res Byte Field Size: Bit Field Size: Time, 1 Second Resolution	Request Parameter Optional Command Parameter: Note 1
	DD391 Time, Standard DF80 Time, 1sec		254 = Error 255 = Not available Range: Variable Res Byte Field Size: 2 Bit Field Size: Time, 1 Second Resolutio Range: 0 to 65532 seconds Res Byte Field Size: 2	Request Parameter Command Parameter: Solution: 1 second Request Parameter Optional Command Parameter: Optional Optional
	DD391 Time, Standard DF80 Time, 1sec Track/Chapter Time	uint16	254 = Error 255 = Not available Range: Variable Res Byte Field Size: 2 Bit Field Size: Time, 1 Second Resolutio Range: 0 to 65532 seconds Res Byte Field Size: 2 Bit Field Size: Time, 1 Second Resolution	Request Parameter Command Parameter: Optional Note 1 solution: 1 second Request Parameter Command Parameter: Optional Optional
7	Elapsed Track/Chapter Time DD391 Time, Standard DF80 Time, 1sec Track/Chapter Time DD391 Time, Standard	uint16	254 = Error 255 = Not available Range: Variable Res Byte Field Size: 2 Bit Field Size: Time, 1 Second Resolutio Range: 0 to 65532 seconds Res Byte Field Size: 2 Bit Field Size: 2 Time, 1 Second Resolution	Request Parameter Command Parameter: Note 1 Solution: 1 second Request Parameter Command Parameter: Optional Optional Optional
7	Elapsed Track/Chapter Time DD391 Time, Standard DF80 Time, 1sec Track/Chapter Time DD391 Time, Standard DF80 Time, 1sec	uint16	254 = Error 255 = Not available Range: Variable Res Byte Field Size: 2 Bit Field Size: Time, 1 Second Resolution Range: 0 to 65532 seconds Res Byte Field Size: 2 Bit Field Size: Time, 1 Second Resolution Range: 0 to 65532 seconds Resolution Range: 0 to 65532 seconds Resolution Range: 0 to 65532 seconds Resolution	Request Parameter Command Parameter: Solution: 1 second Request Parameter Command Parameter: Optional Optional Solution: 1 second Request Parameter Command Parameter: Optional Note 1

PGN: 130569 hex: 1FE09

9	Shuffle Status		•	eld Size: ield Size: <mark>4</mark>		Request Parameter Command Parameter:	Optional Note 1
	DD393 Shuffle			0 = Off 1 = Play Queue 2 = All 3 - 14 = Reserved 15 = Data Not Avail	able / Do Not	Change	
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
	If the shuffle status is set to Play Queue the	A/V device	will play a	all the files in the Play Queu	ue in random o	order.	
	If the shuffle status is set to all the A/V devictions of play files in the Play Queue.	e will play	all files fro	m a source in a random ord	der. The A/V [Device will no	
10	Save Favorite Number (write only)			eld Size: 1		Request Parameter Command Parameter:	Optional Note 2
	DD005 Generic numeric ID, short			Number of route, way	ypoint, event,	mark, etc.	
	DF53 Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit Unit-les	ss number
	Used to save current station as favorite. Tun When this PGN is generated as a status or r						
11	Play Favorite Number		•	eld Size: 1		Request Parameter Command Parameter:	Optional Note 1
	DD005 Generic numeric ID, short			Number of route, way	ypoint, event,	mark, etc.	
	DF53 Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution:	1 bit Unit-les	ss number
	Used to command AV to play indicated favo	rite station					
12	Thumbs Up/Thumbs Down		•	eld Size: ield Size: 8		Request Parameter Command Parameter:	Optional Note 1
	DD394 Thumbs Up / Thumbs Down			0 = None 1 = Thumbs Up 2 = Thumbs Down 3 - 253 = Reserved 254 = Error 255 = Data Not Avai	lable		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	1 Used to	construct bit fields
13	Signal Strength			eld Size: 1		Request Parameter Command Parameter:	Optional Optional
	DD263 Generic Absolute Percentage	0-252%					
	DF93 Percent, Absolute	uint8	Range:	0 - 252%	Resolution:	1%	
	Generic Absolute Percentage 0-252%						
14	Radio Frequency			eld Size: 4		Request Parameter Command Parameter:	Optional Note 2
	DD016 Radio Tx or Rx Frequency						
	DF21 Frequency	uint32	Range:	0 to ~4.295x10E+10 Hz	Resolution:	10 Hz	

Entertainment - Current File and Status PGN: 130569 hex: 1FE09

15	HD Frequ		Byte Field Size: 1 Bit Field Size:			Request Parameter Command Parameter:			
	DD005	Generic numeric ID, short			Number of	route, waypoint, event	, mark, etc.		
	DF53 Digital sub	Integer, 8 bit unsigned channel used for multicasting dig	uint8 tal radio o	_	0 to 252 stations on a sir	Resolution gle frequency.	i: 1 bit	Unit-less n	number
16	Delete Favorite Number			Byte Field Size: 1 Bit Field Size:			Request Parameter Optional Command Parameter: Note 2		
	DD005 Generic numeric ID, short				Number of	route, waypoint, event	, mark, etc.		
	DF53 Integer, 8 bit unsigned uint Used to delete a station as favorite. Tuner based so status or report, this field is set to not available (0x)			es only: Al	<mark>0 to 252</mark> M/FM/DAB/Sirius	Resolution XM. When this PGN is	1 010	Unit-less n	number
17	Total Number of Tracks			•	eld Size: 2 ield Size:		Request Parameter Optional Command Parameter: Note 2		
	DD007	Generic numeric ID, medium	m Number of			route, waypoint, event	, mark, etc.		
	DF54 Number of	Integer, 16 bit unsigned Tracks/files in current album, play		<i>Range:</i> er	0 to 65,532	Resolution	Resolution: 1 bit Unit-les		

Entertainment - Library Data File

PGN: 130570 hex: 1FE0A

The PGN details the library data for an individual Audio/Video file. Field 15 Artist Name, Field 16 Album Name and Field 17 Station Name may optionally contain null strings (see DF 50 for details).

This PGN is sent upon request or change. This PGN cannot be requested with the ISO request (PGN 059904).

If a globally addressed ISO request is received, there is no response.

If an addressed ISO request is received, the response is the ISO Acknowledge (PGN 059392) providing a negative acknowledge (NAK). If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

- If no requested fields have been included with the Request Group Function then the response is to return the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) of "0x3 = Access denied".
- If the Request Group Function (PGN 126208) includes the Audio/Video Source Type, Audio/Video Source Number, File ID and Library Data Type fields, then the response shall be filtered by these fields contained within this request resulting in one or more responses of this PGN.
- If the fields requested are not valid then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) of "0x3 = Access denied". If an individual field is invalid the field parameter error code for that field shall be "0x3 = Requested or command parameter out-of-range".
- If the individual fields contain valid values but the combination of the fields together are invalid, then the appropriate response shall be the Acknowledge Group Function (PGN 126208) with the PGN error code (Field 3) set to "0x3 = Access denied.

Note 1:

The fields can be commanded using the NMEA Command Group Function (PGN 126208) to add or remove a file from a play queue. A command shall include all of the following fields; Audio/Video Source Type, Audio Video Source Number, File ID, Library Data Type, Play Queue Zone Number and In Play Queue fields.

This PGN may exceed 223 bytes. If the PGN exceeds 223 bytes, then ISO Transport Protocol shall be used to transmit this PGN (See NMEA 2000 Main Document for further information on ISO multi-packet transfers).

Further details can be found in the NMEA2000 Entertainment Application Notes in Appendix D.

Single Frame: N	Priority Default: 6	De	efault Update Rate:	milliseconds	Frequency:	NA	cycles per se	econd
Destination: Global	Query Support: Requir	ed	Command Support: Required	ACK Rqmnts:	Yes			
Field # Field Name	е							

Entertainment - Library Data File PGN: 130570 hex: 1FE0A 1 Audio/Video Source Type Byte Field Size: Request Parameter Required Bit Field Size: 8 Command Parameter: Required 0 = Vessel Alarm **DD389** Audio/Video Source Type 1 = AM2 = FM3 = Weather4 = DAB5 = Aux6 = USB7 = CD8 = MP39 = Apple iOS 10 = Android 11 = Bluetooth 12 = Sirius XM 13 = Pandora 14 = Spotify 15 = Slacker 16 = Songza 17 = Apple Radio 18 = Last FM19 = Ethernet20 = Video MP4 21 = Video DVD 22 = Video BlueRay 23 = HDMI24 = Video 25 - 252 = User Defined253 = Reserved254 = Error 255 = Not available DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields Byte Field Size: Request Parameter **Audio/Video Source Number** 2 Required Command Parameter: Required Bit Field Size: **DD005** Generic numeric ID, short Number of route, waypoint, event, mark, etc. **DF53** Integer, 8 bit unsigned Range: 0 to 252 Resolution: 1 bit Unit-less number uint8 Audio/Video Source Number per Type

File ID

DD010 Generic numeric ID, large

Integer, 32 bit unsigned

ID of a file, song, station which is unique per Audio/Video source.

3

There can be more than one of each type of audio source available on a A/V Device (e.g. 3 USB Sources).

Byte Field Size:

Bit Field Size:

uint32 Range: 0 to 4,294,967,292

Request Parameter

Number of route, waypoint, event, mark, etc.

Resolution: 1 bit

Command Parameter: Required

Required

Unit-less number

Entertainment - Library Data File PGN: 130570 hex: 1FE0A **Library Data Type** Byte Field Size: Request Parameter 4 Required Bit Field Size: 8 Command Parameter: Optional 0 = File**DD395** Library Data Type 1 = Playlist Name 2 = Genre Name/ Category Name 3 = Album Name Artist Name 5 = Track Name/ Song Name 6 = Station Name/ Channel Name 7 = Station Number/ Channel Number 8 = Favorite Number 9 = Play Queue 10 = Content Info 11 - 253 = Reserved254 = Error255 = Data Not Available DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields 5 **Library Data Name** Byte Field Size: 8 or 16 ln Request Parameter Optional Bit Field Size: Command Parameter: Optional **DD004** Generic name string, short Name of place, route, waypoint, destination, vessel, vehicle, etc. Resolution: 1 ASCII or 2 to 252 bytes. First byte in **DF50** ch8or16(n) Range: 0 to 250 ASCII or String, variable, short 1 Unicode string (uint8) is the Count 0 to 125 Unicode byte indicating the number Characters Character of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = $1 \Rightarrow ASCII$ characters A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string. Byte Field Size: 2 Track/Chapter Number Request Parameter 6 Optional Bit Field Size: Command Parameter: Optional **DD007** Generic numeric ID, medium Number of route, waypoint, event, mark, etc.

uint16 Range: 0 to 65,532

uint16 Range: 0 to 65,532

Byte Field Size: 2

Bit Field Size:

Resolution: 1 bit

Resolution: 1 bit

Number of route, waypoint, event, mark, etc.

Request Parameter

Command Parameter: Optional

Unit-less number

Unit-less number

Optional

Integer, 16 bit unsigned

Integer, 16 bit unsigned

DD007 Generic numeric ID, medium

DF54

7

Station Number

Generic numeric ID, medium

Generic numeric ID, medium

PGN: 130570 hex: 1FE0A Byte Field Size: 1 Request Parameter **Favorite Number** 8 Optional Bit Field Size: Command Parameter: Optional **DD005** Generic numeric ID, short Number of route, waypoint, event, mark, etc. Integer, 8 bit unsigned Range: 0 to 252 Resolution: 1 bit Unit-less number **DF53** uint8 Used to save current station as favorite Tuner based sources only: AM/FM/DAB/SiriusXM Byte Field Size: Request Parameter Radio Frequency Optional Command Parameter: Optional Bit Field Size: **DD016** Radio Tx or Rx Frequency uint32 Range: 0 to ~4.295x10E+10 Resolution: 10 Hz DF21 Frequency Frequency **HD Frequency Multi-Cast** Byte Field Size: Request Parameter Optional 10 Bit Field Size: Command Parameter: Optional **DD005** Generic numeric ID, short Number of route, waypoint, event, mark, etc. Integer, 8 bit unsigned Range: 0 to 252 Resolution: 1 bit Unit-less number DF53 uint8 Generic numeric ID, short Play Queue Zone Number Byte Field Size: Request Parameter Optional 11 Bit Field Size: Command Parameter: Note 1 **DD396** Entertainment Zones Zone 1 2 = Zone 23 = Zone 34 = Zone 45 - 252 = User Defined253 = Reserved254 = Error255 = Data Not Available Range: Variable Resolution: 1 DF52 Bit field Used to construct bit fields bit(n) Byte Field Size: Request Parameter 12 In Play Queue Optional Bit Field Size: 2 Command Parameter: Note 1 MSB/LSB: **DD002** Generic status pair 00 = [No, Off, Disabled, Reset, "0"], 01 = [Yes, On, Enabled, Set, "1"],10 = Error, 11= [Unavailable, Unknown] Used to construct bit fields Bit field Range: Variable Resolution: 1 DF52 bit(n) Lock Status of Sirius XM Channel Byte Field Size: Request Parameter 13 Optional Command Parameter: Optional Bit Field Size: 2 **DD415** Lock Status 0 = unlocked/unrestricted 1 = locked/restricted 2 = error3 = unavailable/unknown

Range: Variable

bit(n)

Resolution: 1

Used to construct bit fields

DF52

Bit field

Entertainment - Library Data File

Entertainment - Library Data File

The Album name of the file if available

PGN: 130570 hex: 1FE0A

Byte Field Size: Request Parameter 14 **NMEA Reserved** Optional Bit Field Size: resv Command Parameter: Optional 4

DD001 Reserved field Variable number of reserved bits, all set to logic "1"

Bit field Range: Variable Resolution: 1 Used to construct bit fields DF52 bit(n)

Byte Field Size: 8 or 16 n Request Parameter 15 **Artist Name** Optional Bit Field Size: Command Parameter: Optional

DD004 Generic name string, short Name of place, route, waypoint, destination, vessel, vehicle, etc.

ch8or16(n) Range: 0 to 250 ASCII or Resolution: 1 ASCII or DF50 String, variable, short 0 to 125 Unicode 1 Unicode Characters Character

The Artist name of the file if available

string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = $1 \Rightarrow ASCII$ characters A string with no characters

(total length of 2 bytes, i.e. Count = 2) is a null string.

2 to 252 bytes. First byte in

Album Name Byte Field Size: 8 or 16 n Request Parameter Optional 16 Bit Field Size: Command Parameter: Optional

Name of place, route, waypoint, destination, vessel, vehicle, etc. **DD004** Generic name string, short

2 to 252 bytes. First byte in

DF50 String, variable, short ch8or16(n) Range: 0 to 250 ASCII or 0 to 125 Unicode

Characters

Resolution: 1 ASCII or 1 Unicode Character

string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = $1 \Rightarrow ASCII$ characters A string with no characters

(total length of 2 bytes, i.e. Count = 2) is a null string.

Entertainment - Library Data File

PGN: 130570 hex: 1FE0A

17 **Station Name** Byte Field Size: 8 or 16 n Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD004 Generic name string, short

Name of place, route, waypoint, destination, vessel, vehicle, etc.

DF50 String, variable, short

The Station name of the file if available

ch8or16(n) Range: 0 to 250 ASCII or

1 Unicode

0 to 125 Unicode Characters

Resolution: 1 ASCII or 2 to 252 bytes. First byte in Character

string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = 0 => Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e.

Count = 2) is a null string.

Entertainment - Library Data Group

PGN: 130571 hex: 1FE0B

The PGN details the library data for an individual Audio/Video group. A group is a list of IDs of other groups or files. This PGN is sent upon request. This PGN cannot be requested with the ISO request (PGN 059904).

If a globally addressed ISO request is received, there is no response.

If an addressed ISO request is received, the response is the ISO Acknowledge (PGN 059392) providing a negative acknowledge (NAK). If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

- If no requested fields have been included with the Request Group Function then the response is to return the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) of "0x3 = Access denied". If the Request Group Function (PGN 126208) includes the Audio/Video Source Type, Audio/Video Source Number, Group Type, Group ID and Index of first ID in PGN fields, then the response shall be filtered by these fields contained within this request resulting in one response.
- If the fields requested are not valid then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) of "0x3 = Access denied". If an individual field is invalid the field parameter error code for that field shall be "0x3 = Requested or command parameter out-of-range".
- If the individual fields contain valid values but the combination of the fields together are invalid, then the appropriate response shall be the Acknowledge Group Function (PGN 126208) with the PGN error code (Field 3) set to "0x3 = Access denied. This PGN can exceed 223 bytes.

This PGN has been designed with a paging feature to allow the information to be packaged without exceeding 223 bytes per transmission. This may result in multiple transmissions of this PGN to convey all of the necessary information. As an alternative, ISO Transport protocol may also be used.

Further details can be found in the NMEA2000 Entertainment Application Notes in Appendix D.

Single Frame: N	Priority Default: 6	Dei	fault Update Rate:	milliseconds	Frequency:	NA	cycles per second
Destination: Global	Query Support: Req	quired	Command Support: Optional	ACK Rqmnts:	Yes		
Field # Field Name	•						

Entertainment - Library Data Group

PGN: 130571 hex: 1FE0B

1	Audio/Video Source Type		-	eld Size: ield Size: <mark>8</mark>		Request Parame Command Param		Required Optional	
	DD389 Audio/Video Source Type			0 = Vessel Alarm 1 = AM 2 = FM 3 = Weather 4 = DAB 5 = Aux 6 = USB 7 = CD 8 = MP3 9 = Apple iOS 10 = Android 11 = Bluetooth 12 = Sirius XM 13 = Pandora 14 = Spotify 15 = Slacker 16 = Songza 17 = Apple Radio 18 = Last FM 19 = Ethernet 20 = Video MP4 21 = Video DVD 22 = Video BlueRay 23 = HDMI 24 = Video 25 - 252 = User Defi 253 = Reserved 254 = Error 255 = Not available	ned				
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	1	Used to	construct bit fields	
2	Audio/Video Source Number		-	eld Size: 1		Request Parame Command Para		Required Optional	
	DD005 Generic numeric ID, short	Number of route, waypoint, event, mark, etc.							
	DF53 Integer, 8 bit unsigned Audio/Video Source Number per Type	uint8	Range:	0 to 252	Resolution	1 bit	Unit-le	ss number	
	There can be more than one of each type of	audio sou	rce availab	le on a A/V Device (e.g. 3 l	JSB Sources).			

Entertainment - Library Data Group

PGN: 130571 hex: 1FE0B

3	Group Type	Byte Field Size: Bit Field Size: 8	Request Parameter Required Command Parameter: Optional	
	DD395 Library Data Type	0 = File 1 = Playlist Name 2 = Genre Name/ Category Nam 3 = Album Name 4 = Artist Name 5 = Track Name/ Song Name 6 = Station Name/ Channel Nan 7 = Station Number/ Channel N' 8 = Favorite Number 9 = Play Queue 10 = Content Info 11 - 253 = Reserved 254 = Error 255 = Data Not Available	e ne	
	DF52 Bit field bit(1	Range: Variable Resolution	7: 1 Used to construct bit field	
4	Play Queue Zone Number DD396 Entertainment Zones	Byte Field Size: Bit Field Size: 8	Request Parameter Required Command Parameter: Optional	
	DF52 Bit field bit(1	1 = Zone 1 2 = Zone 2 3 = Zone 3 4 = Zone 4 5 - 252 = User Defined 253 = Reserved 254 = Error 255 = Data Not Available Range: Variable Resolution	7: 1 Used to construct bit field	
	DF52 Bit field bit(1 Audio Video Zone Number	Nange. Variable Nesolution	osed to construct of field	
5	Group ID	Byte Field Size: 4 Bit Field Size:	Request Parameter Required Command Parameter: Optional	
	DD010 Generic numeric ID, large	Number of route, waypoint, even	t, mark, etc.	
	DF55 Integer, 32 bit unsigned uint3 ID of a group which is unique per Audio/Video source.		7: 1 bit Unit-less number	
6	Index of first ID in PGN	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter: Optional	
	DD007 Generic numeric ID, medium	Number of route, waypoint, event, mark, etc.		
	DF54 Integer, 16 bit unsigned uint Generic numeric ID, medium	Resolution	n: 1 bit Unit-less number	
7	Number of IDs in this PGN	Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional	
	DD007 Generic numeric ID, medium	Number of route, waypoint, even	t, mark, etc.	
	DF54 Integer, 16 bit unsigned uint	Resolution	7: 1 bit Unit-less number	

Count = 2) is a null string.

Entertainment - Library Data Group PGN: 130571 hex: 1FE0B Byte Field Size: 2 Total number of IDs available Request Parameter 8 Optional Bit Field Size: Command Parameter: Optional DD007 Generic numeric ID, medium Number of route, waypoint, event, mark, etc. Integer, 16 bit unsigned uint16 Range: 0 to 65,532 Resolution: 1 bit Unit-less number Generic numeric ID, medium 9 **ID Type** Byte Field Size: Request Parameter Optional Bit Field Size: 8 Command Parameter: Optional DD397 ID Type 0 = Group1 = File2 = Encrypted Group 3 = Encrypted File4 - 252 = User Defined253 = Reserved254 = Error 255 = DataNot Available Range: Variable Used to construct bit fields **DF52** Bit field Resolution: 1 bit(n) Byte Field Size: ID Request Parameter 10 Optional Bit Field Size: Command Parameter: Optional **DD010** Generic numeric ID, large Number of route, waypoint, event, mark, etc. Integer, 32 bit unsigned uint32 Range: 0 to 4,294,967,292 Resolution: 1 bit Unit-less number **DF55** This field will be either a File ID or Group ID depending on the value of Field 9 ID Type. Byte Field Size: 8 or 16 n Request Parameter 11 **ID Name** Optional Bit Field Size: Command Parameter: Optional Name of place, route, waypoint, destination, vessel, vehicle, etc. **DD004** Generic name string, short Resolution: 1 ASCII or 2 to 252 bytes. First byte in DF50 String, variable, short ch8or16(n)Range: 0 to 250 ASCII or string (uint8) is the Count 0 to 125 Unicode 1 Unicode byte indicating the number Characters Character of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e.

Entertainment - Library Data Group

PGN: 130571 hex: 1FE0B

13 **Artist Name**

Byte Field Size: 8 or 16 n Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD004 Generic name string, short

The Artist name of the file if available

Name of place, route, waypoint, destination, vessel, vehicle, etc.

DF50 String, variable, short ch8or16(n) Range:

0 to 250 ASCII or 0 to 125 Unicode Characters

Resolution: 1 ASCII or 1 Unicode Character

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = 0 => Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e.

Count = 2) is a null string.

PGN: 130572 hex: 1FE0C

This PGN details the library data for an individual Audio/Video group. A group is a list of IDs of other groups or files.

This PGN cannot be requested with the ISO request (PGN 059904).

If a globally addressed ISO request is received, there is no response.

If an addressed ISO request is received, the response is the ISO Acknowledge (PGN 059392) providing a negative acknowledge (NAK). If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

- If no requested fields have been included with the Request Group Function then the response is to return the Acknowledge Group Function (PGN 126208, containing the error state for PGN error code (Field 3) of "0x3 = Access denied".
- If the Request Group Function (PGN 126208) includes the Audio/Video Source Type, Audio/Video Source Number, and one or more Library Group Types, and Library Data Names in PGN fields, then the response shall be filtered by all of these fields contained within this request resulting in one response.
- If the fields requested are not valid then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) of "0x3 = Access denied". If an individual field is invalid the field parameter error code for that field shall be "0x3 = Requested or command parameter out-of-range".
- If the individual fields contain valid values but the combination of the fields together are invalid, then the appropriate response shall be the Acknowledge Group Function (PGN 126208) with the PGN error code (Field 3) set to "0x3 = Access denied. This PGN may exceed 223 bytes.

If the PGN exceeds 223 bytes, then ISO Transport Protocol shall be used to transmit this PGN (See NMEA 2000 Main Document for further information on ISO multi-packet transfers).

Further details can be found in the NMEA2000 Entertainment Application Notes in Appendix D.

Single Frame: N	Priority Default: 6	6 De	fault Update Rate:		milliseconds	Frequency:	NA	cycles per s	econd
Destination: Global	Query Support: <mark>F</mark>	Required	Command Support:	Optional	ACK Rqmnts:	Yes			
Field # Field Na	ame								

PGN: 130572 hex: 1FE0C

1	Audio/Video Source Type		Byte Field Size: Bit Field Size: 8	Request Parameter Required Command Parameter: Optional
	DD389 Audio/Video Source Type		0 = Vessel Alarm 1 = AM 2 = FM 3 = Weather 4 = DAB 5 = Aux 6 = USB 7 = CD 8 = MP3 9 = Apple iOS 10 = Android 11 = Bluetooth 12 = Sirius XM 13 = Pandora 14 = Spotify 15 = Slacker 16 = Songza 17 = Apple Radio 18 = Last FM 19 = Ethernet 20 = Video MP4 21 = Video DVD 22 = Video BlueRay 23 = HDMI 24 = Video 25 - 252 = User Defined 253 = Reserved 254 = Error 255 = Not available	
	DF52 Bit field	bit(n)	Range: <mark>Variable Re</mark>	Used to construct bit fields
2	Audio/Video Source Number		Byte Field Size: 1 Bit Field Size:	Request Parameter Command Parameter: Optional
	DD005 Generic numeric ID, short		Number of route, waypoi	nt, event, mark, etc.
	DF53 Integer, 8 bit unsigned Audio/Video Source Number per Type There can be more than one of each type of	uint8 audio sour		Unit-less number Sources).
3	Group ID		Byte Field Size: 4 Bit Field Size:	Request Parameter Required Command Parameter: Optional
	DD010 Generic numeric ID, large		Number of route, waypoi	nt, event, mark, etc.
	DF55 Integer, 32 bit unsigned ID of a group which is unique per Audio/Vide	uint32 eo source.	Range: 0 to 4,294,967,292	esolution: 1 bit Unit-less number

PGN: 130572 hex: 1FE0C

Library Group Type 1 Byte Field Size: Request Parameter 4 Required Bit Field Size: 8 Command Parameter: Optional 0 = FileDD395 Library Data Type 1 = Playlist Name 2 = Genre Name/ Category Name 3 = Album Name 4 = Artist Name 5 = Track Name/ Song Name 6 = Station Name/ Channel Name 7 = Station Number/ Channel Number 8 = Favorite Number 9 = Play Queue 10 = Content Info 11 - 253 = Reserved254 = Error255 = Data Not Available DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields 5 **Library Data Name 1** Byte Field Size: 8 or 16 n Request Parameter Required Bit Field Size: Command Parameter: Optional **DD004** Generic name string, short Name of place, route, waypoint, destination, vessel, vehicle, etc. Resolution: 1 ASCII or 2 to 252 bytes. First byte in **DF50** String, variable, short ch8or16(n) Range: 0 to 250 ASCII or 0 to 125 Unicode 1 Unicode string (uint8) is the Count byte indicating the number Character Characters of bytes in the string, The name string in this field will be of the type in Field 4 – Library Group Type 1. including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = $1 \Rightarrow ASCII$ characters A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

PGN: 130572 hex: 1FE0C

6 **Library Group Type 2** Byte Field Size: Request Parameter Required Bit Field Size: 8 Command Parameter: Optional 0 = FileDD395 Library Data Type 1 = Playlist Name 2 = Genre Name/ Category Name 3 = Album Name 4 = Artist Name 5 = Track Name/ Song Name 6 = Station Name/ Channel Name 7 = Station Number/ Channel Number 8 = Favorite Number 9 = Play Queue 10 = Content Info 11 - 253 = Reserved254 = Error255 = Data Not Available DF52 Bit field bit(n) Range: Variable Resolution: 1 Used to construct bit fields 7 **Library Data Name 2** Byte Field Size: 8 or 16 n Request Parameter Required Bit Field Size: Command Parameter: Optional **DD004** Generic name string, short Name of place, route, waypoint, destination, vessel, vehicle, etc. String, variable, short Resolution: 1 ASCII or 2 to 252 bytes. First byte in **DF50** ch8or16(n) Range: 0 to 250 ASCII or 0 to 125 Unicode 1 Unicode string (uint8) is the Count byte indicating the number Character Characters of bytes in the string, The name string in this field will be of the type in Field 6 – Library Group Type 2. including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = $1 \Rightarrow ASCII$ characters A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

PGN: 130572 hex: 1FE0C

8	Library Group Type 3 DD395 Library Data Type DF52 Bit field	Bit F	ield Size: 0 = File 1 = Playlist Name 2 = Genre Name/ Ca 3 = Album Name 4 = Artist Name 5 = Track Name/ So 6 = Station Name/ C 7 = Station Number 8 = Favorite Numbe 9 = Play Queue 10 = Content Info 11 - 253 = Reserved 254 = Error 255 = Data Not Avail	ategory Name ong Name Channel Name / Channel Number or	meter Required rameter: Optional Used to construct bit fields
9	Library Data Name 3		ield Size: 8 or 16 n	Request Para	
•		•	Field Size:	_ '	rameter: Optional
	DD004 Generic name string, shor		Name of place, route,	, waypoint, destination, vessel	l, vehicle, etc.
	DF50 String, variable, short	ch8or16(n) Range:	0 to 250 ASCII or 0 to 125 Unicode Characters	Resolution: 1 ASCII or 1 Unicode Character	2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number
	The name string in this field will be of the	type in Field 8 – Library	y Group Type 3.		of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = 0 => Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

PGN: 130573 hex: 1FE0D

This PGN details the Audio/Videos sources supported by an Audio/Video device.

This PGN is sent upon change or in response to a request. Pre-defined sources can be left unnamed or may be customized with a name, e.g. "iOs" vs "Steve's phone."

This PGN cannot be requested with the ISO request (PGN 059904).

- If a globally addressed ISO request is received, there is no response.
- If an addressed ISO request is received, the response is the ISO Acknowledge (PGN 059392) providing a negative acknowledge (NAK). If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:
- If no requested fields have been included with the Request Group Function then the response is to return the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) of "0x3 = Access denied".
- If the Request Group Function (PGN 126208) includes the Index of first Source ID in this PGN field, then the response shall be filtered by these fields contained within this request resulting in one response containing one or more supported source data.
- If the fields requested are not valid then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) of "0x3 = Access denied".
- If an individual field is invalid the field parameter error code for that field shall be "0x3 = Requested or command parameter out-of-range".
- If the individual fields contain valid values but the combination of the fields together are invalid, then the appropriate response shall be the Acknowledge Group Function (PGN 126208) with the PGN error code (Field 3) set to "0x3 = Access denied".

If commanding the Audio/Video Source Name is supported (See Field 8, Source Capabilities), the NMEA Command Group Function (PGN 126208) shall be used. The command shall include the, Audio/Video Source Type, Audio/Video Source Number and Audio/Video Source Name fields.

This PGN can exceed 223 bytes. This PGN has been designed with a paging feature to allow the information to be packaged without exceeding 223 bytes per transmission. This may result in multiple transmissions of this PGN to convey all of the necessary information. As an alternative, ISO Transport protocol may also be used.

Further details can be found in the NMEA2000 Entertainment Application Notes in Appendix D

Single Fra	Single Frame: N Priority Default: 6				Default	Update R	ate:	n	nilliseconds	Frequency:	NA	cycles per	second
Destination	n: Global	Qu	ery Support: <mark>Re</mark>	equired	Co	mmand Sup	port: Req	uired	ACK Rqmnts:	Yes			
Field #	Field N	ame											
1	Index of	first Source	ce ID in this	PGN		•	eld Size: eld Size:	1		Request Pa Command F		Required Optional	
	DD005	Generic n	umeric ID, s	hort			Num	ber of rou	te, waypoint, ever	nt, mark, etc.			
	DF53 Generic nu	Integer, Imeric ID, sh	8 bit unsigne nort	ed	uint8	Range:	0 to 252		Resolutio	on: 1 bit	Unit-les	s number	
2	Number	of Source	IDs in this P	GN		•	eld Size: eld Size:	1		Request Pa		Optional Optional	
	DD005	Generic n	umeric ID, sl	hort			Num	ber of rou	te, waypoint, ever	nt, mark, etc.			
	DF53 Generic nu	Integer, Imeric ID, sh	8 bit unsigne ort	ed	uint8	Range:	0 to 252		Resolutio	on: 1 bit	Unit-les	s number	
3	Total nu	mber of So	ource IDs av	ailable		Byte Fie Bit Fi	eld Size: eld Size:	1		Request Pa		Optional Optional	
	DD005	Generic n	umeric ID, s	hort			Num	ber of rou	te, waypoint, ever	nt, mark, etc.			
	DF53 Generic nu	Integer, imeric ID, sh	8 bit unsigne ort	ed	uint8	Range:	0 to 252		Resolutio	on: <mark>1 bit</mark>	Unit-les	s number	

PGN: 130573 hex: 1FE0D

4	Source ID		•	eld Size: 1			Request Para Command Pa		Optional Required
	DD005 Generic numeric ID, short		5,,,		of route, wayp	oint, event,		ramotor.	required
	DF53 Integer, 8 bit unsigned Generic numeric ID, short	uint8	Range:	0 to 252	ı	Resolution:	1 bit	Unit-le	ss number
5	Audio/Video Source Type		•	eld Size: ield Size: 8	7		Request Para		Required Required
	DD389 Audio/Video Source Type			18 = Las 19 = Eth 20 = Vic 21 = Vic 22 = Vic 23 = HE 24 = Vic 25 - 252 = 253 = R 254 = E	Inther B B B B B B B B B B B B B B B B B B B	ed			
	DF52 Bit field	bit(n)	Range:	Variable		Resolution:	1	Used to	construct bit fields
	User defined allows for forward compatibility	1							
6	Audio/Video Source Number			eld Size: 1 ield Size:			Request Para Command Pa		Required Required
	DD005 Generic numeric ID, short			Number o	of route, wayp	oint, event,	mark, etc.		
	DF53 Integer, 8 bit unsigned Audio/Video Source Number per Type There can be more than one of each type of Bluetooth source is currently supported.	uint8 faudio sou		0 to 252		Resolution: SB Sources)		Unit-le	ss number

PGN: 130573 hex: 1FE0D

7 Audio/Video Source Name Byte Field Size: 8 or 16 n Bit Field Size:

Request Parameter Command Parameter: Optional

Optional

DD004 Generic name string, short

Name of place, route, waypoint, destination, vessel, vehicle, etc.

String, variable, short DF50

ch8or16(n) Range:

0 to 250 ASCII or 0 to 125 Unicode Characters

Resolution: 1 ASCII or 1 Unicode Character

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = $0 \Rightarrow$ Unicode characters Control byte = $1 \Rightarrow ASCII$ characters A string with no characters (total length of 2 bytes, i.e.

Count = 2) is a null string.

8 **Source Capabilities** Byte Field Size:

Bit Field Size: 32

Request Parameter Command Parameter: Optional

Optional

DD403 Supported Play Status

```
xxxx xxxx xxxx xxxx xxxx xxxx xxxx x1xx = Stop
xxxx xxxx xxxx xxxx xxxx xxxx xxxx 1xxx = FF(1x)
xxxx xxxx xxxx xxxx xxxx xxxx xx1x xxxx = FF(3x)
xxxx xxxx xxxx xxxx xxxx xxxx x1xx xxxx = FF(4x)
xxxx xxxx xxxx xxxx xxxx xxxx 1xxx xxxx = RW(1x)
xxxx xxxx xxxx xxxx xxxx xxx1 xxxx xxxx = RW(2x)
xxxx xxxx xxxx xxxx xxxx xxxx xx1x xxxx xxxx = RW(3x)
xxxx xxxx xxxx xxxx xxxx xxxx xxxx = Jog Ahead
xxxx xx1x xxxx xxxx xxxx xxxx xxxx = Source Renaming
xxxx 1xxx xxxx xxxx xxxx xxxx xxxx = Reserved
xxx1 xxxx xxxx xxxx xxxx xxxx xxxx = Reserved
```

DF52 Bit field bit(n)

Range: Variable

Resolution: 1

1xxx xxxx xxxx xxxx xxxx xxxx xxxx = Reserved

Used to construct bit fields

PGN: 130573 hex: 1FE0D

9	Supported Browsing Methods		Byte Fi	eld Size:		Request Parameter	Optional
			•	ield Size: 16		Command Parameter:	•
	DD404 Supported Browsing Method	ods		xxxx xxx1 xxxx xxxx xxxx xx1x xxxx xxxx	a = Playlist b = Genre / Cat b = Album b = Artist b = Track / Son b = Station Nan b = Station Nun b = Favorite Nun b = Play Queue b = Content Inf b = Reserved	ng me / Channel Name mber / Channel Number umber	
	DF52 Bit field	bit(n)	Range:	1xxx xxxx xxxx xxxx Variable	Resolution:	1 Used to	construct bit field
10	Thumbs Supported	~1t(11)		eld Size:		Request Parameter	Optional
			Bit F	ield Size: 2		Command Parameter:	
	DD002 Generic status pair			MSB/LSB: 00 = [No, Off, Disabl 01 = [Yes, On, Enabl 10 = Error, 11= [Unavailable, Un	led, Set, "1"],],	
	DE51 D:+ £ -1-1						
	DF52 Bit field	bit(n)	Range:	Variable	Resolution:	Used to	construct bit field
11	Source Connected	bit(n)	Byte Fi	Variable eld Size: ield Size: 2		1 Used to Request Parameter Command Parameter:	Optional
11		bit(n)	Byte Fi	eld Size:	led, Reset, "0"] led, Set, "1"],	Request Parameter Command Parameter:	Optional
11	Source Connected	bit(n)	Byte Fi	eld Size: ield Size: MSB/LSB: 00 = [No, Off, Disabl 01 = [Yes, On, Enabl 10 = Error,	led, Reset, "0"] led, Set, "1"],	Request Parameter Command Parameter:],	Optional
	Source Connected DD002 Generic status pair		Byte Fid Bit Fid Range:	eld Size: ield Size: MSB/LSB: 00 = [No, Off, Disabl 01 = [Yes, On, Enabl 10 = Error, 11 = [Unavailable, Un	led, Reset, "0"] led, Set, "1"], nknown] Resolution:	Request Parameter Command Parameter:],	Optional Optional
	Source Connected DD002 Generic status pair DF52 Bit field		Byte Fid Bit Fid Range:	eld Size: ield Size: MSB/LSB: 00 = [No, Off, Disabl 01 = [Yes, On, Enabl 10 = Error, 11 = [Unavailable, Un Variable eld Size:	led, Reset, "0"] ed, Set, "1"], nknown] Resolution:	Request Parameter Command Parameter: Used to Request Parameter Command Parameter:	Optional Optional
	Source Connected DD002 Generic status pair DF52 Bit field NMEA Reserved		Byte Fit Bit Fit Range: Byte Fit Bit Fit	eld Size: ield Size: MSB/LSB: 00 = [No, Off, Disabl 01 = [Yes, On, Enabl 10 = Error, 11 = [Unavailable, Un Variable eld Size: ield Size: resv 4	led, Reset, "0"] ed, Set, "1"], nknown] Resolution:	Request Parameter Command Parameter:], Used to Request Parameter Command Parameter: Il set to logic "1"	Optional Optional
11	Source Connected DD002 Generic status pair DF52 Bit field NMEA Reserved DD001 Reserved field	bit(n)	Byte Fit Bit Fit Range: Byte Fit Bit Fit	eld Size: ield Size: MSB/LSB: 00 = [No, Off, Disabl 01 = [Yes, On, Enabl 10 = Error, 11 = [Unavailable, Un Variable eld Size: ield Size: ield Size: Variable number of re	led, Reset, "0" led, Set, "1"], nknown] Resolution:	Request Parameter Command Parameter:], Used to Request Parameter Command Parameter: Il set to logic "1"	Optional Optional
12	Source Connected DD002 Generic status pair DF52 Bit field NMEA Reserved DD001 Reserved field DF52 Bit field	bit(n)	Byte Fide Bit Fide Bi	eld Size: ield Size: MSB/LSB: 00 = [No, Off, Disabl 01 = [Yes, On, Enabl 10 = Error, 11 = [Unavailable, Un Variable eld Size: ield Size: ield Size: Variable number of re	led, Reset, "0" led, Set, "1"], nknown] Resolution: eserved bits, al	Request Parameter Command Parameter:], Used to Request Parameter Command Parameter: Il set to logic "1"	Optional Optional construct bit field construct bit field Optional
	Source Connected DD002 Generic status pair DF52 Bit field NMEA Reserved DD001 Reserved field DF52 Bit field Used to align subsequent data on a byte byte.	bit(n)	Byte Fide Bit Fide Bi	eld Size: ield Size: MSB/LSB: 00 = [No, Off, Disabl 01 = [Yes, On, Enabl 10 = Error, 11 = [Unavailable, Un Variable eld Size: ield Size: variable number of re Variable	led, Reset, "0" led, Set, "1"], nknown] Resolution: eserved bits, al	Request Parameter Command Parameter: 1 Used to Request Parameter Command Parameter: Il set to logic "1" 1 Used to Request Parameter	Optional Optional construct bit field construct bit field Optional

PGN: 130573 hex: 1FE0D

14	Shuffle Supported	Byte Field Size: Bit Field Size: 4	Request Parameter Optional Command Parameter: Optional
	DD409 Shuffle Supported	xxx1 = Play Queue xx1x = All x1xx = Reserved 1xxx = Reserved	
	DF52 Bit field	bit(n) Range: <mark>Variable</mark>	Resolution: 1 Used to construct bit fields
15	Fields 4 – 14 repeat as needed	Byte Field Size: ? Bit Field Size: n	Request Parameter Command Parameter:
	DD000 Undefined		
	DF00 Undefined	Undefined Range: undefined	Resolution: undefined Application specific, defined at time of use.

PGN: 130574 hex: 1FE0E

This PGN details the Audio/Video Zones supported by an Audio/Video device.

This PGN is sent upon change or in response to a request.

This PGN cannot be requested with the ISO request (PGN 059904).

- If a globally addressed ISO request is received, there is no response.
- If an addressed ISO request is received, the response is the ISO Acknowledge (PGN 059392) providing a negative acknowledge (NAK). If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:
- If no requested fields have been included with the Request Group Function then the response is to return the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) of "0x3 = Access denied".
- If the Request Group Function (PGN 126208) includes the Index of first Zone Number in this PGN field, then the response shall be filtered by these fields contained within this request resulting in one response containing one or more supported zone data.
- If the fields requested are not valid then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) of "0x3 = Access denied". If an individual field is invalid the field parameter error code for that field shall be "0x3 = Requested or command parameter out-of-range".
- If the individual fields contain valid values but the combination of the fields together are invalid, then the appropriate response shall be the Acknowledge Group Function (PGN 126208) with the PGN error code (Field 3) set to "0x3 = Access denied. If commanding the Zone Name is supported, the NMEA Command Group Function (PGN 126208) shall be used. The command shall include the Zone Name (Field 4) and the Zone Number (Field 5).

This PGN can exceed 223 bytes. This PGN has been designed with a paging feature to allow the information to be packaged without exceeding 223 bytes per transmission. This may result in multiple transmissions of this PGN to convey all of the necessary information. As an alternative, ISO Transport protocol may also be used.

Further details can be found in the NMEA2000 Entertainment Application Notes in Appendix D.

Single Fra	ame: N	Priority Default: 6	Default	t Update Ra	ite:	mill	iseconds	Frequency:	N/	cycles per	second
Destination	n: Global	Query Support: Required	Co	ommand Supp	ort: Opti	onal	ACK Rqmnts: Ye	es			
ield#	Field Na	ame									
1	Index of	first Zone Number in this PGN	1	Byte Fie	ld Size:	1		Request Parai	meter	Required	
				Bit Fie	eld Size:			Command Par	rameter:	Optional	
	DD005	Generic numeric ID, short			Num	ber of route,	waypoint, event,	mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	
2	Number	of Zone Numbers in this PGN		Byte Fie	ld Size:	1		Request Parai	meter	Optional	
				Bit Fie	eld Size:			Command Par	rameter:	Optional	
	DD005	Generic numeric ID, short			Num	ber of route,	waypoint, event,	mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	
3	Total nur	mber of Zone Numbers availal	ole	Byte Fie	ld Size:	1		Request Parai	meter	Optional	
				Bit Fie	eld Size:			Command Par	rameter:	Optional	
	DD005	Generic numeric ID, short			Num	ber of route,	waypoint, event,	mark, etc.			
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252		Resolution:	1 bit	Unit-les	ss number	

PGN: 130574 hex: 1FE0E

4	Zone Number	Byte Field Size: Bit Field Size: 8	Request Parameter Optional Command Parameter: Optional
	DD396 Entertainment Zones	0 = All Zones 1 = Zone 1 2 = Zone 2 3 = Zone 3 4 = Zone 4 5 - 252 = User Defined 253 = Reserved 254 = Error 255 = Data Not Availa	1
	DF52 Bit field	bit(n) Range: <mark>Variable</mark>	Resolution: 1 Used to construct bit fields
5	Zone Name	Byte Field Size: 8 or 16 n Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD004 Generic name string, shor	Name of place, route,	waypoint, destination, vessel, vehicle, etc.
	DF50 String, variable, short	ch8or16(n) Range: 0 to 250 ASCII or 0 to 125 Unicode Characters	Resolution: 1 Unicode Character 2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte The Control byte indicates it the string consists of ASCII characters (Char8) or Unicode characters (Char8) characters Control byte = 0 => Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.
6	Fields 4 – 5 repeat as needed	Byte Field Size: ? Bit Field Size: n	Request Parameter Optional Command Parameter: Optional
	DD000 Undefined		
	DF00 Undefined	Undefined Range: undefined	Resolution: undefined Application specific, define at time of use.

Entertainment – Parental Control Status

PGN: 130575 hex: 1FE0F

Details the parental control / locked channel status for a Audio/Video source.

This PGN can be used lock and unlock a specific group or file id by sending the user pincode.

This PGN can also be used to change the user pincode by providing the current and new pincodes.

A device receiving an ISO Reguest (PGN 059904) for this PGN, shall respond with this PGN with all fields set to invalid.

Begin Request Group Function If a Request Group Function (PGN 126208) requesting this PGN is received, the receiving device shall respond in the following manner:

IMPORTANT: The error codes specified in this PGN description for the Acknowledgement response shall take precedence. This variation is specified to be consistent with the previously published suite of Entertainment PGNs, as the suite of Entertainment PGNs contain an unusual response to Request Group Functions.

- If no requested fields have been included with the Request Group Function then the response is to return the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) of "0x3 = Access denied".
- If the Request Group Function (PGN 126208) includes the Audio/Video Source Type, Audio/Video Source Number or File ID then the response shall be filtered by these fields contained within this request resulting in one response.
- If the fields requested are not valid then the appropriate response would be the Acknowledge Group Function (PGN 126208), containing the error state for PGN error code (Field 3) of "0x3 = Access denied".
- If an individual field is invalid the field parameter error code for that field shall be "0x3 = Requested or command parameter out-of-range". If the individual fields are valid but the combination of fields together are invalid then just the error state for PGN error code (Field 3) of "0x3 = Access denied" would be in the Acknowledge Group Function (PGN 126208) response. End Request Group Function

Begin Command Group Function

The NMEA Command Group Function (PGN 126208) can be used to perform the following three possible operations:

Command to lock or unlock all file / station IDs Command to lock or unlock a specific file / station ID) Command to change the current pincode The command to lock or unlock all file / station IDs shall include:

The Audio/Video Source Type (Field 1), Audio/Video Source Number (Field 2), Lock Type (Field 3) set to Master (value 0), Lock Status (Field 4), Current Pincode (Field 7).

The command to lock or unlock a specific file / station ID command shall include:

- The Audio/Video Source Type (Field 1), Audio/Video Source Number (Field 2), Lock Type (field 3) set to Individual (Value 1) Lock Status (Field 4), File / Station ID (Field 6) and Current Pincode (Field 7).
- The command to change the Pincode shall include: Audio/Video Source Type (Field 1), Audio/Video Source Number (Field 2), Current Pincode (Field 7) and New Pincode (Field 8).

End Command Group Function Revisions: Created 2018 message database version 3.200, revised March 2018

Single Fram	e: No	Priority Default:	6	Default Update Rate:		milliseconds	Frequency:	NA	cycles per s	secono
Destination:	Global	Query Support:	Required	Command Support:	Required	ACK Rqmnts:	Yes			
Ciold #	Field Neme									

Entertainment – Parental Control Status

PGN: 130575 hex: 1FE0F

1	Audio/Video Source Type			eld Size:		Request Parame	ter Required
			Bit F	ield Size: 8		Command Paran	neter: Required
	DD389 Audio/Video Source Type			0 = Vessel Alarm 1 = AM 2 = FM 3 = Weather 4 = DAB 5 = Aux 6 = USB 7 = CD 8 = MP3 9 = Apple iOS 10 = Android 11 = Bluetooth 12 = Sirius XM 13 = Pandora 14 = Spotify 15 = Slacker 16 = Songza 17 = Apple Radio 18 = Last FM 19 = Ethernet 20 = Video MP4 21 = Video MP4 21 = Video DVD 22 = Video BlueF 23 = HDMI 24 = Video 25 - 252 = User D 253 = Reserved 254 = Error 255 = Not availal	Ray Jefined		
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	: 1	Jsed to construct bit fiel
2	Audio/Video Source Number			ield Size: 1		Request Parame Command Param	· ·
	DD005 Generic numeric ID, short			Number of route, v	waypoint, event,	mark, etc.	
	DF53 Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolution	1 bit U	Jnit-less number
3	Lock Type		•	eld Size: ield Size: <mark>2</mark>		Request Parame Command Paran	ter Required neter: Required
	DD420 Lock Type			0 = Master 1 = Individual 2 = Reserved 3 = Do Not Use / I	Data Not Availa	ble	
	DF52 Bit field	bit(n)	Range:	Variable	Resolution	· 1 I	Jsed to construct bit fiel

Entertainment – Parental Control Status

PGN: 130575 hex: 1FE0F

4	Lock Status	Byte Field Size: Bit Field Size: 2	Request Parameter Command Parameter: Required
	DD002 Generic status pair	MSB/LSB: 00 = [No, Off, Dis 01 = [Yes, On, En: 10 = Error, 11 = [Unavailable,	abled, Set, "1"],
	DF52 Bit field bit	t(n) Range: <mark>Variable</mark>	Resolution: 1 Used to construct bit fields
	Specifies the lock status of the File ID, which can	be either enabled/locked or disabled/un	-locked.
5	NMEA Reserved	Byte Field Size: Bit Field Size: resv 4	Request Parameter Command Parameter:
	DD001 Reserved field	Variable number of	of reserved bits, all set to logic "1"
	DF52 Bit field bit	t(n) Range: Variable	Resolution: 1 Used to construct bit fields
	Used to align subsequent data on byte boundary.		
6	File / Station ID	Byte Field Size: 4 Bit Field Size:	Request Parameter Required Command Parameter: Required
	DD010 Generic numeric ID, large	Number of route, v	waypoint, event, mark, etc.
	DF55 Integer, 32 bit unsigned uin	at32 Range: 0 to 4,294,967,292	Resolution: 1 bit Unit-less number
	ID of a individual file or station that is being locke when used in conjunction with this field.	d or unlocked. Note: the lock type (field	3) should be set to individual
7	Current Pincode	Byte Field Size: 2 Bit Field Size:	Request Parameter Required Command Parameter: Required
	DD007 Generic numeric ID, medium	Number of route, v	waypoint, event, mark, etc.
	DF54 Integer, 16 bit unsigned uin	t16 Range: 0 to 65,532	Resolution: 1 bit Unit-less number
	The current pincode field should be sent when un numeric code which can range from 0000 to 9999		ncode should be a 4 digit
8	New Pincode	Byte Field Size: 2 Bit Field Size:	Request Parameter Command Parameter: Optional
	DD007 Generic numeric ID, medium	Number of route, v	waypoint, event, mark, etc.
	DF54 Integer, 16 bit unsigned uin	at16 Range: 0 to 65,532	Resolution: 1 bit Unit-less number
	The new pincode field should be sent when chan which can range from 0000 to 9999.		hould be a 4 digit numeric code

Trim Tab Status PGN: 130576 hex: 1FE10

This PGN is transmitted as a status of current trim tab settings on vessels.

Trim tabs improve planning and fuel efficiency, they correct for uneven weight distribution, and they improve speed, safety and overall boat performance.

Trim tab settings may be set over the network by using the NMEA Command Group Function (PGN 126208) to command individual trim tab positions.

The NMEA Acknowledge Group Function (PGN 126208) shall be sent as the response to the NMEA Command Group Function indicating acceptance or rejection of the command.

If the command is accepted, the trim tab status PGN shall be transmitted to confirm the actual settings.

This PGN shall be a response to a global ISO Request (PGN 059904) or global Request Group Function (PGN 126208).

If an addressed Request Group Function cannot be satisfied, the Acknowledgment Group Function shall be sent indicating the applicable error conditions of this request.

Used primarily by display or instrumentation devices.

This PGN title was changed from "Small Craft Status" to "Trim Tab Status" as of Database Version 2.00.

The Center Trim Tab (Field 3) was added to this PGN in the NMEA PGN Network Database Version 2.20.

Single Frame: Yes		Yes	Priority Default: 2	Defau	lt Update R	Rate: 200) milliseconds	Frequency:	5.	cycles per	second
Destinatio	n: <mark>Gl</mark> o	obal	Query Support: Optio	nal	ommand Sup	oport: Optional	ACK Rqmnts:	None			
ield#	Fie	eld Na	ame								
1	Port trim tab		•	Byte Field Size: 1 Bit Field Size:			Request Parameter Command Parameter:				
	DD	138	Generic percent of range								
	_	F30 e 0 - 1	Percent, Relative measu 100%, where 0% =Full Up ar		•	+/- 124% esitions	Resolution	n: <mark>1%</mark>			
2	Sta	rboar	d trim tab		•	eld Size: 1		Request Para Command Pa		Optional Optional	
	DD	138	Generic percent of range								
	_	F30 e 0 - 1	Percent, Relative measu 100%, where 0% =Full Up ar		•	+/- 124% esitions	Resolution	n: <mark>1%</mark>			
3	Cen	ter tr	im tab			eld Size: 1		Request Para Command Pa		Optional Optional	
	DD	138	Generic percent of range								
	_	F30 e 0 - 1	Percent, Relative measu 100%, where 0% =Full Up ar		•	+/- 124% psitions	Resolution	n: <mark>1%</mark>			
4	NMI	EA Re	eserved		•	eld Size: ield Size: resv	40	Request Para Command Pa			
	DD	001	Reserved field			Variable nur	mber of reserved bits,	all set to logic "1	"		
	_	F52 to aliq	Bit field gn subsequent data on a byte	bit(n) boundary.	Range:	Variable	Resolution	n: <u>1</u>	Used to	construct bit f	ields

Direction Data PGN: 130577

hex: 1FE11

The purpose of this PGN is to group three fundamental vectors related to vessel motion, - Speed and heading referenced to the water - Speed and course referenced to ground - Current speed and flow direction Products that are the primary form of navigation would be appropriate for construction and transmission of this sentence, either by combining PGN's 128259, 129026 or through direct measurement. The SID (Sequence Identification Number) should only be used to synchronize data when PGN 126992 (Time Stamp) is available, otherwise it should be set to unavailable. This PGN should only be used when all three elements are available and by a primary navigation product.

Single Fra	ame: No	Priority Default: 3	Default	t Update Ra	ate: 1000 I	milliseconds	Frequency:	1.	cycles per second
Destinatio	n: Global	Query Support: Optional	Co	ommand Sup	port: Optional	ACK Rqmnts:	None		
⊏ield #	Field N	ame							
1	Data Mo	de		Byte Field Size: Bit Field Size: 4			Request Parar Command Par		Optional optional
	DD025 Mode, Data				0x0 = Autono 0x1 = Differer 0x2 = Estimat 0x3 = Simulat 0x4 = Manual 0x5 to 0xD = 0xE = Error, 0xF = Data no	ntial, enhanced moded ed mode, or mode, mode, Reserved	de,		
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: 1	Used to	construct bit fields
2		i/Heading Ref.		Byte Fie Bit Fi	eld Size: feld Size: 0 = True,		Request Parar Command Par		Optional Optional
	טט117	Direction reference			1 = Magnetic, 2 = Error, 3 = Null				
	DF52	Bit field	bit(n)	Range:	Variable	Resolutio	n: 1	Used to	construct bit fields
3	NMEA R	eserved	Byte Field Size: Bit Field Size: resv 2		2	Request Parameter Command Parameter:			
	DD001	Reserved field	Variable number of re		per of reserved bits	, all set to logic "1"	•		
	DF52 Used to ali	Bit field gn subsequent data on a byte bou	bit(n) ndary.	Range:	Variable	Resolutio	n: <mark>1</mark>	Used to	construct bit fields
4	Sequenc	ce ID		-	eld Size: 1		Request Parar Command Par		Optional Optional
	DD056	Sequence ID			PGNs from a different PGN related data se	single source addre transmissions ider t. For example, ide	ss. Identical SID v atifies those PGN t entical SID values	alues with ransmissi bind the	
					0 - 252 = bind data set)	ing available (whe	n SID value reache	es 252, re	sume with 0 on next
					253 - 254 = re	served for future u	se		
					255 = No bind whenever pract	ling provided. NM tical.	EA recommends ι	ising bind	ling SID values
	DF53	Integer, 8 bit unsigned	uint8	Range:	0 to 252	Resolutio	n: 1 bit	Unit-le:	ss number

Direction Data PGN: 130577 hex: 1FE11

5	Course Over Ground		Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD165 Course-Over-Ground (COG)		The direction of the	path over ground actually followed by a vessel.
	DF02 Angle	uint16	Range: 0 to 2Pi rad	Resolution: $1 \times 10E-4$ rad Resolution ~ 0.0057 deg, 1 deg = .01745 rad
6	Speed Over Ground		Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD044 Generic Speed			
	DF35 Speed	uint16	Range: 0 to 655.32 m/s	Resolution: $\frac{1 \times 10E-2 \text{ m/s}}{1 \times 10E-2 \text{ m/s}}$ 1 Knot = 0.5144 m/s
7	Heading		Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD167 Heading		expressed in angular	tion in which a ship actually points or heads at any instant, units from a reference direction, usually from 000 at the lockwise through 359 degrees.
	DF02 Angle	uint16	Range: 0 to 2Pi rad	Resolution: 1x10E-4 rad Resolution ~0.0057deg, 1 deg = .01745 rad
8	Speed through Water		Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD044 Generic Speed			
	DF35 Speed	uint16	Range: 0 to 655.32 m/s	Resolution: $1 \times 10E-2 \text{ m/s}$ 1 Knot = 0.5144 m/s
9	Set		Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD048 Current flow direction		Direction towards w	hich current flows. Degrees relative to True North.
	DF02 Angle	uint16	Range: 0 to 2Pi rad	Resolution: 1x10E-4 rad Resolution ~0.0057deg, 1 deg = .01745 rad
10	Drift		Byte Field Size: 2 Bit Field Size:	Request Parameter Optional Command Parameter: Optional
	DD044 Generic Speed			
	DF35 Speed	uint16	Range: 0 to 655.32 m/s	Resolution: 1x10E-2 m/s 1 Knot = 0.5144 m/s

Vessel Speed Components

PGN: 130578 hex: 1FE12

This PGN provides a single transmission that accurately describes the speed of a vessel by component vectors. This information is relevant for large vessels and would typically be provided by a product that interfaces to sensors such as dual axis logs. Products that can only measure speed in one direction should not use this PGN.

Single Fr	ame: No	Priority Default: 2	Defau	ılt Update Ra	ate: 250 i	milliseconds	Frequency:	4.	cycles per second
Destinatio	n: Global	Query Support: Optiona	I	Command Supp	oort: Optional	ACK Rqmnts:	None		
Field #	Field Na	ame							
1	Longitud	inal Speed, Water-reference	d	Byte Field Size: 2			Request Parameter Optional		
				Bit Fie	eld Size:		Command Pa	rameter:	Optional
	DD160	Generic speed, signed				es represent ahead rn or port transver		erse speed	and negative values
	DF36	Speed, signed	int16	Range:	+/-32.764 m/s	Resolution	on: 1x10E-3 m/s		
2	Transver	se Speed, Water-referenced		Byte Fie	eld Size: 2		Request Para	meter	Optional
				Bit Fie	Bit Field Size:		Command Pa	rameter:	Optional
	DD160	Generic speed, signed				es represent ahead rn or port transver		erse speed	and negative values
	DF36	Speed, signed	int16	Range:	+/-32.764 m/s	Resolution	on: 1x10E-3 m/s		
3	Longitud	inal Speed, Ground-reference	ced	Byte Fie	eld Size: 2		Request Para	meter	Optional
		•		Bit Fie	Bit Field Size:		Command Par		Optional
	DD160	Generic speed, signed		Positive values represent ahead or starboard transverse speed and negative					and negative values
					-	rn or port transver	•		
	DF36	Speed, signed	int16	Range:	+/-32.764 m/s	Resolution	on: 1x10E-3 m/s		
4	Transver	se Speed, Ground-reference	ed	Byte Fie			Request Para		Optional
				Bit Fie	eld Size:		Command Pa	rameter:	Optional
	DD160	Generic speed, signed				es represent ahead rn or port transver		erse speed	and negative values
	DF36	Speed, signed	int16	Range:	+/-32.764 m/s		on: 1x10E-3 m/s		
5	Stern Sp	eed, Water-referenced		Byte Fie	eld Size: 2		Request Para	meter	Optional
				Bit Fie	eld Size:		Command Pa	rameter:	Optional
	DD160	Generic speed, signed					esent ahead or starboard transverse speed and negative valu oort transverse speed.		
	DF36	Speed, signed	int16	Range:	+/-32.764 m/s	Resolution	on: 1x10E-3 m/s		
6	Stern Sp	eed, Ground-referenced		Byte Fie	eld Size: 2		Request Para	meter	Optional
-				-	eld Size:		Command Pa	rameter:	Optional
	DD160	Generic speed, signed				es represent ahead rn or port transver		erse speed	and negative values
	DF36	Speed, signed	int16	Range:	+/-32.764 m/s	Resolution	on: 1x10E-3 m/s		

NMEA 2000 Appendix B - Revision History

Rev ID	Date Version	Description
1	Sep 2001 1.001	Initial Release
2	Oct 2001 1.001	This Revision History Log Added
3	Oct 2001 1.001	DF09 Range Correction from 10E+5 to 10E+7
4	Oct 2001 1.001	DF21 Range Correction from 10E+10 to 10E+8
5	Dec 2001 1.001	DD176 Network Addresses updated the allocations. Corrections made to agree with specifications
6	Jan 2002 1.001	PGN 127489 - added a second Discrete Status Field 12
7	Jan 2002 1.001	DD223 Dictionary item added for 127489
8	Jan 2002 1.001	PGN 129545 inserted field 3 (Reserve of 6bits) for alignment and corrected Latitude expected error's Data Dictionary reference from DD001 to DD220
9	Sep 2002 1.002	PGNs 060160 & 060416 (Transport Protocol) chgd from priority 7 to 6 as defined by ISO
10	Sep 2002 1.002	PGN 060416 correct "ABORT" description labeling
11	Nov 2002 1.002	PGN 126996 corrected Single Frame "Yes" to "No", field 2 corrected grammer from "manufactures" to "manufacturer's"
12	Nov 2002 1.002	PGN 130321 Field 6 DD022 corrected to DD023
13	Nov 2002 1.002	PGN 129540 Added field 3 Reserve to pad previous field 2 - Mode to Byte, this new field insertion shifted all fields above 2 up 1
14	Nov 2002 1.002	PGN 129033 In description corrected incorrect pgn reference of 128012 to 126992
15	Nov 2002 1.002	PGN 126998 changed note field from 50 char to 70 ASCII or 35 Unicode
16	Nov 2002 1.002	PGN 130577 in description corrected pgn reference from 128006 & 128007 to 128259 & 129026. Also removed no longer appropriate reference to 128008.
17	Nov 2002 1.002	PGN 130577 in description corrected pgn reference from 128012 to 126992
18	May 2003 1.003	Changed Ack Rqmnts Field in PGNs 059904, 060416, 060928, 065240,126208

Rev ID	Date Version	Description
19	May 2003 1.003	PGN 128520 - removed field 15 Reserve Bits is not needed at end.
20	May 2003 1.003	PGN 128520 - changed fields14 & 13 fromDD007 to DD050 var length short ASCII
21	May 2003 1.003	DD045 - Removed description with reference to ground, mag or true
22	May 2003 1.003	PGN 059392 - added clarification to description that message will always be sent with a destination address of 255. (Per agreement with SAE/ISO)
23	May 2003 1.003	PGN 127488 in description corrected pgn reference from 127509 to 127489
24	May 2003 1.003	PGN 129033 in description corrected pgn reference from 128012 to 126992
25	May 2003 1.003	PGN 129029 in description corrected pgn reference from 128005 to 129025
26	Jul 2003 1.004	PGN 126996 field 1 clarified version to "NMEA 2000 Database Version"
27	Jul 2003 1.004	PGN 127251 Rate of turn added along with DD125, DF85
28	Jul 2003 1.004	PGN 128520 fields 13 & 14 changed to ASCII String Fields
29	Jul 2003 1.004	DD217 correct upper 2 bit field definitions
30	Jul 2003 1.004	PGN 129540 GNSS Sats in View. Corrected field references, added missing filed 16 Range Residuals "n", Clarified Description.
31	Sep 2003 1.004	Moved Eng Trim from PGN 127489 to PGN 127488
32	Oct 2003 1.005	PGN 127251 Rate of Turn, deleted Vessel Heading
33	Nov 2003 1.005	Moved "The message will always be sent with a destination address of 255" from ISO Request (pgn 059904) to ISO Acknowledge (pgn 059392)
34	Nov 2003 1.005	Time & Date PGN 129033 corrected old PGN reference 128012 to 126992
35	Feb 2004 1.100	PGN 127489 changed Fuel Pressure Range (field 9); required adding DD225 with DF29 range
36	Feb 2004 1.100	PGN 126208 Command Group, Description clarification made
37	Feb 2004 1.100	PGN 129283 Cross Track Error, removed field 3, increase Reserve field size to adjust
38	Feb 2004 1.100	PGN 129550 chgs fields 3&4 & PGN 129551 chgs fields 8,9

Rev ID	Date Version	Description
39	Mar 2004 1.100	PGN 127505 Fluid Level, added field 4 - Tank Capacity
40	Mar 2004 1.100	PGN 129284 Navigation Data - updated Description
41	Mar 2004 1.100	PGN 129291 Set & Drift, Rapid Update - updated Description
42	Mar 2004 1.100	PGN 130577 Direction Data - field 8 added "through water" to Speed name
43	Apr 2004 1.101	PGN 127505 Fluid Level, revised field 4 size and resolution added DF86 & DD227 to support the change
44	Apr 2004 1.101	PGN 129283 Cross Track Error, added field 4 "Navigation Terminated" to previously "reserve" field
45	Apr 2004 1.101	PGN 129808 DSC Call Info, fields 8, 22, 24 use DD015, no other reference - DD015 was changed from DF63 to DF50. Notes added to each field defining maximum size
46	Apr 2004 1.101	PGN 126208 Command Group, Ack group 2 field 3 PGN error code state 0x4 added , 0xF removed
47	Apr 2004 1.101	PGN 127489 Eng Parms, Dynamic - add % Torque and % Load
48	Apr 2004 1.101	PGN 127489 Eng Parms, Status 2 - added Maintenance Required and Comm error Alarms
49	Apr 2004 1.101	PGN 130311 Environmental Parameters added to be used insterad of PGN 130310 in new designs. Allows for instance of temp and humidity. More flexible. DD129, DD130, and DD131added to support this.
50	May 2004 1.111	PGN 129027 Position Delta & PGN 129028 Altitude Delta addded
51	May 2004 1.111	DD233 thru DD235 & DF88 thru DF90 added to support PGN129027&129028
52	May 2004 1.111	PGN 127496 Trip Parameters, Vessel
53	May 2004 1.111	PGN 127497 Trip Parameters, Engine - revised per discussions last meeting
54	May 2004 1.111	Nav & WP PGN's 129285, 130064 thru 130072 added
55	May 2004 1.111 +	PGN 127258 new PGN Name chgd from Headding variation to Magnetic Variation
56	Sep 2004 1.111 B	Engine Parms Dynamic, added to Field 12, Engine discrete Status 2, the following status bits: Sub or Secondary Throttle, Neutral Start Protect, and Engine Shutting Down.
57	Sep 2004 1.111 B	Added description to Titles on first cover page on all reports

Rev ID	Date Version	Description
58	Sep 2004 1.111 B	PGN 126996 Product Information - added field 8 - Load Equivalency Number, DD242 added in support of this, other text clarifications
59	Oct 2004 1.111 B	Way Point and Route PGNs and supporting items updated.
60	Oct 2004 1.111 B	AIS PGNss and supporting items added and/or updated
61	Nov 2004 1.111 B	PGN 127508 - Field 5 SID added, replaced spare
62	Nov 2004 1.200	DD237 - bit field typo corrections
63	Nov 2004 1.200	PGN 130065 fields 7,8,9 realignment
64	Nov 2004 1.200	PGN 130066 fields 9,1,11 realignment
65	Nov 2004 1.200	WP & Route PGNs 130066, 130067, 130068, 130073, 130074 Descriptions updated
66	May 2009 1.200 A	Fluid Level Corrected DF84 range and resolution (used in PGN 127505)
67	May 2009 1.200 A	Added to PGN Reports the display of the PGN number in hexidecimal format. Located below original Decimal PGN #
68	May 2009 1.200 A	PGN 060928 ISO Address Claim - field 11 note field changed from "Only values less than 254 shall be used" to "Only values less than 252 shall be used"
69	Jul 2005 1.200 A	Added extensions to Command Group PGN 126208
70	Aug 2005 1.200 A	Added Proposed Power PGNs (PGN #s not yet assigned)
71	Aug 2005 1.200 A	PGN 126208 Request group Function, field 3 Transmission Interval added state 0xFFFF FFFE Restore default Time Interval
72	Aug 2005 1.200 A	PGN 059392 ISO Ack remove last line of description "This message will always be sent with a destination address of 255"
73	Sep 2005 1.200 B	PGN 059392 ISO Ack add last line of description "The destination address of this PGN shall always contain a destination specific address" and note about version 1.000
74	Sep 2005 1.200 B	PGN 129796 AIS Acknowledge correct field 10 from DD001 to DD010
75	Jul 2006 1.200 C	Power PGN Support added DF92 - DF102
76	Jul 2006 1.200 C	Power PGN Support added DD258 - DD288

Rev ID	Date Version	Description
77	Jul 2006 1.200 C	Power PGNs added: 127503 AC Input Status 127504 AC Output Status 127506 DC Detailed Status 127507 Charger Status 127509 Inverter Status 127511 Inverter Configuration Status 127513 Battery Configuration Status 127514 Automatic Generator Start Configuration Status
78	Aug 2006 1.200 D	Meeting Updates PGN 060928,127250, int24,129039,129538,130323, DD025, DD070, DD232
79	Sep 2006 1.210	PGNs added 130312,130313,130314,130315 to replace 130311 for future designs
80	Sep 2006 1.210	PGN 128259 designate field 3 not for new designs refer to 129026 for value
81	May 2009 1.300	Revised and added AIS Class B PGNs in accordance with AIS Class B working group report dated 24 April 2006, and as modified July 2008. - Revised: 129039, 129040 - Restored from vers 1.111: 129806 - New: 129807, 129809, 129810 - Data Definitions added: DD294 - DD304
82	May 2009 1.300	Implemented structural changes to database to make database maintenance easier: - Added VersionHistory table and changed all reports to list version identified for this file when printing - Changed "Pick_PGN_Form" to also refer to version identified for this file - Added RevisionHistory table, imported revision history data from "PGNs by Number" report footer, removed revision history data from report footer - Added "RevisionHistory-Edit" form for entering/editing revision history data - Added new "RevisionHistoryReport" and Revision History button on "Pick_PGN_Form" to launch it
84	May 2009 1.300	Revised AIS Class A PGNs to reflect changes and corrections noted during Update of AIS Class B PGNs; PGNs, affected: 129794, 129795, 129797, 129798, 129801, 129802.
85	Jun 2009 1.300 B	Corrected PGN 130315 and 130313 destination; changed from no value to Global.
86	Mar 2010 1.300 B	Revised PGNs 127503 AC Input Status, and 127504 AC Output Status. Marked as not for use in new designs per Standards Committee Meeting minutes of Feb 2008 and referred manufacturers to J1939-75.
87	Apr 2010 1.301	Structural change to create PGN sub-selection groups to allow printing Parameter Groups either by the full list or by the following selections: AIS, Environmental, Navigation, Power, Propulsion, Steering. All selections include the subselections Mandatory and Other. New selection group reports include electronic licensing agreement.
88	May 2010 1.301	Structural/formatting changes: - Modified reports used for standard publishing to include to include electronic licensing agreement, and cleaned up formatting so all reports are similar in formation and have consistent use of headers and footers. Reports modified: - Parameter_Group_ByNumber_Report - Data_Formats_ByNumber_Report - Data_Dictionary_Report - Type_ByType_Report - Created PGN Field List report.

Rev ID	Date Version	Description
89	Jul 2010 1.301 A	Added PG Short Name and PG Short Description to IDRef_Tbl for recording public unlicensed data dumps.
90	Sep 2010 1.301 A	Revise PGN 126208 to clarify that the Command group function always requires an acknowledgement either positively or negatively, and Request group functions only require an acknowledgement if the request cannot be completed. [August 2005 Standards Committee Meeting, Agenda Item 17b]
91	Sep 2010 1.301 A	(For Confirmation) Per request from Jacop Lie Simonsen, change PGN 127258 from priority 7 to priority 6 in recognitiion of the fact the PGN contains real-time data. [October 2005 Standards Committee, Agenda Item 16]
92	Sep 2010 1.301 A	(For Confirmation) Change description for System Time (PGN 126992) and rename and update Time and Date (PGN 129033) in accordance with Standards Committee decision. Also removed/reworded Application Notes as necessary to ensure there is no conflict with the revised description [June 2007 Standards Committee Meeting, Agenda Item 7]
93	Sep 2010 1.301 A	Add to description for Engine Parameters, Static (PGN 127498) to require that no bit fields in Engine Discrete Status 1 and 2 may be set to unused/unimplemented. Also added requirement to DD206 and DD223. [May 2008 Standards Committee Meeting, Agenda Item 11]
94	Sep 2010 1.301 A	Add value ??? "Atmospheric Pressure, Corrected for Altitude" to Actual Pressure (PGN 130314), Field 3, DD289. [October 2007 Standards Committee Meeting, Agenda Item 6]
95	Sep 2010 1.301 A	Revise DF63, String Fixed, to require that unused characters be filled with 0xFF = Data not available. [July 2008 Standards Committee Meeting, Agenda Item 2]
96	Sep 2010 1.301 A	Corrected typographical error in Int24 definition: Range was mis-stated, should be -8,388608 to 8,388,607. Also impacted definition of reserved values. [Reported by Actisense 2010-02-17]
97	Sep 2010 1.301 A	Corrected DF102 by revising resolution to match the specified range. Also revised all resulutions with fractional values to conform to standard "1x10E-n units". Affected DFs are: DF66, DF81, DF84, DF97, DF101, DF102, DF103. [Reported by Actisense 2010-02-17]
98	Sep 2010 1.301 A	(For Confirmation) Add requirement that Product Information (PGN 126996) parameter groups may only be requested from one device at a time. [July 2008 Standards Committee Meeting, Agenda Item 3]
99	Sep 2010 1.301 A	Corrected typo in GNSS Differential Correction Receiver Signal, Field 9, Differential Signal Detection Mode; removed invalid designation of 3 reserved bits. [Reported by Actisense 2010-02-17]
100	Sep 2010 1.301 A	Corrected field designations for GNSS Differential Correction Receiver Interface (PGN 129550), resolved missing field 6 by changing fields 7,8 to 6,7. [Reported by Actisense 2010-02-17]
101	Oct 2010 1.301 A	Added new parameter group AIS Aids to Navigation (AtoN) Report (PGN 129041); Also created new Data Definitions DD305, DD306, DD307, DD308, DD309; Also updated DD191 to define meaning for a value of 7. (Incorporated minor typographical fixes to new parameter group and DD's 10/6 & 10/19.)
103	Jan 2011 1.301 B	Revised SystemTime (126992) to state that when transmitted it always represents current system time; Revised Local Time Offset (PGN 129033) to remove the phrase "with the SID set to 255". (reverses previous revision 92) [September 2010 Standards Committee Meeting, Agenda Item 12]
104	Jan 2011 1.301 B	Modified Sequence ID (DD 056) to show a valid range of from 0 to 252, replacing a range from 0 to 250. [September 2010 Standards Committee Meeting, Agenda Item 12]
105	Feb 2011 1.301 B	Modified DD302 in accordance with AIS 1371-4 Updates dated 15 February 2011 by L. Luft. [February 2011 Standards Committee Meeting, Agenda Item 11] Net change is to revise order of enumerations 9, 10, and 11.

Rev ID	Date Version	Description
106	Feb 2011 1.301 B	Revised AIS Class A Position Report (PGN 129038) in accordance with AIS 1371-4 Updates dated 15 February by L. Luft. Also Created new DD310 & DD311. [February 2011 Standards Committee Meeting, Agenda Item 11]
107	Feb 2011 1.301 B	Revised AIS Group Assignement (PGN 129807) to remove 'Class B' from its title; Added 'AIS Transceiver Information field to PGNs 129807, 129809, and 129810. [February 2011 Standards Committee Meeting, Agenda Item 11]
108	Mar 2011 1.301 B	Additional changes and confirmation of revisions 105-108 in accordance with L.Luft markup. [nmea-2000-corrigendum-1-2011_LAL_Mar_7_1]
109	Mar 2011 2.000	Added Payload Mass parameter group (PGN 130560) in accordance with approved PGN Template, including required DD312 Scale Measurement Status, DD313 Mass, and DF104 Mass; Added Command Support Field to IDRef_Tbl and Command Parameter Field to IDRef_Detail_Tbl [February 2011 Standards Committee Meeting, Agenda Item 12]
110	Jul 2011 2.000	Revised Address Claim (PGN 60928) to provide additional clarification of requirements and add a reference to address mode and request frequency limits established in Section 8.3.2; Revised PGN List - Received PGNs group function and PGN List - Transmitted PGNs group function to provide typographical corrections and to establish limitations on when requests for them may be made globally; Revised Product information (PGN 126996) and Configuration Information (PGN 126998) both to establish limitations on when requests for them may be made globally. [February 2011 Standards Committee Meeting, Agenda Item 15]
111	Jul 2011 2.000	Revised Binary Switch Bank Status (PGN127501) and Switch Bank Control (PGN127502 descriptions in accordance with descriptions developed at the meeting of the Power Distribution Group with the PGN committee in August 2010. Also added Command Support and Command Parameter field values according to the intent of the description and meeting notes. [February 2011 Standards Comittee Meeting, Agenda Item 4]
112	Jul 2011 2.000	Added visability for Command Support and Command parameter fields added in revision 109. Includes changes to Queries "Test_Report_Query," "New_Report_Query," and "PG_Selection_Report_Query," and changes to reports "Test_Report," "Parameter_Group_Report," "Parameter_Group_By_Number_Report," and "Parameter_Group_Selection_Report_By_Number."
113	Jul 2011 2.000	Added new parameter group: Temperature, Extended Range (PGN 130316), and deprecated parameter group Temperature (PGN 130312). Added new Data Dictionary item Temperature, extended range and precision (DD314). Added new Data Format item Temperature, extended range and precision (DF105). Added new type uint24. [February 2011 Standards Committee Meeting, Agenda Item 9]
114	Jan 2012 2.000	Added new parameter group: Payload Mass (PGN 130560)
116	Feb 2012 2.000	Revised the following AIS PGN's to include Sequence ID (SID) as the last field, so these PGN's can be linked to other PGN's: 129038, 129039, 129040, 129793, 129794, 129796, 129798, 129800, 129801, 129802, 129803, 129804, 129805, 129806, 129807, 129810 129810
117	Apr 2012 2.000	Edited AIS ACA Channel Assignment Message (PGN 129806). Field 9 has become the Source ID field. Fields 11 thru 14 have Lat Lon Resolution specified to 1/10 min. Addition of In Use Flag (Field 24), Time of in-use Flag Cahnge (Field 26), SID (Field 27).
118	Mar 2012 2.000	Edited Output rate of PGN 130313
119	Mar 2012 2.000	Edited Bit Field size of PGN 129285

Rev ID	Date Version	Description
121	Mar 2012 2.000	Added Exhaust Gas Temperature as a state to Field 3 of PGN 130316.
122	Apr 2012 2.000	Deprecated PGN's 130310, 130311, 130312. Within the PGN descriptions lists all details and suggested PGN to use as replacements
123	Mar 2012 2.000	Added the following states to Filed 3 (DD289) to PGN 130314 - Filter Pressure, Altimiter Setting, Oil Pressure, and Fuel Pressure.
124	May 2012 2.000	Added "Maximum Depth Range" (Field 4) to PGN 128267
125	May 2012 2.000	Added "Speed Direction" (Field 5) to PGN 128259
126	May 2012 2.000	Added new ALERT Parameter Groups: Alert (PGN 126983), Alert Response (PGN 126984), Alert Text (PGN 126985), Alert Configuration (PGN 126986), Alert Threshold (PGN 126987), Alert Value (PGN 126988). Added 900 Alert codes to be used with Alert PGN's Added Alert document Appendix which details Alert PGN's and code implementation.
127	May 2012 2.000	Added Default update rate (2000ms) to PGN 130313 Humidity
128	May 2012 2.000	Added Field 8 (Consumed Amp Hours) to PGN 127506
129	Aug 2012 2.000	Added new Parameter Groups: Label (PGN 130060) and Channel Source Configuration (PGN 130061)
130	2.000	Added new Power Parameter Groups: Load Controller Connection State and Control (PGN 127500), AC Power / Current, Phase A (PGN 127744), AC Power / Current, Phase B (PGN 127745), AC Power / Current, Phase C (PGN 127746), AC Voltage/Frequency, Phase A (PGN 127747), AC Voltage/Frequency, Phase B (PGN 127748), AC Voltage/Frequency, Phase C (PGN 127749), Converter (Inverter/Charger) Status (PGN 127750)
135	Sep 2012 2.000	Changed state options of Query Support box for all PGN headers New state options are: Required(formerly YES), Optional, Prohibited(formerly NO) States are described in Appendix A, Version 2.00
136	Sep 2012 2.000	Changed state options of Request Parameter box for ALL Fields within ALL PGN's New state options are: Required(formerly YES), Optional, Note(which is described in the PGN header) States are described in Appendix A, Version 2.00
137	Sep 2012 2.000	PGN 060416 (CTS Group Function) Added PGN description.
138	Sep 2012 2.000	PGN 060416 (EOM Group Function) Added PGN description.
139	Sep 2012 2.000	PGN 060416 (RTS Group Function) Added PGN description.
143	Sep 2012 2.000	PGN 126208 (Command Group Function) Added to description Note 1: When sending a complex command to a device, when accepted if the PGN referenced has command capability, then these fields shall contain the commanded values.

Rev ID	Date Version	Description
144	Sep 2012 2.000	PGN 126208 (Request Group Function) Edited description and added the following: NMEA encourages manufacturers to provide the capability of altering the values of transmission time for NMEA certified products on the network. When the values of transmission time or delay before the first transmission are altered, they should be maintained after power cycling.
145	Sep 2012 2.000	Edited fields within all PGN's to reference new Class & Function Codes Appendix B6 (where applicable)
146	Sep 2012 2.000	All PGN's- removed "NMEA 2000" specifics in PGN descriptions in preparation for NMEA OneNet. These are now referred to as "NMEA Network Messages"
147	Sep 2012 2.000	126996 Field 1 added the following note: NMEA encourages manufacturers to provide the capability to support multiple NMEA Network Message database versions within their product. This provides a means for manufacturers products to retain backwards compatability with previous versions of the database and existing legacy products.
148	Sep 2012 2.000	Added NEW Command Support header box to ALL PGN's Command Support state options are: Required, Optional, Prohibited States are described with detail in Appendix A, Version 2.00
149	Sep 2012 2.000	Added NEW Command Parameter box to ALL Fields within ALL PGN's Command Parameter state options are: Required, Optional, Prohibited, Note(which is described in the PGN header) States are described with detail in Appendix A, Version 2.00

Rev	Date	Description
ID	Version	
150	Sep 2012	Changed the Query Support header box value on listed PGN's below to the following values:
	2.000	126998 Optional to Prohibited
		126208 Optional to Required
		065240 Blank to Required
		060416 Blank to Required
		127245 Optional to Required
		127250 Optional 127251 Optional
		127527 Optional
		127258 No to Optional
		127488 Required
		127489 Optional to Required
		127493 Optional to Required
		127496 No to Optional
		127497 Optional to Required
		127498 Optional to Required
		127505 Optional to Required
		127507 Required
		127508 Optional to Required
		129027 No to Optional
		129028 No to optional
		129038 No to optional 129285 No to optional
		129547 No to optional
		129039 No to optional
		129040 No to optional
		129401 No to optional
		129792 No to optional
		129793 No to optional
		129794 No to optional
		129795 No to optional
		129796 No to optional
		129797 No to optional
		129798 No to optional 129799 No to optional
		129800 No to optional
		129802 No to optional
		129803 No to optional
		129804 No to optional
		129805 No to optional
		129806 No to optional
		129807 No to optional

Rev ID	Date Version	Description
151	Sep 2012 2.000	Changed the Request Parameter box value on the following PGN's and Field Numbers within the PGN's 060416 Field 1 Optional to Required 126208 Field 2 Optional to Required 126208 Field 2 Optional to Required 126998 Field 1,2,3 Optional to Prohibited 127237 Field 1,2,3,4,5,6,7,9,10,11,12,13,14,15,16,17,18 No to Optional 127245 Field 1,2,3,4,5 Optional to Required 127250 Field 1,2,3,4,5 Optional 127251 Field 1,2,3,4,5 Optional 127252 Field 1,2,3,4,5 No to Optional 127258 Field 1,2,3,4,5 No to Optional 127498 Field 1 Optional to Required 127496 Field 1,2,3,4, No to Optional 127497 Field 1 Optional to Required 127498 Field 1 Optional to Required 127500 Field 2 Required 127501 Field 1 Required 127505 Field 1 Required 127507 Field 1,2 Required 127509 Field 1,2 Required 127510 Field 1,2 Required 127510 Field 1,2 Required 127511 Field 1,2 Required 127511 Field 1,2 Required 127512 Field 1,2 Required 127513 Field 1 Required 127514 Field 1 Required 127515 Field 1 Required 127515 Field 1 Required 127516 Field 1 Required 127517 Field 1,2 Required 127518 Field 1 Required 127519 Field 1 Required 127510 Field 1 Required 127511 Field 1,2 Required 127513 Field 1 Required 127514 Field 1 Required
152	Sep 2012 2.000	Added Sequence ID (SID) Sentence to PGN 129794 header description.
153	Sep 2012 2.000	PGN 060416 (Abort Group Function) Added PGN description.
155	Sep 2012 2.000	PGN 060416 (BAM Group Function) Added PGN description.
156	Nov 2012 2.000	Discussion regarding Deprecation of PGN 127502- Temporary decision was to keep 127502 until NMEA consults with SAE regarding obtaining more addressable PGN's. NMEA will then create a new addressable PGN based on 127502. Date is TBD.
157	Jan 2013 2.000	Re-named references to "Table 8 Class & Function Codes" to "Appendix B.6 Class & Function Codes"
158	Jan 2013 2.000	Deprecated PGN's As of January 2013: 127503 127504 130310 130311 130312 127507 127509

Rev ID	Date Version	Description
160	Mar 2013 2.100	Released Power PGN Corrigendum containing the following PGNs
	2.100	127744 AC Power / Current Phase A 127745 AC Power / Current Phase B 127746 AC Power / Current Phase C 127747 AC Voltage / Frequency Phase A 127748 AC Voltage / Frequency Phase B 127749 AC Voltage / Frequency Phase C 127750 Converter (Inverter / Charger) Status 127751 DC Voltage and Current 127500 Load Controller Connection State and Control
161	Mar 2013 2.100	Appendix B.6 Class & Function Codes Added to Class 10- Functions 120, 121, 122, 123. Added to Class 25- Functions 136, 137. Changed Solar Panel to Function 142 in Class 35. Removed NMEA 2000 Wireless Gateway from Class 90.
162	Dec 2013 2.100	PGN 127509, changed Field 7 DD item to Ripple Voltage DD287. Previously Field 7 was DD001 and this was incorrectly entered in draft version 1.4. This PGN was deprecated in V2.000. DD item was changed to align correct number of bits. Garmin identified this issue.
163	Jan 2014 2.100	Heartbeat PGN 126993 . Changed reserved Field 3 bit boundary error. Was incorrect at 24 bits, corrected to 40 bits.
164	Jan 2014 2.100	PGN 126208 Group Function PGN. Moved ACK Requirements to a Note at the end of the PGN text description for Command and Request Group function. This makes the page look cleaner and read easier as the note was too big for the ACK Requirements box which usually is filled with "none".
165	Jan 2014 2.100	PGN 126208 Read & Write Fields Group Function Clarifications: The clarification of the Read Fields and Write Fields group functions (and their associated Reply group functions) was necessary to clarify their use to interrogate and configure PGNs that have at least one instance field.
166	Jan 2014 2.100	PGN 126208 Text Descriptions clarification: The text descriptions for each specific group function have now been placed within the header of each group function. Previously, all text describing each of the group functions were only listed in the Request Group Function PGN description.
167	Dec 2014 2.100	(PDW) In Table "DD#_Tbl", DD351 was missing Bit field size - should be 8 bits. Fixed. This fix is also related to a fix at RevisionID 168 below
168	Dec 2014 2.100	(PDW) In Table "IDRef_Detail_Tbl", entry 1741 ("State"), has a value set for "Reserved bits". This should be blank - This relates to Revision ID 167 above - because the reserved bit size was set, the PGN report worked, but the definition was incorrect, this is not a reserved field.
169	Dec 2014 2.100	(PDW) In Table "DD#_Tbl", DD352 was set to a bit field size of 13. Should be 16 bits. Although the three bits at the end are "reserved", the whole field size is actually 16 bits. Fixed. This fix is also related to a fix at RevisionID 170 below.
170	Dec 2014 2.100	(PDW) In Table "IDRef_Detail_Tbl", entry 1742 ("Status") has a value of 16 set for "Reserved bits". This should be blank - This relates to Revision ID 169 above - because the reserved bit size was set, the PGN report worked, but the definition was incorrect, this is not a reserved field.
171	Dec 2014 2.100	(PDW) In Table "DD#_Tbl", DD353 ("AIS Channel Management Source") had no bit field size. Should be 3 bits. Fixed. This fix is also related to a fix at RevisionID 172 below.

Rev ID	Date Version	Description
172	Dec 2014 2.100	(PDW) In Table "IDRef_Detail_Tbl", entry 1566 ("Source Identifier") has a value of 3 set for "Reserved bits". This should be blank - This relates to Revision ID 171 above - because the reserved bit size was set, the PGN report worked, but the definition was incorrect, this is not a reserved field.
173	Dec 2014 2.100	(PDW) In Table "DD#_Tbl", DD330 ("Alert State") uses DF53, which is an integer byte field (8 bits), but also has a bit field size set of 8. The bit field size is not required, it has been removed.
174	Dec 2014 2.100	(PDW) In Table "Type_Tbl", bit0(n) has been added - makes clear a bit type that defaults to a value of "0" when NULL or unused - clarifies this requirement for AIS fields. Linked to Revision ID 175 below.
175	Dec 2014 2.100	(PDW) In Table "DF#_Tbl",DF118 has been added - makes clear a data format that defaults to a value of "0" when NULL or unused - clarifies this requirement for AIS fields. Linked to Revision ID 174 above.
176	Dec 2014 2.100	(PDW) In Table "IDRef_Detail_Tbl", The following fields marked "AIS Spare" currently set to "DD001" need to change to "DD311" Where "RefID_Detail_ID" = 1038, 1056,1068, 1075, 1087, 1106, 1117, 1119, 1111, 1130, 1151, 1137, 1142, 1146, 1164, 1157, 1172, 1176, 1218, 1224, 1241, 1252, 1267, 1283, 1557, 1539, 1545, 1531, 1563, 1579, 1598 (All are definitions of the AIS Spare bits, which should use DD311 as this definition ensures that the description shows that all bit default to zero for null data)
177	Dec 2014 2.100	(PDW) In Table "IDRef_Detail_Tbl", The following fields marked "Reserved for Regional Applications" used in AIS MEssages currently set to "DD001" have been changed to "DD311" Where "RefID_Detail_ID" = 1104, 1191, 1192, 1205, 1206, 1253 (All are definitions of the AIS Spare bits, which should use DD311 as this definition ensures that the description shows that all bit default to zero for null data)
178	Dec 2014 2.100	(PDW) In Table "IDRef_Detail_Tbl", entry 1524 ("Message ID") has a value of 6 set for "Reserved bits". This should be blank - this is not a reserved field, the bit field is defined in the DD type DD188 "Bit field size" of 6 bits
179	Dec 2014 2.100	(PDW) In Table "IDRef_Detail_Tbl", entry 1525 ("Repeat Indicator") has a value of 2 set for "Reserved bits". This should be blank - this is not a reserved field, the bit field is defined in the DD type DD185 "Bit field size" of 2 bits
180	Dec 2014 2.100	(PDW) In Table "IDRef_Detail_Tbl", entry 1547 ("Repeat Indicator") has a value of 2 set for "Reserved bits". This should be blank - this is not a reserved field, the bit field is defined in the DD type DD185 "Bit field size" of 2 bits
181	Dec 2014 2.100	(PDW) In Table "IDRef_Detail_Tbl", entry 1549 ("Type of Ship and Cargo") has a value of 8 set for "Reserved bits". This should be blank - this is not a reserved field, the bit field is defined in the DD type DD193 "Bit field size" of 8 bits
182	Dec 2014 2.100	(PDW) In Table "IDRef_Detail_Tbl", entry 1582 ("Message ID") has a value of 6 set for "Reserved bits". This should be blank - this is not a reserved field, the bit field is defined in the DD type DD188 "Bit field size" of 6 bits
183	Dec 2014 2.100	(PDW) In Table "IDRef_Detail_Tbl", entry 1583 ("Repeat Indicator") has a value of 2 set for "Reserved bits". This should be blank - this is not a reserved field, the bit field is defined in the DD type DD185 "Bit field size" of 2 bits
184	Dec 2014 2.100	(PDW) In Table "IDRef_Detail_Tbl", entry 1782 ("In-Use flag") has a value of 2 set for "Reserved bits". This should be blank - this is not a reserved field, the bit field is defined in the DD type DD354 "Bit field size" of 2 bits. Linked to Revision ID 185 below.
185	Dec 2014 2.100	(PDW) In Table "DD#_Tbl", DD354 ("AIS Channel Management Parameters Usage") had no bit field size. Should be 2 bits. Fixed. This fix is related to the fix at RevisionID 184 above.

Rev ID	Date Version	Description
186	Dec 2014 2.100	(PDW) In Table "DD#_Tbl", DD391 ("Time, Standard") uses DF65, which is an unsigned integer 32 bit field (32 bits), but also has a bit field size set of 32. The bit field size is not required, it has been removed, as it is already defined in the DF table
187	Dec 2014 2.100	(PDW) In Table "IDRef_Detail_Tbl" PGN 129550 [IDRef ID 27] has bad field sequence - field "7" should be field "6" and field "8" should be field "7"
189	Dec 2014 2.100	(PDW) In Table "IDRef_Detail_Tbl" ID= 1517 was not being used - it had no ID ref, name or other details. It has been re-assigned to PGN 127512 (AGS status), as this PGN had 44 unassigned bits at the end. In the default single packet PGNS, it should be made clear that remaining bits must be set to one. Adding this field 4 DD01 reserved bit definition of 44 bits makes this clear.
190	Dec 2014 2.100	(PDW) PGN 129538 has 6 bits remaining at the end of the message that should be set to "reserved" Added field 11 to this PGN with DD001 and reserved size of 6 bits to show these bits must always be set to "1"
191	Dec 2014 2.100	Removed DF115 as this was not associated with any specific Data Dictionary Item or PGN. DF115 Time Interval was the same as DF116 Time interval. DF116 has more detail and is used with the Heartbeat PGN, Field #1. DF115 is now available for future use of data dictionary items.
192	Dec 2014 2.100	ID Reference 119, PGN 129803 Field 21 has been changed to 6 bits instead of 4 bits so it is aligned on the correct byte boundary. Versions beyond this version, this field has been corrected to 6 bits, as it was 4.
193	Dec 2014 2.100	DD311 now links to DF115, instead of DF118 which was available for future use based on the 12/9/2014 change, see RevisionID 191. DF118 is now open for future use
194	Dec 2014 2.100	Added "Status" field at the far right of the IDRef_Tbl to indicate if the PGN is "Current", "Draft", or "Deprecated"
195	Dec 2014 2.100	Removed "orphan" ID References 230, 222, 224, 225 as these were not used
196	Jan 2015 2.100	Added new Data Dictionary Item specific to Engine / Transmission Instance. DD410. Updated engine and transmission PGNs to reflect using the DD410 instead of DD128. These specific PGNs are 127493, 127488, 127489, 127497, 127498
197	2.100	Added 12 new Entertainment / Audio PGNs: Entertainment Current File & Status 130569, Entertainment Library Data File 130570, Entertainment Library Data Group 130571, Entertainment Library Data Search 130572, Entertainment System Configuration Status 130580, Entertainment Zone Volume Status 130582, Entertainment Zone Configuration Status 130581, Entertainment Supported Zone Data 130574, Entertainment Supported Source Data 130573, Entertainment Available Audio EQ Presets 130583, Entertainment Bluetooth Source Status 130585, Entertainment Bluetooth Devices 130584
198	2.100	Updated Alert Configuration PGN 126986 to include instructions as to how to create custom user defined alerts. Added a new 2 bit Field 11 called User defined alert assignment along with new Data Dictionary item DD411. Moved all proceeding fields ahead by one and reduced NMEA Reserved Field 12 from 6 bits down to 4 bits.
199	Feb 2015 2.100	Increased the recommended update rate of PGN 127500 to 15,000 per request of manufacturer member Maretron.
200	Feb 2015 2.100	Combined Reserved fields in AIS PGN ID 232 starting at Field 12 and adjusted remaining fields accordingly.

Rev ID	Date Version	Description
201	Feb 2015 2.100	Combined Reserved fields in AIS PGN ID 231 starting at Field 7 and adjusted remaining fields accordingly.
202	2.100	Added 3 new AIS PGNs Single Slot 129811, Multi Slot 129812, Long Range Binary 129813
203	Sep 2013 2.100	Added Watermaker PGN 130567
204	Jun 2014 2.100	Added Heave PGN 127252
205	Jun 2019 2.100	Added Heartbeat PGN 126993
206	Sep 2013 2.100	Added MOB PGN 127233
207	Sep 2013 2.100	Updated Field 7 of Product Information PGN 126996. Added Field Note "As of February 2015 and Version 2.000 of the Main Document, Certification Level 7 shall be set to 2 meaning "Not Applicable" Also added State 2 "Not Applicable"
208	Sep 2013 2.100	Revised DSC PGN 129808 to reflect exactly what was in DSC Corrigenda from 2013.
209	Mar 2017 2.200	Updated DD291. Added shaft seal temperature as State 15. Changed Reserved states to 16 to 128.
210	Apr 2017 2.200	Trim Tab Status PGN- 130576. Added center trim tab (Field 3)
211	Apr 2017 2.200	Added Nautical Leeway Angle PGN 128000
212	Apr 2017 2.200	Added Elevator Car Status PGN 128538
213	Apr 2017 2.200	Added Elevator Deck Push Button PGN 128769
214	Apr 2017 2.200	Added Elevator Motor Control PGN 128768
215	Aug 2020 2.300 A	Update to Engine Parameters - 127489, Dynamic- New Warning Flag added
216	Aug 2021 2.300 A	Added Lighting messages - 130330, 130561, 130562, 130563, 130564, 130565, 130566
217	Aug 2021 2.300 A	Update Entertainment Zone Volume- Increased Padding - NMEA reserved
218	Feb 2021 2.300 A	Added Linear Actuator - 128780
219	Oct 2021 2.300 A	Added Acceleration - 126001

Rev ID	Date Version	Description
222	Feb 2021 2.300 A	Added Windlass Messages, 128776, 128777, 128778
223	Feb 2021 2.300 A	Added Thruster Messages 128006, 128007, 128008
220	Oct 2021 3.000	Depricated Binary Switch Command 127502
221	Oct 2021 3.000	Updated Binary Switch Status 127501
224	Dec 2021 3.000	Added Lighting Messages, Linear Actuator Message, Vessel Acceleration
225	Mar 2022 3.000	Release 3.000
226	3.001 A	Update to 126998 fields 1&2 from Optional to Required to support OneNet TPP requirements.
227	Jun 2022 3.001 A	Update to Data Dictionary Entry(s) DD449, DD507, DD515. Updates to PGN 130330, 130561, 130563, 130565.
229	Dec 2022 3.002	PGN 127751 DC Voltage/Current, Update Field 5 NMEA Reserved to 8 Bit fron 16 Bit

Date Version	Description
	PGN 130579 Entertainment - System Configuration, deprecated in version 3.000 in error. PGN 128520 Tracked Target Data - Added NMEA Reserved Field 15, 6 Bit PGN 129793 AIS UTC and Date Report- Added NMEA Reserved Field 16, 6 Bit PGN 129798 AIS SAR Aircraft Position Report- updated description, added NMEA Reserved Field 17, 2 Bit Added PGN 129810 AIS Static Data Report, Part A PGN 129810 AIS Static Data Report, Part B- Added NMEA Reserved Field 15, 5 Bit PGN 130561 Lighting Zone Added NMEA Reserved Field 14, 6 Bit PGN 130563 Lighting Device Added NMEA Reserved Field 18, 6 Bit PGN 130566 Lighting Program Added NMEA Reserved Field 5, 4 Bit PGN 128538 Elevator Car Status Added NMEA Reserved Field 32, 2 Bit PGN 129038 updated description and field guidance. PGN 129039 updated description guidance and field name change. PGN 129040 updated description PGN 129041 updated description PGN 129042 High Electric Drive Information New PGN 127494 Electric Drive Status (Dynamic) New PGN 127495 Electric Drive Status (Rapid Update) New PGN 127491 Electric Energy Storage Information New PGN 128003 Electric Energy Storage Information New PGN 129803 Updated description guidance and field name change. PGN 129803 updated description guidance and field name change. PGN 129803 updated description guidance and field name change. PGN 129804 updated description guidance and field name change.
	Version Jan 2023