Dräger medical
A Dräger and Siemens Company

RS-232 Export Protocol

Reference Booklet

Emergency Care · Perioperative Care · Critical Care · Perinatal Care · Home Care

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Table of Contents

Introduction

Scope of Protocol

This document defines the message protocol used between Infinity compliant patient monitors (servers) and client systems such as Clinical Information Systems, Anesthesia Record Systems and Data Loggers for RS-232 based communications.

This document is divided into 6 parts:

1. The first part covers the physical connection details, which includes the cable requirements, connecting to a modular monitor, and connecting a configured monitor.
2. The second part covers general guidelines for implementation and interfacing with Dräger devices that support the Infinity® Export Protocol.
3. The third part specifies the server's behavior during standby and discharge, as well as power-off or Pick and Go®.
4. The fourth part specifies the messages used for start-up, such as the exchange of demographics, server status and parameter dictionary and data.
5. The fifth part specifies run-time messages for data acquisition.
6. The sixth part specifies the ID codes for all parameters as well as the ID codes for the EEG Lead Labels. This document describes Revision 4 of the protocol.

VF Level Protocol Enhancement

The new parameters available in the VF and later release require the use of a second parameter block.

Use of this parameter block requires applications to recognize a 2 byte ID (i.e. 0FExxh).
While the Export Protocol has always specified that a second byte was possible, we were concerned that some applications have not properly implemented this feature.
As a result, we have limited the previous 057h Data Message Request to those parameters available using a single byte ID.

We have defined a Message Request 077h, which will transmit all parameters using 2 byte ids, eliminating the use of the existing 057h data request message.

Basic Protocol Goals and Assumptions

The protocol defined in this document is constructed to meet a number of goals:

- The communication scheme should minimize the need for having to perform simultaneous client software releases each time new parameters are added to an Infinity compliant server.

  A system of self-defining parameter definitions is used at startup time so that the client can identify and label all possible parameters, which might be sent from the server (host bedside).

- No “edge triggered” logic is used in the message scheme; i.e., data is sent repetitively, and not only when things change.

- All available parameter data is available to the client.

- It is assumed that the client does not need to track the alarm condition of the server; however, a provision is made to track the alarm state of each parameter.

The supported baud rate supported is 19.2 kbaud.
In all cases the startup message sequence must be exchanged, which provides for initialization of the link and identification of the existence and type of server.
Optional patient demographics and various dictionaries can be downloaded.
Finally, near real time data transfer is enabled.

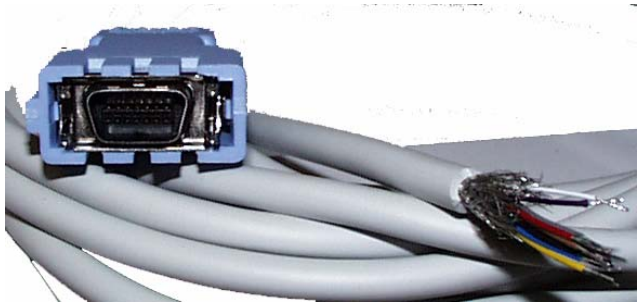
1 Physical Connection Details

Cable Requirements

In order to connect to the Export Protocol port for the Gamma/Gamma XL, Delta/Delta XL, Kappa /Kappa XLT, Vista/Vista XL Dräger Infinity devices, the cable (p/n 5206441) must be obtained.

This is an un-terminated / universally keyed interface cable, which is terminated in a 14-pin Minichamp connector. The un-terminated side must then be wired as described in the next sections, depending on the type of monitor to be interfaced.

The Kappa XLT uses a different cable (p/n MS15045) altogether.



Connecting Infinity Gamma/Gamma XL, Vista or SC 6802 XL to a PC

Note: To support both Scio Multigas Module and export protocol simultaneously, the Scio must be connected to the USB port.

The terminated end of the cable will mate with the X5 connector on the Infinity CPS or IDS or on the Interface plate (p/n 3376493). Refer to the table at the end of this section for wiring details. (Connection to the Vista is available only through an Interface Plate.)

Connecting an Infinity Delta/Delta XL, Gamma X XL, Kappa/Kappa XLT, Vista XL or an SC 7000/SC 9000XL to a PC

The Delta and Delta XL, or SC 7000/SC 9000XL can connect with either the X3 or X5 connector depending on configuration. Wiring information is available at the end of this section.

Refer to the following table for details.

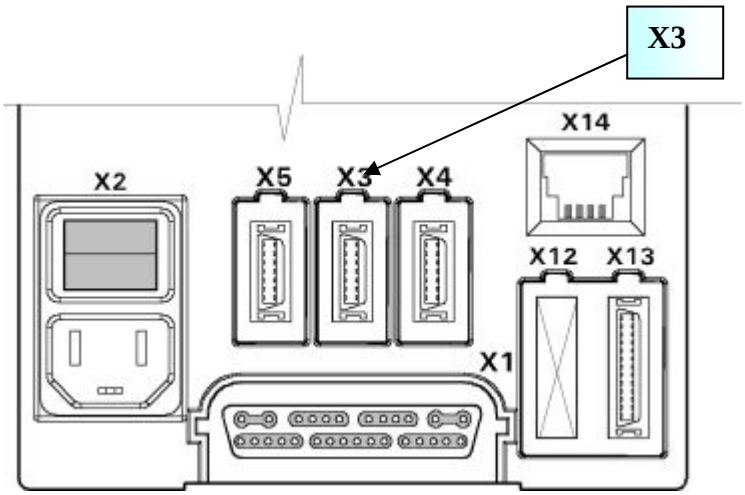
Infinity Delta/Delta XL and SC 7000/SC 9000XL Hardware Configuration Table

Infinity Delta/Delta XL, Gamma X XL, Vista XL and SC 7000/SC 9000XL			
Menu selection	Biomed/Service/ Bedside Setup	Biomed/Service/ Bedside Setup	Biomed/Service/ Bedside Setup
Network Mode	Network Mode is Direct Net	Network Mode is Direct Net	Network Mode is IDS / CPS
Port Function	SC 9015	Export Protocol	N/a
RS 232 Export Port	**N/a**	**X5 with Interface Plate**	**X3 with IDS / CPS**

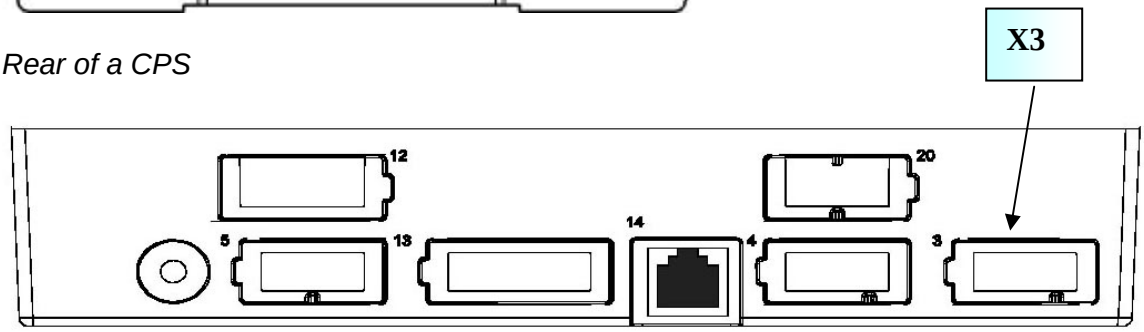
Note: A DirectNet Delta/Delta XL and SC 7000/SC 9000XL cannot support a SC 9015 and Export protocol at the same time.

The use of an IDS / CPS is required to simultaneously support a SC 9015 and data export.
The X5 port on the IDS / CPS is used for the SC 9015 and the X3 port for RS 232 Export Protocol.
Vista XL does not support an IDS.

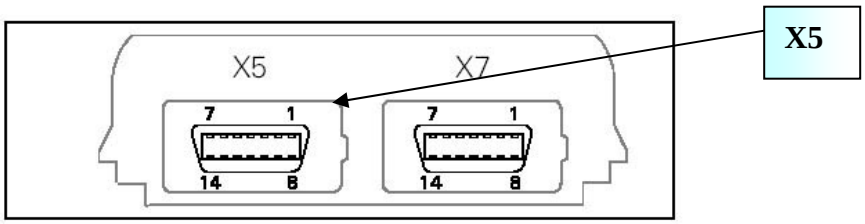
Infinity Docking Station (IDS) / CPS / Interface Connector layout



Rear of a CPS



Rear of an IDS



Rear of an Interface plate

Rear of Kappa XLT

Connecting Infinity Delta/Delta XL, Gamma X XL and SC 7000/SC 9000XL to a PC

The X3 port on an IDS or CPS is used. Refer to the table at the end of this section for wiring details.

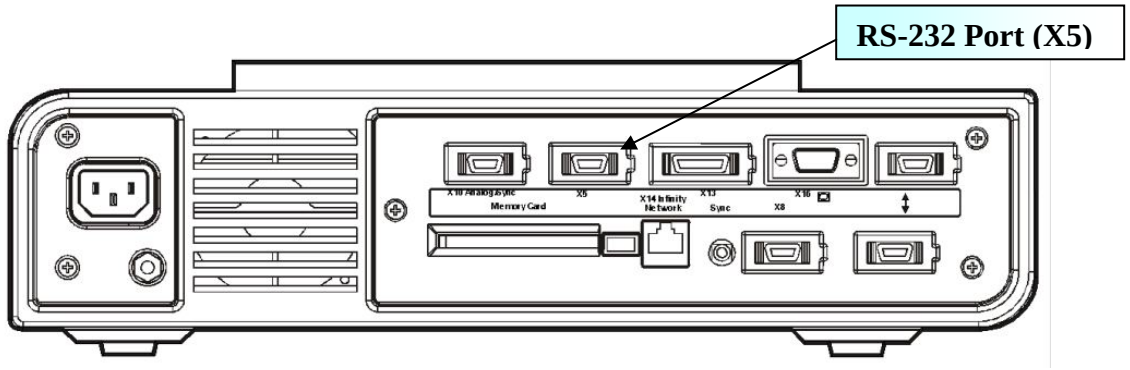
Infinity Delta/Delta XL, Gamma X XL and SC 7000/SC 9000XL Serial Connections - Connector X3 CPS / IDS

The unterminated end should be wired as follows:

Pin Number Minichamp (lead color)	Signal Description	Pin Number PC - 9 pin 'D'	Pin Number PC - 25 pin 'D'
10 (Grey)	GND	GND - Pin 5	GND - Pin 7
12 (Pink)	COMM-2 RxD	Xmit Data - Pin 3	Xmit Data - Pin 2
13 (Lt Blue)	COMM-2 TxD	Rcv Data - Pin 2	Rcv Data - Pin 3

Connecting an Infinity Kappa or SC 8000 to a PC

The terminated end of the cable will mate with the X5 connector on the back of the Infinity Kappa or SC 8000 monitor. Refer to the table at the end of this section for wiring details.



Rear of an Infinity Kappa monitor

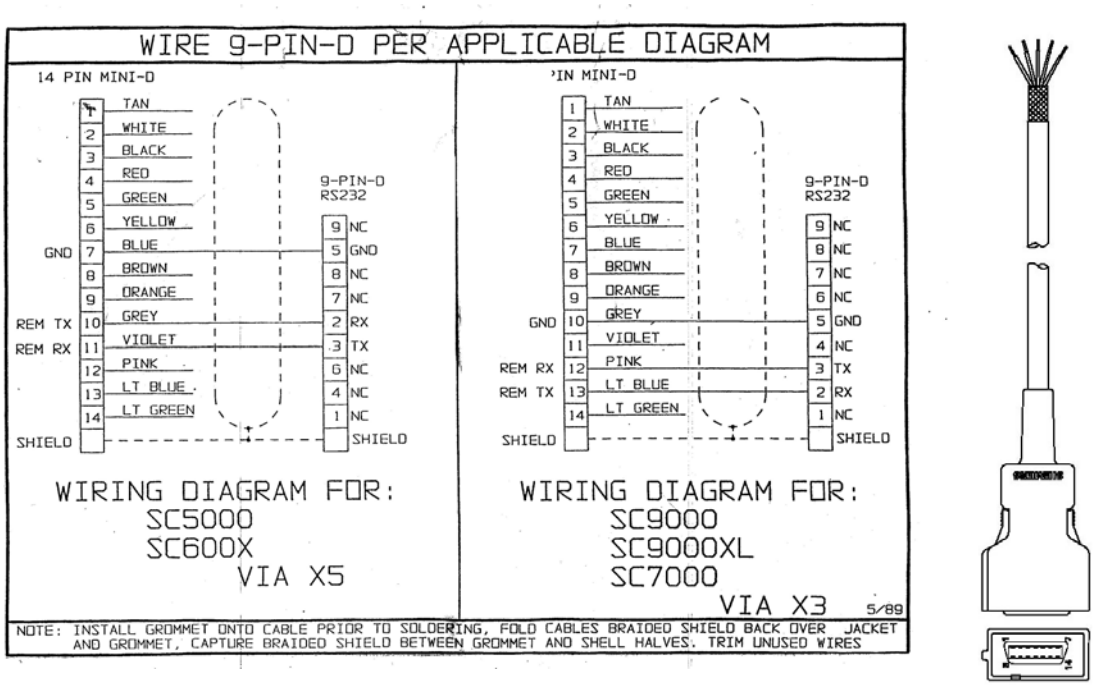
Infinity Kappa or SC 8000 Serial Connections - Connector X5

The un-terminated end should be wired as follows:

Pin Number Minichamp (lead color)	Signal Description	Pin Number PC - 9 pin 'D'	Pin Number PC - 25 pin 'D'
7 (Blue)	GND	GND - Pin 5	GND - Pin 7
10 (Grey)	Remote TxD	Rcv Data - Pin 2	Rcv Data - Pin 3
11 (Violet)	Remote RxD	Xmit Data - Pin 3	Xmit Data - Pin 2

Configured Monitor Serial Connections - Connector X5 CPS / IDS / Interface Plate
The unterminated end should be wired as follows:

Pin Number Minichamp (lead color)	Signal Description	Pin Number PC - 9 pin 'D'	Pin Number PC - 25 pin 'D'
7 (Blue)	GND	GND - Pin 5	GND - Pin 7
10 (Grey)	Remote TxD	Rcv Data - Pin 2	Rcv Data - Pin 3
11 (Violet)	Remote RxD	Xmit Data - Pin 3	Xmit Data - Pin 2



The RS 232 export cable (5206441) and a 9 pin 'D' application example

Infinity Kappa XLT – COM 3
Connecting an Infinity Kappa XLT to a PC, the Com3 port on the Kappa XLT is used, cable part # MS15045.

Note: The RS 232 export protocol is not available when used with a Sirenet CPS

2 General Message Details

Stimulus/Response Message Pairs

The Infinity Export Protocol is a half-duplex protocol, where communication is always initiated by the client system, and responded to by the server (patient monitor). The one exception is the case of Extended Data Mode, which is described later in this document.

The “stimulus/response” message pair occurs when the client machine sends a request message, and the server machine (host) returns a reply message.

On receipt of a request message, the host will check the message for completeness, for a correct checksum, and for correct length.

If the message is invalid then it will send a NAK (i.e. 0x15h) to the sender and wait for the next request.

If the host does not have the capability to respond to the request (i.e. it only supports a subset of the protocol) it will reply with an EOT (i.e. 0x04h).

If the host received the request, and was able to process it, it will reply as specified in the following pages. The client should also check for proper checksum, message length, etc. If an error occurs in reception, the client should re-send the request message.

If there is no server reply within 1 second, the client should re-send its request message (for up to 3 times). If still no reply, the client should assume the link has been broken and it should simply request the initial handshake message (a ‘break’ character followed by Msg 50h) every 2 seconds.

Baud Rate

All communication sessions occur at 19.2 Kbaud (1 stop bit, no parity).

Checksums

Checksums are used in all messages. It is calculated as the byte-wide sum of all bytes in the message up to, but not including itself.

3 Server States

Behavior During Standby and Discharge

The server may go into a standby or patient discharge state at any time. When this happens follow these guidelines:

- When the server enters standby, it sets the “orderly shutdown” byte in its Parameter Data message to 01. Similarly, when the patient is discharged, it sets the byte to 02.
- When the next Parameter Data message is fully reconstructed by the client, it will detect that the orderly shutdown byte is other than the normal value of 00. It will send a MSG 52h (request to stop sending packets) back to the server.
- At this point, the client should send, approximately every 2 seconds, Message 50h to the server. A ‘Break’ character must precede the Message 50h. The server will respond to this message by returning a reply containing its status; i.e., 01 for standby, 02 for discharge.
- The client will assume the server is in standby or discharge state as long as these returned status bytes say the server is still in the corresponding state.
- When the server reenters the active state, it will set its status byte to 00. The client should detect this and begin the start up sequence.

Behavior during Power-Off or Pick and Go®

If the server is turned off, or removed for transport, the stream of data to the client will stop if the Extended Data Mode was enabled, or it will get no response to data requests to the server. When this condition is detected, the client should follow this sequence:

- The client should operate on the basis that the server has been removed, and that when communications are re-established, a different server is now connected.
- The client should send a Message 50h, approximately every 2 seconds, until the server responds. A ‘Break’ character must precede this message.
- Once it starts receiving acknowledgments, the client should wait until the server is in ‘active’ state (not standby or discharge), and follow the startup sequence reinitializing any internal data tables.

4 Startup Messages

Msg 50H: Software ID / Status Request Message

The client should first ask the server to identify itself via the Software ID / Status Request Message. Because of the server state machine, this message should always be originated by the client, even if it will ignore the contents of the reply.
One of the purposes of this exchange is to test the communications link. If the server does not respond, the client must assume that either:

- the server is disconnected
- the server is set to a different baud rate, so the client may want to change baud rate and try again
- the server is turned off
- there is a hardware problem which does not allow the two systems to communicate.

The client can ask the server by sending...

To request the software ID and Server Status string, the following message is specified. The client must first send a 'break' character and then send...

0xA5	Sync byte
0x02	Low length Note: 2 bytes follow the length pair
0x00	High length
0x50	Transaction code
0xF7	Checksum

The server will reply by sending...

0xA5	Sync byte
lenlo	Low order of message length
lenhi	High order of message length
0x50	Transaction code (0x49 for an ISD request)
device	Device code (type of server instrument) 01h=Modular Monitor, 02h=Configured Monitor 09=reserved
language	Current language in use by the server Coded as: 01h = English; 02h = German, 03h = French, 04h = Spanish 05h = Italian 06h = Dutch 07h = Swedish 08h = Japanese Katakana 09h = Japanese Kanji 0Ah = Japanese Hiragana 0Bh = Danish 0Ch = Portuguese 0Dh = Greek 0Eh = Finnish 0Fh = Norwegian 10h = Polish 11h = Hungarian 12h = Romanian 13h = Slovakian 14h = Russian 15h = Chinese 16h = Arabic
support level	Bit 0 =0 if server cannot download dictionaries (Msg 53h, 54h, 55h) =1 if server supports Msgs 53h, 54h, & 55h Bit 1: Reserved Bit 2: Reserved
server-status	Coded as 00 if server is in active state Coded as 01 if server in standby Coded as 02 if patient discharged
server date/time	8 bytes (in binary): century (e.g., 19), year, month, day, hour (0-23), min, sec, spare
s/w version	Null terminated string (max 16 chars)
protocol rev	'RVx.y, 0 (This revision is 2.1) Null terminated string (max 6 chars) 'x' is the major revision number while 'y' is the minor revision number.
Checksum	

The reply message should be treated as an implied acknowledgment to the request.

Msg 56H: Patient Demographics

The client can request the patient demographics. The server returns the patient's name, ID, room/bed and other fields. This message is optional.

The client can ask the server for Patient Demographics: Message Format by sending:

The client requests patient demographics name, ID, and room/bed number through the use of this message.

0xA5	Sync byte
0x02	Low order length
0x00	High order length
0x56	Transaction code (or message ID)
0xFD	Checksum

The server replies with a message of the form:

0xA5	Sync byte
len low	Low order length byte
len high	High order length byte
0x56	Echoback of transaction code
0x01,len,ptname	32 max Unicode characters
0x02,len,ptid	16 max Unicode characters
0x03,len,roomid	8 max Unicode characters
0x04,len,birth-date	10 max Unicode characters, "DD/MM/YYYY",00
0x05,len,admit-date	10 max Unicode characters, "DD/MM/YYYY",00
0x06,len,height	3 max Unicode characters, in cms
0x07,len,weight	6 max Unicode characters, in kgms x10
0x08,len,dx	32 max Unicode characters
0x09,len,bldtyp	4 max Unicode characters
0x0A,len,phn#	13 max Unicode characters
0x0B,len,sex	8 max Unicode characters
Checksum	

All character fields are null (double byte 00) terminated - not included in character count. The length (len) is the number of characters, or 1/2 the number of bytes.

As shown, each field has a Field ID, Field Length and associated information. If the server does not support the field type, or has no information for that field, the entire field is not transmitted.

5 Run Time Messages

The client should not expect the Basic Data Message to be computed by the server more than once per second. It is transmitted in response to a Basic Data Message Request (Msg 57h or Msg 77h). It contains all the available parameter values in addition to parameter and waveform support information. The same message format is used, in a partitioned fashion, for the Extended Data Message.

Parameter Data Format

Msg 57H Parameter Data Message

The client can request the entire parameter data message by sending:

0xA5h	Sync
0x02h	Length low
0x00h	Length high
0x57h	Transaction code
0xFEh	Checksum

MSG 77h Parameter Data Message Format

The client can request the entire parameter data message by sending:

0xA5h	Sync
0x02h	Length low
0x00h	Length high
0x77h	Transaction code
0x1Eh	Checksum

The server replies with a Parameter Response

The server will respond by sending a Parameter Data Message as a normal reply message. The message layout is identical whether sent as a bulk message or sent interleaved with a number of waveform packets (refer to the Extended Data message). The response will contain a definition for each of the parameters (including those not displayed) as follows:

1	0xA5h	Sync byte
2	Low len	Low order length
3	High len	High order length, i.e.,# bytes to follow after here
4	0x57 or 0x77	This identifies this as a Parameter Data message
5	Reserved	
6	SHUTDNF	Orderly shutdown byte; normally 0
7-23	Reserved	
24	PMNUMB	Number of PARAMETER subpackets to follow
25-??	PARAM 1	Parameter subpacket; one of these for each PARAMETER
??-??	PARAM 2	The layout for each subpacket is given below
...		
??-??	PARAM N	
??	Checksum	

Sync Byte (Byte 1)

The use of a sync byte in the Parameter Data message is specified so that the content of the message is identical when it is retrieved using a stimulus/response method or interleaved within the Extended Data message.

Length of the Parameter Data Message (Bytes 2 & 3)

The string is of variable length, so it must contain a length specifier after the sync byte. This word value contains the number of bytes which follow (including the checksum) and does not include the length bytes themselves. The order is Intel (low, high) format.

Transaction ID (Byte 4)

The transaction code is included so that the format of the parameter data message is the same whether it is fetched by a stimulus / response method or it has recieved four bytes in each waveform packet as part of the Extended Data message.

Orderly Shutdown Byte (Byte 6)

The “orderly shutdown” byte is normally 00h. This is used to signal that the server is going into either a standby state, or some other state which requires that the packet stream stop.

Other valid reasons are specified as:

01h	Monitor put into standby
02h	Patient discharged

Number of Parameter Subpackets to Follow (Byte 24)

The client needs to know how many parameter subpackets to expect in the remainder of the message. Please refer to the Operating Guide for the host to find an explanation of which parameters get transmitted.

Parameter Subpacket - General Considerations

One parameter subpacket is transmitted for each parameter available from the server up to a maximum of 20 {future versions may support more than 20}. Each parameter's code has already been defined at startup time. The client needs to know on a dynamic basis the numeric values for each parameter.

Byte#	Content(s)	Description
1	Subpacket length	Number of bytes in this subpacket
2	PARAM COUNT	Specifies how many CODE/Value pairs are present in this subpacket. If Bit 3 is set, then a time stamp follows.
3-8	Reserved	

Parameter Subpacket - 57H Parameter Subpacket

Byte#	Content(s)	Description
9	1st Param Code	Parameter Code for 1st Parameter
10	1st Param status	Status for first parameter.
11-i	1st Param value	ASCII for parameter #1, <= 5 bytes
i+1	2nd Param Code	(optional, i.e. Param Count > 1, see Byte 2)
i+2	2nd Param status	(opt.) Status for second parameter.
i+3 - j	2nd Param value	(opt.) ASCII for param #2, <= 5 bytes
j+1	3rd Param Code	(optional, i.e. Param Count > 2, see Byte 2)
j+2	3rd Param status	(opt.) Status for third parameter.
j+3-k	3rd Param value	(opt.) ASCII for param #3, <= 5 bytes
. . . . .		
s+1	sth Param Code	(optional, i.e. Param Count > 2, see Byte 2)
s+2	sth Param status	(opt.) Status for fourth parameter.
s+3-t	sth Param value	(opt.) ASCII for param #4, <= 5 bytes
t+1	0F2h	Timestamp CODE (optional, see Byte 2)
t+2	day, hour	(opt.) 2 bytes, binary
t+4	minute, second, 0	(opt.) 2 bytes, binary

Parameter Subpacket - 77h Two Parameter Subpacket

Byte#	Content(s)	Description
9 / 10	1st Param Code	Parameter ID for 1st Parameter
11	1st Param status	Status for first parameter
12-i	1st Param value	ASCII for parameter #1, <= 5 bytes
i+1	2nd Param Code	(optional, i.e. Parameter Count > 1, see Byte 2)
i+3	2nd Param status	(opt.) Status for second parameter.
i+4 - j	2nd Param value	(opt.) ASCII for parameter #2, <= 5 bytes
j+1	3rd Param Code	(optional, i.e. Parameter Count > 2, see Byte 2)
j+3	3rd Param status	(opt.) Status for third parameter.
j+4-k	3rd Param value	(opt.) ASCII for parameter #3, <= 5 bytes
. . .		
s+1	sth Param Code	(optional, i.e. Parameter Count > 2, see Byte 2)
s+3	sth Param status	(opt.) Status for fourth parameter.
s+4-t	sth Param value	(opt.) ASCII for parameter #4, <= 5 bytes
t+1	0F2h	Timestamp ID (optional, see Byte 2)
t+2	day, hour	(opt.) 2 bytes, binary
t+4	minute, second, 0	(opt.) 2 bytes, binary

Parameter Subpacket- Value Encoding Rules

Note that the Parameter Value strings are actually variable in length. They support a maximum of 5 displayable characters.

If fewer than 5 are to be displayed, then the fields shall terminate with a null character. In other words, you can have 5 characters without a null or 4 (or fewer) with a null.

Units of measure will not be affected by the configuration of the host device and will follow host defaults. Parameter units of measure are as follows:

Pressure	mmHg
Temperature	OC
STx	mm
iCO2, exCO2	mmHg
%iCO2, %exCO2	%
iO2, exO2	%
iN2O, exN2O	%
iAG, exAG	% (applies to ISO, SEV, HAL, ...)

Parameter Subpacket - Length (Byte 1)

The length byte is the number of bytes in the subpacket including itself.

Parameter Subpacket - Number of Parameters (Byte 2)

This byte contains the number of parameter IDs (right 3 bits - Bits 0,1, 2) included in this subpacket. The number of parameter values can be 1 through 3 as defined by the parameter type.

If Bit 3 is set, then the parameter (or parameter group) is measured intermittently (such as NBP or CO), and a timestamp will follow. It is up to the client to detect timestamp changes, which result from new measurements.

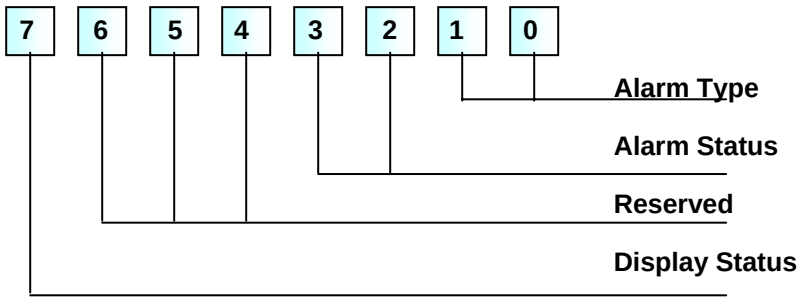
Parameter Subpacket – Parameter Code Bytes

Each parameter CODE is verified to exist in the Parameter Coding Table. An error should be flagged if an unmatched CODE is received. Note that blank parameters can be sent, which represent blank Parameter Boxes on the server - these should be ignored.

If the Parameter CODE has a value of 0FEh, then the client must assume that the relevant information is in the second section of the Parameter Coding Table. Note that in these cases the Parameter CODE is effectively 2 bytes long.

Parameter Subpacket: Parameter Status Byte (Byte 9)

The status of each parameter in the parameter subpacket will be encoded separately, since each parameter can independently go into and out of alarm. Please note that alarm conditions are only available for connected parameters.



The current alarm type is encoded in the parameter status byte as follows:

Bits 0,1	0 = No Alarm
	1 = Advisory Alarm
	2 = Serious Alarm
	3 = Life Threatening Alarm

[Refer to the Patient Monitor's User Manual for definitions of alarm levels.]

The current alarm status is encoded in the parameter status byte as follows:

Bits 2,3	0 = No Alarm
	1 = Active Alarm - alarm condition is ongoing, user has not silenced the alarm (audio & video annunciation.)
	2 = Latched Alarm - alarm condition has ceased, however user has not silenced the alarm yet (audio and video annunciation).
	3 = Silenced Alarm - alarm condition is ongoing, user has silenced the alarm (video annunciation only).

The current parameter display status is encoded in the parameter status byte as follows:

Bit 7	0 = Displayed (on main screen)
	1 = Not displayed (on main screen)

Parameter Subpacket - Parameter Value Fields

For each parameter ID, a text string of variable length, which contains the ASCII representation for the parameter value shall follow.

This string can contain up to 5 characters. If fewer than 5 characters are to be displayed, the string shall be terminated by one and only one null character. A parameter value can have a delimiter of either a period or comma, depending on language setting of monitor. (i.e 5.5 or 5,5)

Parameter Subpacket - Parameter Special Conditions

The parameter value is not always an ASCII string. Under special conditions the value is represented by a byte-wide Condition ID.
These IDs are listed and available through the Parameter ID Table. In order to distinguish an ID from a value, a '^^' is transmitted as the first 2 bytes of the parameter Value.

Some examples are as follows:

- Parameter over-range - '^^',010h,0 is transmitted
- Parameter under-range - '^^',011h,0 is transmitted
- Parameter cannot be determined '^^',012h,0 is transmitted
- Heart rate = Asystole '^^',005h,0 is transmitted
- Parameter Status = Artifact '^^',014h,0 is transmitted

The arrhythmia parameter is non-numeric. Refer to the Parameter ID Table for a list of IDs.

Parameter Subpacket - EEG Parameter Special Handling

The EEG parameter represents a somewhat special condition.
The set of parameter values per lead (i.e. EEG1, EEG2, EEG3 and EEG4) is sent in 2 subpackets since there are more than 7 measurements possible per lead.

The 1st parameter ID in each subpacket will specify the lead, while the 1st parameter value for the lead will be the Lead Label (or Lead Location). The Lead Label can be any of the labels specified in the EEG Lead Label ID Table (pg. 26). In addition, differential Lead Labels can be specified.

Some examples follow:

- LEFT '!', 056H, 0
- LEFT BACK '!', 056h, 059h, 0
- FP '!', 041h, 0
- FP - C4 '!', 041h, 04Bh,

The 2nd and following parameter codes will contain the values for specific measurements. The first subpacket will contain: MED, BSR, and THETA. The second subpacket will contain:

SEF, POWER, ALPHA, BETA, and Delta.

Parameter Subpacket: Time Stamp

If the parameter is measured intermittently (i.e. typically more than one minute between measurements) a time stamp will follow. For example, CO via thermal dilution will be time stamped, however, Continuous Cardiac Output via SvO_2 measurement would not be time stamped. The day field should be checked to determine how old the reading is.

6 ID Tables

Parameter Coding Table

Note: Parameters labeled as being provided by an MGM (Multi-Gas Module) can be available in the following situations:

- Connection to Scio Multigas Module (does not include SC6002XL)
- Connection to MGM or MGM+
- Marquet KION configuration
- Anesthesia configuration when connected via MIB.

Note: The Range can be used to derive the data format, and the number of characters required to transmit the value. Leading zeros are never sent, and only negative numbers are designated by a sign ('-').

CODE# 1 BYTE	DRÄGER/ SIEMENS LABEL	GAMMA/ GAMMA XL SC 6002 XL SC 6802 XL	Vista	Delta/Delta XL Kappa/Kappa XLT SC 7000 SC 9000 SC 8000	Gamma X XL Vista XL	SOURCE	Unit of Measure	RANGE	PARAMETER DESCRIPTION
00h									Start of First Section
01h	'HR'	X	X	X	X	ECG	bpm or ENUM	15-300	Heart Rate (Can be value or 05h or 06h)
02h	'ARR'	X	X	X	X	ECG	ENUM	see 05h-0Eh	Arrhythmia Status
03h	'ARR'	-	-	X	X	ECG	ENUM	see 05h-0Eh	Arrhythmia Status
04h	'PVC'	X	X	X	X	ECG	PVC/min	0-60	Number of PVCs per minute
05h	'ASY'	X	X	X	X	ECG	ASCII	fixed	Asystole
06h	'VF'	X	X	X	X	ECG	ASCII	fixed	Ventricular Fibrillation
07h	'VT'	X	X	X	X	ECG	ASCII	fixed	Ventricular Tachycardia
08h	'RUN'	X	X	X	X	ECG	ASCII	fixed	Run of PVCs
09h	'AIVR'	X	X	X	X	ECG	ASCII	fixed	Accelerated Idioventricular Rhythm
0Ah	'CPT'	X	X	X	X	ECG	ASCII	fixed	Couplet

CODE# 1 BYTE	DRÄGER/ SIEMENS LABEL	GAMMA/ GAMMA XL SC 6002 XL SC 6802 XL	Vista	Delta/Delta XL Kappa/Kappa XLT SC 7000 SC 9000 SC 8000	Gamma X XL Vista XL	SOURCE	Unit of Measure	RANGE	PARAMETER DESCRIPTION
0Bh	'BGM'	X	X	X	X	ECG	ASCII	fixed	Bigeminy
0Ch	'TACH'	X	X	X	X	ECG	ASCII	fixed	Tachycardia (VE)
0Dh	'BRDY'	X	X	X	X	ECG	ASCII	fixed	Bradycardia (VE)
0Eh	'PAUS'	X	X	X	X	ECG	ASCII	fixed	Pause (VE)
0Fh	'SVT'	X	X	X	X	ECG	ASCII	fixed	Supraventricula Tachycardia
10h	'+++'	X	X	X	X	ALL	ASCII	fixed	Overrange (Almost any parameter can display this 'value')
11h	'---'	X	X	X	X	ALL	ASCII	fixed	Underrange (Almost any parameter can display this 'value')
12h	'***'	X	X	X	X	ALL	ASCII	fixed	Unknown (Almost any parameter can display this 'value')
13h	'APN'	X	X	Pod/Cartr.	Pod/Cartr.	CO2 RESP	ASCII	fixed	Apnea (Resp. rate from pod or cartridge can display this 'value')
14h	'ARTF'	X	X	X	X	ALL	ASCII	fixed	Artifact
15h	RESERVED	-	-	-	-	-	-	-	
16h	RESERVED	-	-	-	-	-	-	-	
17h	RESERVED	-	-	-	-	-	-	-	
18h	ENUMERAT	-	-	Device	Device	MGM	ENUM	see Parameter Description	Agent Status -- Can have the following values: 15h Unknown Agent 17h Mixed Agent 9Fh Desflurane A2h Sevoflurane A5h Halothane A8h Enflurane ABh Isoflurane

CODE# 1 BYTE	DRÄGER/ SIEMENS LABEL	GAMMA/ GAMMA XL SC 6002 XL SC 6802 XL	Vista	Delta/Delta XL Kappa/Kappa XLT SC 7000 SC 9000 SC 8000	Gamma X XL Vista XL	SOURCE	Unit of Measure	RANGE	PARAMETER DESCRIPTION
19h	'BIS'	-	-	MIB	-	BIS-		0 - 100	Bispectral Index
1Ah	'SQI'	-	-	MIB	-	BIS-	%	0 – 100	Signal quality indicator
1Bh	'EMG'	-	-	MIB	-	BIS-	dB	0 – 100	Electromyographic power
1Ch	'BSR'	-	-	MIB	-	BIS-	%	0 - 100	Burst suppression ratio
1Dh	'SEF'	-	-	MIB	-	BIS-	-Hz	0 – 300	Spectral edge frequency
1Eh	'POWER'	-	-	MIB-	-	BIS-	-dB	40 – 100	Total power
1Fh	NOT USED	-	-	-	-	-	-	-	
20h	'ART'	X	X	X	X	BP	mmHg	-5 - 300	Arterial BP – Systolic
21h		X	X	X	X	BP	mmHg	-5 - 300	Arterial BP – Diastolic
22h		X	X	X	X	BP	mmHg	-5 - 300	Arterial BP – Mean
23h	'PA'	X	X	X	X	BP	mmHg	-5 - 300	Pulmonary Artery BP – Systolic
24h		X	X	X	X	BP	mmHg	-5 - 300	Pulmonary Artery BP – Diastolic
25h		X	X	X	X	BP	mmHg	-5 - 300	Pulmonary Artery BP – Mean
26h	'RV'	-	-	X	X	BP	mmHg	-5 - 300	Right Ventricle BP – Systolic
27h		-	-	X	X	BP	mmHg	-5 - 300	Right Ventricle BP – Diastolic
28h		-	-	X	X	BP	mmHg	-5 - 300	Right Ventricle BP – Mean
29h	'LV'	-	-	X	X	BP	mmHg	-5 - 300	Left Ventricle BP – Systolic
2Ah		-	-	X	X	BP	mmHg	-5 - 300	Left Ventricle BP – Diastolic
2Bh		-	-	X	X	BP	mmHg	-5 - 300	Left Ventricle BP – Mean
2Ch	'RA'	-	-	X	X	BP	mmHg	-5 - 300	Right Atrial BP
2Dh	'LA'	-	-	X	X	BP	mmHg	-5 - 300	Left Atrial BP
2Eh	'CVP'	X	X	X	X	BP	mmHg	-5 - 300	Central Venous Pressure
2Fh	'ICP'	X	X	X	X	BP	mmHg	-5 - 300	Intra-Cranial Pressure
30h	'CPP'	-	-	X	X	BP	mmHg	-5 - 300	Central Perfusion Pressure
31h	'GP1'	X	X	X	X	BP	mmHg	-5 - 300	General Purpose BP Channel 1 – Systolic
32h		X	X	X	X	BP	mmHg	-5 - 300	General Purpose BP Channel 1 – Diastolic
33h		X	X	X	X	BP	mmHg	-5 - 300	General Purpose BP Channel 1 – Mean

CODE# 1 BYTE	DRÄGER/ SIEMENS LABEL	GAMMA/ GAMMA XL SC 6002 XL SC 6802 XL	Vista	Delta/Delta XL Kappa/Kappa XLT SC 7000 SC 9000 SC 8000	Gamma X XL Vista XL	SOURCE	Unit of Measure	RANGE	PARAMETER DESCRIPTION
34h	'GP2'	X	X	X	X	BP	mmHg	-5 - 300	General Purpose BP Channel 2 - Systolic
35h		X	X	X	X	BP	mmHg	-5 - 300	General Purpose BP Channel 2 - Diastolic
36h		X	X	X	X	BP	mmHg	-5 - 300	General Purpose BP Channel 2 - Mean
37h	'P1A'	-	-	X	X	BP	mmHg	-5 - 300	BP Channel 1a - Systolic
38h		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 1a - Diastolic
39h		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 1a - Mean
3Ah	'P1B'	-	-	X	X	BP	mmHg	-5 - 300	BP Channel 1b - Systolic
3Bh		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 1b - Diastolic
3Ch		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 1b - Mean
3Dh	'P1C'	-	-	X	X	BP	mmHg	-5 - 300	BP Channel 1c - Systolic
3Eh		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 1c - Diastolic
3Fh		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 1c - Mean
40h	'P1D'	-	-	X	X	BP	mmHg	-5 - 300	BP Channel 1d - Systolic
41h		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 1d - Diastolic
42h		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 1d - Mean
43h	'P2A'	-	-	X	X	BP	mmHg	-5 - 300	BP Channel 2a - Systolic
44h		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 2a - Diastolic
45h		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 2a - Mean
46h	'P2B'	-	-	X	X	BP	mmHg	-5 - 300	BP Channel 2b - Systolic
47h		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 2b - Diastolic
48h		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 2b - Mean
49h	'P2C'	-	-	X	X	BP	mmHg	-5 - 300	BP Channel 2c - Systolic
4Ah		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 2c - Diastolic
4Bh		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 2c - Mean
4Ch	'P2D'	-	-	X	X	BP	mmHg	-5 - 300	BP Channel 2d - Systolic
4Dh		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 2d - Diastolic
4Eh		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 2d - Mean

CODE# 1 BYTE	DRÄGER/ SIEMENS LABEL	GAMMA/ GAMMA XL SC 6002 XL SC 6802 XL	Vista	Delta/Delta XL Kappa/Kappa XLT SC 7000 SC 9000 SC 8000	Gamma X XL Vista XL	SOURCE	Unit of Measure	RANGE	PARAMETER DESCRIPTION
4Fh	'P3A'	-	-	X	X	BP	mmHg	-5 - 300	BP Channel 3a - Systolic
50h		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 3a - Diastolic
51h		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 3a - Mean
52h	'P3B'	-	-	X	X	BP	mmHg	-5 - 300	BP Channel 3b - Systolic
53h		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 3b - Diastolic
54h		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 3b - Mean
55h	'P3C'	-	-	X	X	BP	mmHg	-5 - 300	BP Channel 3c - Systolic
56h		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 3c - Diastolic
57h		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 3c - Mean
58h	'P3D'	-	-	X	X	BP	mmHg	-5 - 300	BP Channel 3d - Systolic
59h		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 3d - Diastolic
5Ah		-	-	X	X	BP	mmHg	-5 - 300	BP Channel 3d - Mean
5Bh	'NBP'	X	X	X /Cartr.	X /Cartr.	NBP	mmHg	0 - 250	Non-Invasive BP - Systolic
5Ch		X	X	X /Cartr.	X /Cartr.	NBP	mmHg	0 - 250	Non-Invasive BP - Diastolic
5Dh		X	X	X /Cartr.	X /Cartr.	NBP	mmHg	0 - 250	Non-Invasive BP - Mean
5Eh	'PWP'	-	-	X	X	BP	mmHg	-5 - 120	Pulmonary Artery Wedge Pressure
5Fh	RESERVED	-	-	-	-	-	-	-	
60h	'RESP'	X	X	X	X	ECG	RPM	0 - 100	Respiration Rate
61h	'IBP'	-	-			BP	mmHg	-5 - 300	Invasive BP - Systolic
62h		-	-			BP	mmHg	-5 - 300	Invasive BP - Diastolic
63h		-	-			BP	mmHg	-5 - 300	Invasive BP - Mean
64h	'SPO2'	X	X	X	X	SPO2	%	0 - 100	Oxygen Saturation (from pulse)
65h	'PLS'	X	X	X	X	SPO2	bpm	15 - 300	Pulse Rate
66h	'RRC'	X	-	Pod/Cartr.	Pod/Cartr.	CO2	breaths/ min	0 - 150	Respiratory Rate
67h	'ETCO2*'	X*	-	Device	Device	MGM	mmHg	0 - 100	End-Tidal CO2
68h	'RRC*'	X*	-	Device	Device	MGM	breaths/ min	0 - 100	Calculated Resp

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CODE# 1 BYTE	DRÄGER/ SIEMENS LABEL	GAMMA/ GAMMA XL SC 6002 XL SC 6802 XL	Vista	Delta/Delta XL Kappa/Kappa XLT SC 7000 SC 9000 SC 8000	Gamma X XL Vista XL	SOURCE	Unit of Measure	RANGE	PARAMETER DESCRIPTION
69h	'ICO2*'	X*	-	Device	Device	MGM	mmHg	0 - 100	Inspired CO2
6Ah	RESERVED	-	-	-	-	-	-	-	
6Bh	RESERVED	-	-	-	-	-	-	-	
6Ch	RESERVED	-	-	-	-	-	-	-	
6Dh	RESERVED	-	-	-	-	-	-	-	
6Eh	RESERVED	-	-	-	-	-	-	-	
6Fh	'TB'	-	-	X	X	TEMP	^{o}C	0 - 50.0	Temperature b (VE)
70h	'TV'	-	-	MIB	-	VENT	ml	0 - 1500	Tidal Volume
71h	'TVI'	-	-	MIB	-	VENT	ml	0 - 1500	Inspired Tidal Volume
72h	'TVE'	-	-	MIB	-	VENT	ml	0 - 1500	Expired Tidal Volume
73h	'MV'	-	-	MIB	-	VENT	L/min	0 - 25	Minute Volume
74h	'MVI'	-	-	MIB	-	VENT	L/min	0 - 25	Inspired Minute Volume
75h	'MVE'	-	-	MIB	-	VENT	L/min	0 - 25	Expired Minute Volume
76h	'MAP'	-	-	MIB	-	VENT	cmH2O	0 - 50	Mean Airway Pressure
77h	'PIP'	-	-	MIB	-	VENT	cmH2O	0 - 100	Peak Inspiratory Pressure
78h	'EEP'	-	-	MIB	-	VENT	cmH2O	0 - 50	End Expiratory Pressure
79h	'RRV'	-	-	MIB	-	VENT	breaths/ min	0 - 75	Respiratory Rate
7Ah	'PEEP'	-	-	MIB	-	VENT	cmH20	0 - 50	Peak End Exp. Pressure
7Bh	'PAUSE'	-	-	MIB	-	VENT	cmH20	0 - 50	Pause Pressure
7Ch	RESERVED	-	-	-	-	-	-	-	
7Dh	RESERVED	-	-	-	-	-	-	-	
7Eh	'IO2*'	-	-	MIB	-	VENT	%	0 - 100	Inspired O2
7Fh	'ΔT'	-	-	X	X	TEMP	^{o}C	-50.0 - 50.0	Delta Temperature
80h	'TA'	X	X	X	X	TEMP	^{o}C	-5.0 - 50.0	Temperature a
81h	'T1A'	-	-	X	X	TEMP	^{o}C	-5.0 - 50.0	Temperature 1a

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CODE# 1 BYTE	DRÄGER/ SIEMENS LABEL	GAMMA/ GAMMA XL SC 6002 XL SC 6802 XL	Vista	Delta/Delta XL Kappa/Kappa XLT SC 7000 SC 9000 SC 8000	Gamma X XL Vista XL	SOURCE	Unit of Measure	RANGE	PARAMETER DESCRIPTION
82h	'T1B'	-	-	X	X	TEMP	°C	-5.0 - 50.0	Temperature 1b
83h	'ΔT1'	-	-	X	X	TEMP	°C	-50.0 - 50.0	Delta Temperature 1
84h	'T2A'	-	-	X	X	TEMP	°C	-5.0 - 50.0	Temperature 2a
85h	'T2B'	-	-	X	X	TEMP	°C	-5.0 - 50.0	Temperature 2b
86h	'ΔT2'	-	-	X	X	TEMP	°C	-50.0 - 50.0	Delta Temperature 2
87h	'T3A'	-	-	X	X	TEMP	°C	-5.0 - 50.0	Temperature 3a
88h	'T3B'	-	-	X	X	TEMP	°C	-5.0 - 50.0	Temperature 3b
89h	'ΔT3'	-	-	X	X	TEMP	°C	-50.0 - 50.0	Delta Temperature 3
8Ah	'BT'	-	-	X	X	CO	°C	0 - 50.0	Blood Temperature
8Bh	'CO'	-	-	X	X	CO	L/min	0 - 20.0	Cardiac Output
8Ch	'ICO'	-	-	MIB		SVO2	L/min	0.5 - 20.0	Intermittent Cardiac Output
8Dh	'CCO'	-	-	MIB		SVO2	L/min	1 - 20.0	Continuous Cardiac Output
8Eh	'SVR'	-	-	MIB		SVO2	Dyne/s/cm-5	0 - 4000	Systemic Vascular Resistance
8Fh.	'IT'	-	-	X	X Gamma X XL CO not supported	CO	°C	-5.0 - 30.0	Injectate Temperature
90h	'O2'	-	-	Device	Device	MGM	%	0 - 100	Oxygen
91h	'IO2'	-	-	Device	Device	MGM	%	0 - 100	Inspired Oxygen
92h	'FIO2'	-	-	Device	Device	FIO2	%	0 - 100	Fractional Inspired Oxygen
93h	'ETO2'	-	-	Device	Device	MGM	%	0 - 100	End-tidal Oxygen
94h	'CO2'	-	-	Device	Device	MGM	mmHg	0 - 100	Carbon Dioxide

CODE# 1 BYTE	DRÄGER/ SIEMENS LABEL	GAMMA/ GAMMA XL SC 6002 XL SC 6802 XL	Vista	Delta/Delta XL Kappa/Kappa XLT SC 7000 SC 9000 SC 8000	Gamma X XL Vista XL	SOURCE	Unit of Measure	RANGE	PARAMETER DESCRIPTION
95h	'ICO2'	X	-	Pod/Cartr.	Pod/Cartr.	CO2	mmHg	0 - 100	Inspired Carbon Dioxide
96h	'ETCO2'	X	-	Pod/Cartr.	Pod/Cartr.	CO2	mmHg	0 - 100	End-tidal Carbon Dioxide
97h	'%ECO2'	X	-	Device	Device	MGM	%	0 - 100	Percent Expired Carbon Dioxide
98h	'%ICO2'	X	-	Device	Device	MGM	%	0 - 100	Percent End-tidal Carbon Dioxide
99h	'N20'	X*	-	Device	Device	MGM	%	0 - 100	Nitrous Oxide
9Ah	'IN20'	X*	-	Device	Device	MGM	%	0 - 100	Inspired Nitrous Oxide
9Bh	'ETN20'	X*	-	Device	Device	MGM	%	0 - 100	End-tidal Nitrous Oxide
9Ch	'AG'	X*	-	Device	Device	MGM	%	0 - 100	Agent
9Dh	'IAG'	X*	-	Device	Device	MGM	%	0 - 100	Inspired Agent
9Eh	'ETAG'	X*	-	Device	Device	MGM	%	0 - 100	End-tidal Agent
9Fh	'DES'	X*	-	Device	Device	MGM	%	0 - 100	Desflurane (see 18h)
A0h	'IDES'	X*	-	Device	Device	MGM	%	0 - 100	Inspired Desflurane
A1h	'ETDES'	X*	-	Device	Device	MGM	%	0 - 100	End-tidal Desflurane
A2h	'SEV'	X*	-	Device	Device	MGM	%	0 - 80	Sevoflurane (see 18h)
A3h	'ISEV'	X*	-	Device	Device	MGM	%	0 - 80	Inspired Sevoflurane
A4h	'ETSEV'	X*	-	Device	Device	MGM	%	0 - 80	End-tidal Sevoflurane
A5h	'HAL'	X*	-	Device	Device	MGM	%	0 - 20	Halothane (see 18h)
A6h	'IHAL'	X*	-	Device	Device	MGM	%	0 - 20	Inspired Halothane
A7h	'ETHAL'	X*	-	Device	Device	MGM	%	0 - 20	End-tidal Halothane
A8h	'ENF'	X*	-	Device	Device	MGM	%	0 - 40	Enflurane (see 18h)
A9h	'IENF'	X*	-	Device	Device	MGM	%	0 - 40	Inspired Enflurane
AAh	'ETENF'	X*	-	Device	Device	MGM	%	0 - 40	End-tidal Enflurane
ABh	'ISO'	X*	-	Device	Device	MGM	%	0 - 25	Isoflurane (see 18h)
ACh	'IISO'	X*	-	Device	Device	MGM	%	0 - 25	Inspired Isoflurane
ADh	'ETISO'	X*	-	Device	Device	MGM	%	0 - 25	End-tidal Isoflurane
AEh	RESERVED	-	-	-	-	-	-	-	
AFh	RESERVED	-	-	-	-	-	-	-	
B0h	'WLO2'	-	-	Device		KION	bar	0 - 100	Wall gas pressure for O2
B1h	'WLN2O'	-	-	Device		KION	bar	0 - 100	Wall gas pressure for N20

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CODE# 1 BYTE	DRÄGER/ SIEMENS LABEL	GAMMA/ GAMMA XL SC 6002 XL SC 6802 XL	Vista	Delta/Delta XL Kappa/Kappa XLT SC 7000 SC 9000 SC 8000	Gamma X XL Vista XL	SOURCE	Unit of Measure	RANGE	PARAMETER DESCRIPTION
B2h	'WLAIR'	-	-	Device		KION	bar	0 - 100	Wall gas pressure for Air
B3h	'TKO2'	-	-	Device		KION	bar	0 - 100	Tank gas pressure for O2
B4h	'TKN2O'	-	-	Device		KION	bar	0 - 100	Tank gas pressure for N2O
B5h	'TKAIR'	-	-	Device		KION	bar	0 - 100	Tank gas pressure for Air
B6h	NOT USED	-	-	-	-	-	-	-	
B7h	NOT USED	-	-	-	-	-	-	-	
B8h	RESERVED	-	-	-	-	-	-	-	
B9h	RESERVED	-	-	-	-	-	-	-	
BAh	RESERVED	-	-	-	-	-	-	-	
BBh	RESERVED	-	-	-	-	-	-	-	
BCh	RESERVED	-	-	-	-	-	-	-	
BDh	'FGO2'	-	-	Device		KION	L/min	0 - 80	Fresh gas flow for O2
BEh	'FGN2O'	-	-	Device		KION	L/min	0 - 80	Fresh gas flow for N2O
BFh	'FGAIR'	-	-	Device		KION	L/min	0 - 80	Fresh gas flow for Air
C0h	'ST'	X	X	X	X	ECG	mm	-15.0 - 15.0	ST (non-specific)
C1h	'STI'	X	X	X	X	ECG	mm	-15.0 - 15.0	ST Lead I
C2h	'STII'	X	X	X	X	ECG	mm	-15.0 - 15.0	ST Lead II
C3h	'STIII'	X	X	X	X	ECG	mm	-15.0 - 15.0	ST Lead III
C4h	'STAVL'	X	X	X	X	ECG	mm	-15.0 - 15.0	ST Lead AVL
C5h	'STAVR'	X	X	X	X	ECG	mm	-15.0 - 15.0	ST Lead AVR
C6h	'STAVF'	X	X	X	X	ECG	mm	-15.0 - 15.0	ST Lead AVF
C7h	'STV' or 'STV1'	X	X	X	X	ECG	mm	-15.0 - 15.0	ST Lead V (5/6 wire) or V1 (12 lead) cable

CODE# 1 BYTE	DRÄGER/ SIEMENS LABEL	GAMMA/ GAMMA XL SC 6002 XL SC 6802 XL	Vista	Delta/Delta XL Kappa/Kappa XLT SC 7000 SC 9000 SC 8000	Gamma X XL Vista XL	SOURCE	Unit of Measure	RANGE	PARAMETER DESCRIPTION
C8h	'STV+' or 'STV2'	X	X	X	X	ECG	mm	-15.0 - 15.0	ST Lead V+ (5/6 wire) or V2 (12 lead) cable
C9h	'STV3'	-	-	X	X	ECG	mm	-15.0 - 15.0	ST Lead V3
CAh	'STV4'	-	-	X	X	ECG	mm	-15.0 - 15.0	ST Lead V4
CBh	'STV5'	-	-	X	X	ECG	mm	-15.0 - 15.0	ST Lead V5
CCh	'TPO2'	-	-	Pod /MIB	-	TCGAS	mmHg	0 – 300 0 - 800	Transcutaneous pO2
CDh	'TPCO2'	-	-	Pod/ MIB	-	TCGAS	mmHg	0 – 150 0 - 200	Transcutaneous pCO2
CEh	'TPO2*'	-	-	Pod	-	TCGAS	mmHg	0 - 300	Transcutaneous pO2 - second pod
CFh	'TPCO2*'	-	-	Pod	-	TCGAS	mmHg	0 - 150	Transcutaneous pCO2 – second pod
D0h	'SVO2'	-	-	MIB	-	SVO2	%	10 - 100	Venous Oxygen Saturation
D1h	'SAO2'	-	-	MIB	-	SVO2	%	0 - 100	Arterial Oxygen Saturation
D2h	'BT*'	-	-	MIB	-	SVO2	^{o}C	25 - 43.0	Blood Temperature
D3h	'CCI'	-	-	MIB	-	SVO2	$L/min/m^2$	0 - 5.0	Continuos Cardiac Index
D4h	'ICI'	-	-	MIB	-	SVO2	$L/min/m^2$	0 - 5.0	Intermittent Cardiac Index
D5h	'SVRI'	-	-	MIB	-	SVO2	Dynes/s/ cm-5/ m^2	0 - 5000	Systemic Vascular Resistance Index
D6h	'DO2'	-	-	MIB	-	SVO2	ml/min	0 - 1000	Oxygen Delivery
D7h	'VO2'	-	-	MIB	-	SVO2	ml/min	0 - 300	Oxygen Consumption
D8h	'STV6'	-	-	X	-	ECG	mm	-15.0 - 15.0	ST Lead V6
D9h	'STVM'	-	-	X	-	ECG	mm	-15.0 - 15.0	ST Vector Magnitude
DAh	'STVCM'	-	-	X	-	ECG	mm	-15.0 - 15.0	ST Vector Change Magnitude

CODE# 1 BYTE	DRÄGER/ SIEMENS LABEL	GAMMA/ GAMMA XL SC 6002 XL SC 6802 XL	Vista	Delta/Delta XL Kappa/Kappa XLT SC 7000 SC 9000 SC 8000	Gamma X XL Vista XL	SOURCE	Unit of Measure	RANGE	PARAMETER DESCRIPTION
DBh	ENUMERAT	-	-	Device	-	KION	ENUM	B9h, BAh	Gas Combination has values of; B9h N2O Combination of O2/N2O BAh Air Combination of O2/Air
DCh	'INSPT'	-	-	MIB	-	VENT	%	0 - 75	Percent Inspiration
DDh	'I'	-	-	MIB	-	VENT	unitless	1-10	Inspiration (part of I:E ratio, see F4h)
DEh	ENUMERATN	-	-	Device	-	KION	ENUM	1 - 3	Breathing Circuit has values of; 1. CLOSED Closed circuit or circle system 2. SEMI-CL Semi-closed circuit 3. OPEN Open circuit or non-rebreathing system
DFh	ENUMERAT	-	-	Device	-	KION	ENUM	1 - 6	Ventilation Mode has values of; 1. HAND Manual Ventilation 2. VCTRL Volume Control 3. PSUP Pressure Support Mode 4. VSUP Volume Support Mode 5. PCTRL Pressure Control Mode 6. PRVC Pressure Regulated Volume Control Mode
E0h	'EEG1'	-	-	Pod	-	EEG	ENUM	Table 8.4	First Channel See Table 8.4
E1h	'EEG2'	-	-	Pod	-	EEG	ENUM	Table 8.4	Second Channel See Table 8.4
E2h	'EEG3'	-	-	Pod	-	EEG	ENUM	Table 8.4	Third Channel See Table 8.4
E3h	'EEG4'	-	-	Pod	-	EEG	ENUM	Table 8.4	Fourth Channel See Table 8.4

CODE# 1 BYTE	DRÄGER/ SIEMENS LABEL	GAMMA/ GAMMA XL SC 6002 XL SC 6802 XL	Vista	Delta/Delta XL Kappa/Kappa XLT SC 7000 SC 9000 SC 8000	Gamma X XL Vista XL	SOURCE	Unit of Measure	RANGE	PARAMETER DESCRIPTION
E4h	'MED'	-	-	Pod	-	EEG	Hz	0.5 - 30.0	Median Frequency
E5h	'SEF'	-	-	Pod	-	EEG	Hz	0.5 - 30.0	Spectral Edge Frequency
E6h	'TOTAL'	-	-	Pod	-	EEG	dB	40 - 100	Total Power
E7h	'BETA'	-	-	Pod	-	EEG	%	0 - 100	BETA Power as percent of Total
E8h	'ALPHA'	-	-	Pod	-	EEG	%	0 - 100	ALPHA Power as percent of Total
E9h	'THETA'	-	-	Pod	-	EEG	%	0 - 100	THETA Power as percent of Total
EAh	'DELTA'	-	-	Pod	-	EEG	%	0 - 100	Delta Power as percent of Total
EBh	'BSR'	-	-	Pod	-	EEG	%	0 - 100	Burst Suppression Ratio
ECh	NOT USED	-	-	-	-	-	-	-	
EDh	NOT USED	-	-	-	-	-	-	-	
EEh	NOT USED	-	-	-	-	-	-	-	
EFh	NOT USED	-	-	-	-	-	-	-	
F0h	'',	-	-	-	-	-	-	-	
F1h	'',	-	-	-	-	-	-	-	
F2h	DAY,HOUR, MIN,SEC	-	-	-	-	-	-	-	Time of Day
F3h	NOT USED	-	-	-	-	-	-	-	
F4h	'E'	-	-	MIB		VENT	unitless	1-10	Expiration (part of I:E ratio, see DDh)
F5h	NOT USED	-	-	-	-	-	-	-	
F6h	NOT USED	-	-	-	-	-	-	-	
F7h	SPO2*	-	-	-	-	MICROII +	%	1 – 100	Pulse oximeter SpO2
F8h	ΔSPO2%	-	-	-	-	MICROII +		0 – 100	Pulse oximeter delta SpO2%
F9h	PLS*	-	-	-	-	MICROII +		30 - 250	Pulse oximeter PLS

CODE# 1 BYTE	DRÄGER/ SIEMENS LABEL	GAMMA/ GAMMA XL SC 6002 XL SC 6802 XL	Vista	Delta/Delta XL Kappa/Kappa XLT SC 7000 SC 9000 SC 8000	Gamma X XL Vista XL	SOURCE	Unit of Measure	RANGE	PARAMETER DESCRIPTION
FAh	RESERVED	-	-	-	-				
FBh	RESERVED	-	-	-	-	-	-	-	
FCh	RESERVED	-	-	-	-	-	-	-	
FDh	NOT USED	-	-	-	-	-	-	-	
FEh	RESERVED	-	-	-	-	-	-	-	Pointer to Second Section
FFh	RESERVED	-	-	-	-	-	-	-	End of First Section
FE00h	RESERVED	-	-	-	-	-	-	-	
FE01h	'Tvi m'	-	-	Pod	-	FLOW	ml	0 – 3000	Inspired Tidal Volume, mechanical
FE02h	'Tvi s'	-	-	Pod	-	FLOW	ml	0 – 3000	Inspired Tidal Volume, spontaneous
FE03h	'Tvalv m'	-	-	Pod	-	FLOW	ml	0 – 3000	Alveolar Tidal Volume, mechanical
FE04h	'Tvalv s'	-	-	Pod	-	FLOW	ml	0 – 3000	Alveolar Tidal Volume, spontaneous
FE05h	'Mvalv m'	-	-	Pod	-	FLOW	L	0 - 60	Alveolar Minute Volume, mechanical
FE06h	'Mvalv s'	-	-	Pod	-	FLOW	L	0 – 60	Alveolar Minute Volume, spontaneous
FE07h	'TVd aw'	-	-	Pod	-	FLOW	ml	0 – 500	Airway Deadspace
FE08h	'Cdyn'	-	-	Pod	-	FLOW	ml/cmH2O	0 – 500	Lung Compliance
FE09h	'C20/Cdyn'	-	-	Pod	-	FLOW	-	N/A	Dynamic Compliance over last 20% breath
FE0Ah	'Raw e'	-	-	Pod	-	FLOW	cmH2O/l s	0 – 100	Expiratory Airway Resistance, dynamic
FE0Bh	'Raw i'	-	-	Pod	-	FLOW	cmH2O/l s	0 - 100	Inspiratory Airway Resistance, dynamic
FE0Ch	NOT USED	-	-		-				
FE0Dh	NOT USED	-	-		-				
FE0Eh	'PIF'	-	-	Pod	-	FLOW	l/min	0 – 180	Peak Inspiratory Pressure
FE0Fh	'PEF'	-	-	Pod	-	FLOW	l/min	0 – 180	Peak Expiratory Pressure
FE10h	'TV'	-	-	X	-	FLOW	%	0 – 100	ET tube leakage

CODE# 1 BYTE	DRÄGER/ SIEMENS LABEL	GAMMA/ GAMMA XL SC 6002 XL SC 6802 XL	Vista	Delta/Delta XL Kappa/Kappa XLT SC 7000 SC 9000 SC 8000	Gamma X XL Vista XL	SOURCE	Unit of Measure	RANGE	PARAMETER DESCRIPTION
FE11h	'TVe m'	-	-	Pod	-	FLOW	ml	0 - 3000	Expiratory Tidal Volume, mechanical
FE12h	'TVe s'	-	-	Pod	-	FLOW	ml	0 – 3000	Expiratory Tidal Volume, spontaneous
FE13h	'MVe m'	-	-	Pod	-	FLOW	L	0 – 60	Expired Minute Volume, mechancial
FE14h	'Mve s'	-	-	Pod	-	FLOW	L	0 – 60	Expired Minute Volume, spontaneous
FE15h	'RRm'	-	-	Pod	-	FLOW	1/min	0 – 150	Respiratory Rate, mechanical
FE16h	'RRs'	-	-	Pod	-	FLOW	1/min	0 – 150	Respiratory Rate, spontaneous
FE17h	NOT USED	-	-		-				
FE18h	'RSBI'	-	-	Pod	-	FLOW	bpm/l	0 – 1000	Rapid Shallow Breathing Index
FE19h	'VCO2'	-	-	Pod	-	FLOW	ml/min	0 – 800	Expired CO2 Minute Volume
FE1Ah	'TVCO2'	-	-	Pod	-	FLOW	ml	0 – 800	Expired CO2
FE1Bh	'TValv'	-	-	Pod	-	FLOW	ml	0 – 3000	Alveolar Tidal Volume, total
FE1Ch	'Mvalv'	-	-	Pod	-	FLOW	L	0 – 60	Alveolar Minute Volume, total
FE1Dh	'PeCO2'	-	-	Pod	-	FLOW	mmHg	0 – 99	Mixed-Expired CO2
FE1Eh	'TVd/ TV aw'	-	-	Pod	-	FLOW	-	0 – 0.75	Dilution Ratio, airway
FE1Fh	'Ti'	-	-	Pod	-	FLOW	sec	0 – 60	Inspired Time
FE20h	'Te'	-	-	Pod	-	FLOW	sec	0 – 60	Expired Time
FE21h	STdV1	-	-	X	X	ECG	mm	-1.5 – 1.5	ST Derived Lead I
FE22h	STdV3	-	-	X	X	ECG	mm	-1.5 – 1.5	ST Derived Lead 3
FE23h	STdV4	-	-	X	X	ECG	mm	-1.5 – 1.5	ST Derived Lead 4
FE24h	STdV6	-	-	X	X	ECG	mm	-1.5 – 1.5	ST Derived Lead 6
FE25h	MAC	-	-	Device	Device	SCIO	%		
FE26h	BCT	-	-	Pod		BIS-X	unitless	0-30	

CODE# 1 BYTE	DRÄGER/ SIEMENS LABEL	GAMMA/ GAMMA XL SC 6002 XL SC 6802 XL	Vista	Delta/Delta XL Kappa/Kappa XLT SC 7000 SC 9000 SC 8000	Gamma X XL Vista XL	SOURCE	Unit of Measure	RANGE	PARAMETER DESCRIPTION
FE27h	Current	-	-	Pod	-	NMT	mA	5-60mA	
FE28h	Single	-	-	Pod	-	NMT	%	0-200	
FE29h	TOF-Ratio	-	-	Pod	-	NMT	%	4-150	
FE30h	TOF-Count	-	-	Pod	-	NMT	unitless	0-4	
FE31h	PTC-Count	-	-	Pod	-	NMT	unitless	0-20	
FE32h	Temp	-	-	Pod	-	NMT	^{o}C	20-40	

EEG Lead Label Coding Table

The value field of EEG1, EEG2, EEG3 and EEG4 are the Lead Labels for the particular EEG lead monitored. The following table provides a list of lead labels.

CODE# 1 BYTE	LEAD LABEL	ASCII CHARACTER
41h	FP	'A'
42h	FP1	'B'
43h	FP2	'C'
44h	FX	'D'
45h	F3	'E'
46h	F4	'F'
47h	F7	'G'
48h	F8	'H'
49h	CZ	'I'
4Ah	C3	'J'
4Bh	C4	'K'
4Ch	T7	'L'
4Dh	T8	'M'
4Eh	PZ	'N'
4Fh	P3	'O'
50h	P4	'P'
51h	P7	'Q'
52h	P8	'R'
53h	O	'S'
54h	O1	'T'
55h	O2	'U'
56h	LEFT	'V'
57h	RIGHT	"W'
58h	FRONT	'X'
59h	BACK	'Y'

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The quality management system at Draeger Medical Systems, Inc. Is certified according to ISO 13485, ISO 9001 and Annex II of Directive 93/42/EEC.

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