
DDC 711

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Functional description

The decentralized digital node module DDC 711 forms an universal interface between sensors/actors and the working process.

The node modules are connected directly to the CAN bus. The node module disposes of 8 digital inputs/outputs. The node module has a module bus interface (MOBI) whereon further modules can be connected.

The maximum number of the connectable expansion modules is however restricted on 7 modules and maximum module bus interface load of 5W (see hardware system manual). The extension modules are digital/analog expansion modules and counter modules.

The detailed functional description of the hardware can be taken from the corresponding specifications.

Operational description

The module runs in the standard case in an endless cycle. It is reading back permanently the inputs (MOBI cycle). The outputs will be set according to the configured output mode (OutMod):

- Async.: The new output conditions will be renewed in the next following MOBI cycle. (Default Modus).
- Sync.: The new output conditions will be renewed only after the receipt of a Sync telegram in the following MOBI cycle.

If necessary, the module transmits the requested data via CAN (according to the CANopen specification).

If a serious error occurs, the watch dog will reset the node. Afterwards the node starts up automatically. The outputs will be set on zero, respectively they remain zero. Possible user configurations of the I/O's are lost after a reset.

Communication

The node modules DDC 711 dispose of an SDO¹ and 16 PDO²s (2 RxPDO (DO), 4 RxPDO (AO), 2 TxPDO (DI), 8 TxPDO (AI)), which are set with a default mapping

The transmission of each of the EPDO's³ takes place when:

- Inputs have changed,
- on status in the 'manufacturer specific error register' a condition change has occurred.

¹ SDO = Service Data Object

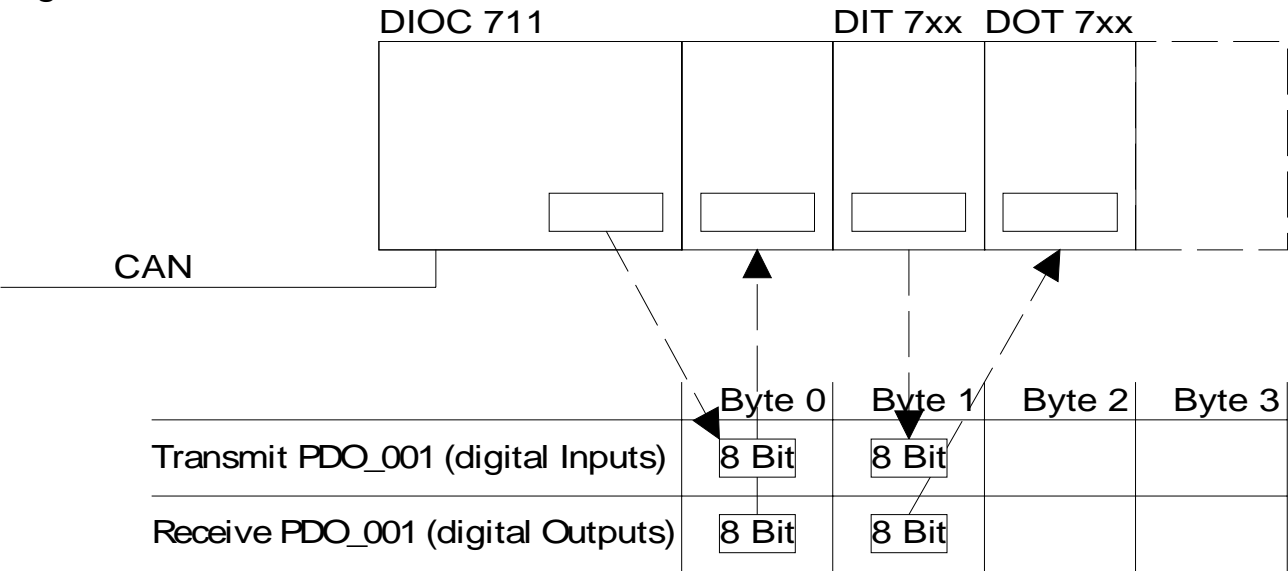
² PDO = Process Data Object

³ EPDO = Event Process Data Object (Ereignisgesteuert)

Default-Mapping

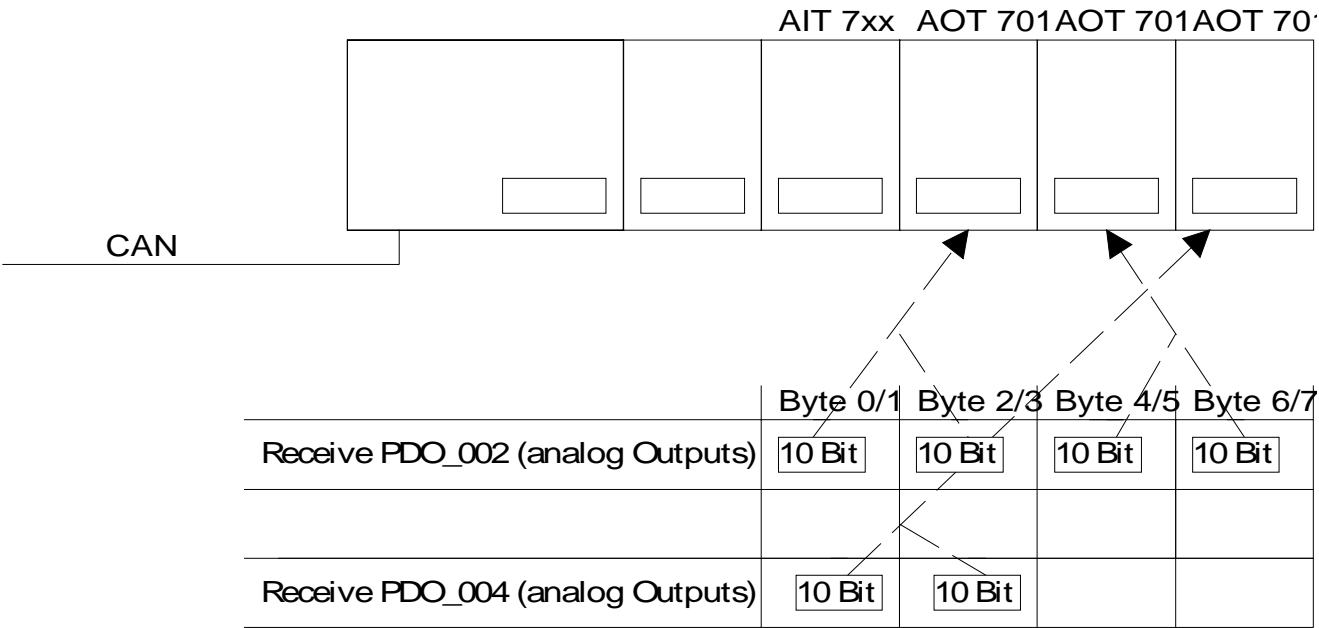
The default mapping of the PDO's has been defined as follows:

Digitale E/A



Drawing 1 : default mapping digital inputs/outputs

For the analog expansion modules AOT 701 (2 analog outputs, 0...+10V / 0...+20mA, 10 bit digital resolution) the following mapping has been planned:



drawing 2 : mapping analog expansion modules AOT 701

Per node module up to maximum 7 expansion modules AOT 701 can be connected. This amounts to a maximum number of 14 analog outputs on the expansion modules. Therefore 2 further receive PDO's have to be put at the disposal (receive PDO_5 ... receive PDO_6).

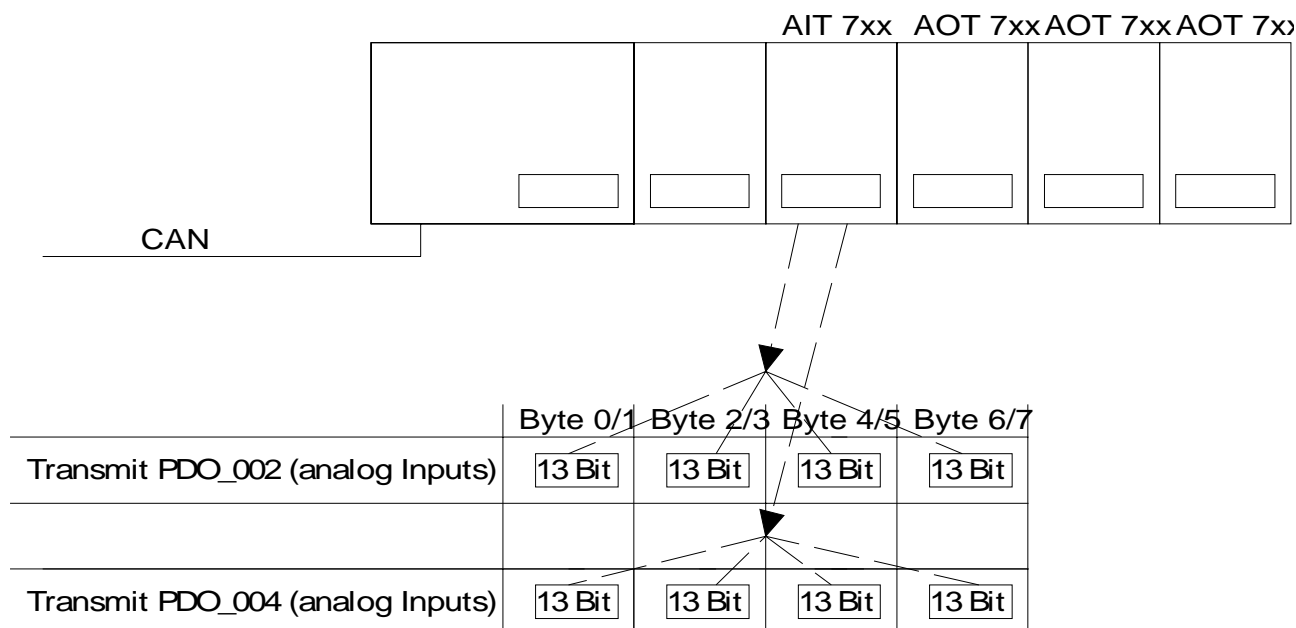
On the communication parameter receive PDO_2 the COB-ID is concerning default on 80'00'03'01 - 7Fh.

On the communication parameter receive PDO_3 the COB-ID is concerning default on 80'00'05'01 - 7Fh.

This means, that the PDO's are not active and the COB-ID is defined by the node address.

On the communication parameter the receive PDO_5 till PDO_6 the COB-ID is concerning default on 80'00'07'FFh. This means, that the PDO is not active. The user has to name each of the COB-ID's on the configuration.

For the analog expansion modules AIT 704 (8 analog inputs 0...+10V / 0...+20mA, 12 bit digital resolution) the following mapping is planned:



Drawing 3 : Mapping analog expansion module AIT 704

Per node module maximum 4 expansion modules AIT 701 can be connected. This amounts a maximum number of 32 analog inputs on the expansion modules. Thus 6 more transmit PDOs should be put at the disposal (transmit PDO_5 ... transmit PDO_10).

On the communication parameter transmit PDO_2 the COB-ID is concerning default on 80'00'02'81 - FFh.

On the communication parameter transmit PDO_3 the COB-ID is concerning default on 80'00'03'81 - FFh.

On the communication parameter transmit PDO_4 the COB-ID is concerning default on 80'00'04'81 - FFh.

This means that these PDO's are not active and the COB-ID is defined by the node address.

On the communication parameters transmit PDO_5 till PDO_10 the COB-ID is concerning default on 80'00'07'FFh. This means that the PDO is not active. The user has to name each of the COB-ID's himself regarding the configuration.

The default identifier distribution of the node modules is as follows:

Object	Identifier (binary)	(hex)	Function
NMT	000000000000	0x000	Boot-up
SYNC	000100000000	0x080	Synch
Emergency	0001xxxxxxx	0x081- 0x0FF	Status
Tx_PDO1	0011xxxxxxx	0x181- 0x1FF	digital inputs
Rx_PDO1	0100xxxxxxx	0x201- 0x27F	digital outputs
Tx_PDO2	0101xxxxxxx	0x281- 0x2FF	analog inputs
Rx_PDO2	0110xxxxxxx	0x301- 0x37F	analog outputs
Tx_PDO3	0111xxxxxxx	0x381- 0x3FF	digital inputs
Rx_PDO3	1000xxxxxxx	0x401- 0x47F	digital outputs
Tx_PDO4	1001xxxxxxx	0x481- 0x4FF	analog inputs
Rx_PDO4	1010xxxxxxx	0x501- 0x57F	analog outputs
Tx_SDO	1011xxxxxxx	0x581- 0x5FF	parameter
Rx-SDO	1100xxxxxxx	0x601- 0x67F	parameter
Node guard	1110xxxxxxx	0x701- 0x77F	Life-/node guarding

Maximum 4 PDO's can be freely distributed by the user. If a maximum expansion with e.g. 32 analog inputs is required, six more PDO's have to be distributed. This happens when the user occupies the COB-ID's of the missing 6 PDO's by „virtual“ node modules. This means that these „virtual“ node modules must have another node ID (yyyyyy ==> node ID will be named by the user), than the „real“ node module (xxxxxx ==> node ID by DIP switch adjustment).

Object	Identifier (binary)	Object	Identifier (binary)
<i>NMT</i>		<i>NMT</i>	
<i>SYNC</i>		<i>SYNC</i>	
<i>Emergency</i>		<i>Emergency</i>	
Tx_PDO(5)	0011yyyyyyy	Tx_PDO(9)	0011zzzzzzz
Rx_PDO(5)	0100yyyyyyy	Rx_PDO(9)	0100zzzzzzz
Tx_PDO(6)	0101yyyyyyy	Tx_PDO(10)	0101zzzzzzz
Rx_PDO(6)	0110yyyyyyy	Rx_PDO(10)	0110zzzzzzz
Tx_PDO(7)	0111yyyyyyy		
Rx_PDO(7)	1000yyyyyyy		
Tx_PDO(8)	1001yyyyyyy		
Rx_PDO(8)	1010yyyyyyy		
<i>Tx_SDO</i>		<i>Tx_SDO</i>	
<i>Rx-SDO</i>		<i>Rx-SDO</i>	
<i>Node-guard</i>		<i>Node-guard</i>	

Behaviour on failure of CAN bus

On a „Bus off“ the node tries to reset the error itself, by resetting the CAN bus interface after five seconds. The outputs accept the conditions, which result from the last transmitted output conditions, the output behaviour and output conditions in an error case

Behaviour on low voltage

If the primary voltage falls below 17V, it will be signaled to the controller. At the same time the supply voltage LED goes off. The node tries to indicate the low voltage to its master (node runs approx. up to 13V, below remain 10ms until node fails. No data securing ensues.

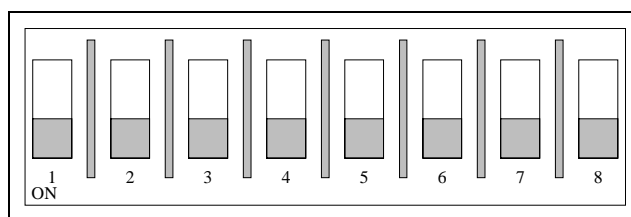
If the secondary voltage falls below 4.65V, the complete node of the reset block will be reset.

Functionality of the LED's

Supply voltage 24V: is defined by hardware.
Lighted as long as the supply voltage (24V) is higher than 17V

- Run:
1. As soon as the initialisation of the node is concluded, the LED should blink with a frequency of 2 Hz (pre operational).
 2. As soon as the CAL state „operational“ is reached, the LED should be illuminated constantly.
 3. Outside of the specific cases the LED should be switched off.
- CAN:
4. As soon as the initialisation of the node is concluded, the LED should be illuminated.
 - If the CAN error warning limit is reached, the LED should blink with a frequency of 0,5 Hz, until the warning limit has fallen below. After this the LED should be illuminated constantly.
 5. If the state „Bus-Off“ is reached, the LED has to be switched of and it should remain switched off until the CAN interface has been initialized again.

Settings of the DIP switches



drawing 4 : DIP switch node module

Adjustment mod. ID: DIP switch 1..5 und 8

Adjustable range 1...63

On node address 0 the test software is started automatically.

Bitrate:

Nr. 7	Nr. 6	kBit/s
0	0	20
0	1	125
1	0	500
1	1	1000

Definition of an error case

If the module has reached the state "Pre-Operational", and if it is commanded in a lower state, this is considered as an error state (stop remote node). The outputs take the defined error condition. Default behaviour of the digital outputs in an error case

The default state of the digital output in case of error is switched off. This signifies that the object 6206 (output behaviour) 0xFF, however object 6207 (output state) 0x00 had been adjusted as default value. If the user changes these values the amendments will be flüchtig memorized => after reset the default values are valid again.

Default behaviour of the analog outputs in an error case

The default state of the output in case of error is 0V. This means that object 6443 (output behaviour) 0x01 however object 6444 (output state) 0x00 had been adjusted as default value. If the user changes these values the amendments will not be memorized => after reset the default values are valid again.

Switching from an error case into standard operation

If an error could be reset and the module should be working according to standards again the outputs have to be released again via the object 5FFE or by changing into the state „Operational“. Only now the error state flag in status can be cancelled and the outputs accept the "regular" values.

Behaviour of the outputs on over charge (load?)

It can be recognized, if on a digital output module an overload switch off has occurred. This is indicated in the manufacturer specific status register (see object list object 1002).

If an overload arises, it will be tested in cycles of approx. 5 seconds with cyclic switch on trials whether the overload is gone (see MOBI library). The other output modules work further.

On each arise of an overload the timer (5 seconds) will be started anew.

Defined analog input amendment (interrupts)

A value per analog input is indicated. In order to change the input since the last transmitted telegram (positive oder negative), that the new input value is indicated again. At activating of the function the actual input value is taken over as first reference value.

Telegram content in poll or cyclic operation:

Always the actual input value is transmitted per channel

After a reset this function is switched off.

Cancellation of the functions

This function cancels all earlier programmed functions on the indicated channel. After the cancellation the corresponding input channel is configured as after a reset.

Exception Behaviour of the SDO

If an access ensues on a unsupported object or a read/write convention has been offended, the server interrupts the transfer by means of an „abort domain transfer protocol“ as well as the corresponding error code. The server remains in standard operation mode (outputs do not accept the error condition):

All data transmitted via SDO, have to be memorized between and can be taken over only after a successful ending of the domain transfer.

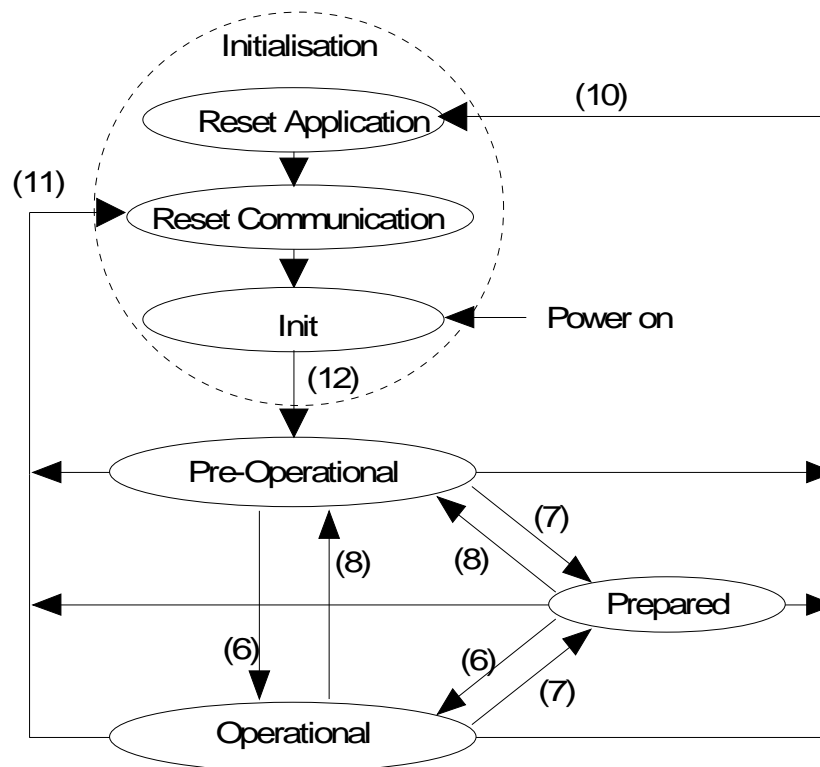
Emergency Message

The inhibit time of an emergency message (EMCY) is 10ms.

Conditions of the Module

Conditions when NMT = 0 & DBT = 0

CANopen allows a simplified boot up of the distributed network. As no DBT services are supported, there is no danger that the modules remain in an undefined condition, as all services are initiated through the master.



Drawing 5 : Condition diagram node module NMT class 0 and DBT class 0

Conditions

Initialisation

On switching on (Power-On) the modules execute the initialisation (CAN interface, MOBI,...). After ending of the initialisation the modules send a boot up telegram (EMCY telegram with length 0).

Pre-operational

PDOs are not yet active. Node guarding is possible, the default identifiers are at the disposal for the SDO. In case of an error on the modules the emergency diagram is sent. In case of a change from pre-operational into operational all active PDOs will be transmitted.

Operational

In the condition all PDOs are active. A change in the configuration via SDO is basically possible.

Prepared

In the condition prepared all outputs are in an error state. NMT and node guarding is only possible then.

Condition change

State transition	Designation	Command specifier (cs)		Function
(6)	Start_Remote_Node indication	1dez	01h	Starts module, releases outputs, starts transmission of PDOs
(7)	Stop_Remote_Node indication	2dez	02h	Stops the communication, leads outputs into error state
(8)	Enter_Pre-Operational_State indication	128dez	80h	Stops PDO transmission, SDO still active
(10)	Reset_Node indication	129dez	81h	Executes module reset (including application)
(11)	Reset_Communication indication	130dez	82h	Executes reset of the communication functions
(12)	Initialisation finished, enter pre-operational	-	-	Automatic transition after pre-operational

Remark: The state transitions (7), (10) and (11) do not have to be supported by the network master. The state transition (12) ensues by itself (automatically).

Object 1000: Device type

Indicates the specified module type code of the unit in the device profile (DS401)

Object description

INDEX	1000h
Variable name	Device type
Object code	7 (var)
Data type index	7 (unsigned32)

Values description

Sub - Index	0
Description	Code of the device type [read only]; DDC 711: 00'03'01'91h
Mandatory range	Unsigned32

Object 1001: Error register

General error register (0 => no error, 1 => corresponding error occurred).

Bit 7

Bit 0

ManSpec.	reserved	reserved	Comm.	reserved	Voltage	Current	Generic
----------	----------	----------	-------	----------	---------	---------	---------

ManSpec. Manufacturer specific error is specified detailed in object 1002.

Comm. Communication error (CAN overrun)

Voltage e.g. input voltage outside the valid range

Current e.g. Overload at outputs

Generic An error not closer specified has occurred (Flag is set on error message)

Object description

INDEX	1001h
Variable Name	Error state
Object code	7 (var)
Data type index	5 (unsigned8)

Value description

Sub - Index	0
Description	Default value: 00h [read only], error state
Value range	Unsigned8
Mandatory range	None

Object 1002: Manufacturer specific status register

Indicates the actual state of the modules (manufacturer specific).

LSB				MSB				
Unsigned32	Status Byte 1		Status Byte 2		Status Byte 3		Status Byte 4	
	Bit 7				Bit 0			
Byte 1	res	ShortC	ComE	OrE	SubDis	PF UC	res	res
Byte 2	res	res	res	utFM	res	PF US	res	res
Byte 3	Actual Node State							
Byte 4	res	res	res	Overfl	res	res	res	Underfl

ShortC	= 1	Short circuit on the digital outputs
ComE	= 1	Communication error (CAN warning limit exceeded)
OrE	= 1	CAN overrun error (CAN data loss)
SubDis	= 1	Warning limit expansion bus exceeded
PF UC	= 1	Voltage supply (24V) of the node has low voltage
OutFM	= 1	Outputs in the error mode
PF US	= 1	24V external supply of the outputs (24V) has low voltage or is not existing.
Actual Node State		present CAL state of the node (corresponds to the state in the CAL node guarding telegram)
Overfl	= 1	Voltage at analog input > 10V (only possible if AIT 70x expansion modules are applied).
Underfl	= 1	Voltage at analog input > 10V (only possible if AIT70x expansion modules are applied).

Object description

INDEX	1002h
Variable name	Error state
Object code	7 (var)
Data type index	7 (unsigned32)

Values description

Sub - Index	0
Description	Default value: 00'00'xx'00h [read only], state manufacturer specific
Value range	Unsigned32
Mandatory range	None

xx = depending on CAL state

Object 1003: Pre-defined error field

Contains the emergency error code according to DS 301. As a detailed differentiation of the error types is possible via the manufacturer specific error register (1002h), only the prescribed mandatory entries are supported:

Supported are

- 00'00: No error respectively error reset
- 10'00: General error, details see error register 1001h and manufacturer specific error register 1002h

Object description

INDEX	1003h
Array name	Pre-defined error field
Object code	9 (record)
Data type index	7 (unsigned32)

Value description

Sub - Index	0
Description	Default value: 01 [read only], number of the memorized errors
Value range	Unsigned8
Mandatory range	1

Sub - Index	1
Description	Standard error field [read only]
Value range	Unsigned32
Mandatory range	None

Object 1004: Number of PDOs

Indicates the number and default type (Tx, Rx, transmission type) of the supported PDOs

Object description

INDEX	1004h
Array name	Number of supported PDO's
Object code	8 (array)
Data type index	7 (unsigned32)

Values description

Sub - Index	0
Description	Default value: 00'06'00'10 number of receive/transmit PDOs [read only]
Value range	Unsigned32
Mandatory range	0 ... 01FF' 01FFh

Sub - Index	1
Beschreibung	00'00'00'00 number of default synchrone Receive/Transmit PDO's [Read only]
Werte Bereich	Unsigned32
Mandatory range	None

Sub - Index	2
Description	00'06'00'10 number of default asynchronous receive/transmit PDO's [read only]
Value range	Unsigned32
Mandatory range	None

Object 1005: COB-ID SYNC message

Announces the CAN identifier of the synchronization telegram.

Object description

INDEX	1005h
Variable name	COB-ID SYNC-message
Object code	7 (Var)
Data type index	7 (unsigned32)

Values description

Sub - Index	0
Description	Default value: 80'00'00'80h [read only], CAN identifier SYNC Tgm
Value range	Unsigned32
Mandatory range	none

Object 1008: Device name

Issues the unit name as visible string.

Object description

INDEX	1008h
Variable name	Device description of the manufacturer
Object code	7 (Var)
Data type index	9 (visible string)

Werte Beschreibung

Description	'IO11' [read only]
Value range	Unsigned8 (ASCII)
Mandatory range	ASCII values for numbers and digits

Object 1009: Hardware version

Indicates the hardware version of the modules.

Object description

INDEX	1009h
Variable name	Hardware version
Object code	7 (var)
Data type index	9 (visible String)

Value description

Description	Default value: 'xxxx' [read only]
Value range	Unsigned8 (ASCII)
Mandatory range	ASCII values for numbers and digits

Object 100A: Software version

Indicates the software version of the modules.

Object description

INDEX	100Ah
Variable name	Software version
Object code	7 (var)
Data type index	9 (visible string)

Values description

Description	Default value: 'xxxx'(software version) [read only]
Value range	Unsigned8
Mandatory range	ASCII values for digits and for numbers

Object 100B: Node-ID

Contains the node ID : DIP switch

Object description

INDEX	100Bh
Variable name	Node ID
Object code	7 (var)
Data type index	7 (unsigned32)

Values description

Sub - Index	0
Description	DIP switch, node address [read only]
Value range	Unsigned32
Mandatory range	0 ... 00'00'00'7Fh

Object 100C: Guard time

Guard time in ms. 'Life time factor' (Object 100D) multiplied with life time for the life guarding (monitoring of the guarding masters, 'node guard protocol').

If the product is 'zero' (default) the master is not monitored (no life guarding).

Object description

INDEX	100Ch
Variable name	Guard time
Object code	7 (var)
Data type index	6 (unsigned16)

Values description

Sub - Index	0
Description	Default value: 00'00h[read/write], guard time
Value range	Unsigned16
Mandatory range	None

Object 100D: Life time factor

Life time factor. With 'guard time' (object 100C) multiplied results into a life time for the 'node guard protocol'. Life time = 0 resp. guard time = 0 means that the failure of the guarding master of the modules is not monitored. If the master is monitored, the outputs go into error condition after the life time has passed.

Object description

INDEX	100Dh
Variable name	Life time factor
Object code	7 (var)
Data type index	7(unsigned32)

Values description

Sub - Index	0
Description	Default value: 00h[read/write], life time factor
Value range	Unsigned8
Mandatory range	None

Object 100E: COB-ID Guarding protocol

Announces the CAN identifier of the node guarding protocol. Life guarding (monitoring of the guarding master) starts after the first guarding telegram, if guard time and life time are not equal ,zero'.

After a guarding time out the proceeding by transmitting the guarding telegram can be started again.

Object description

INDEX	100Eh
Variable name	Life guard-COB-ID
Object code	7 (var)
Data type index	7 (unsigned32)

Values description

Sub - Index	0
Description	Default value: 0x700 + node-ID [read/write]
Value range	Unsigned32
Mandatory range	None

Object 1014: COB-ID emergency message

The index 1014 defines the COB-ID of the emergency (EMCY).

Object description

INDEX	1014h
Variable name	COB-ID emergency message
Object code	7 (var)
Data type index	7 (unsigned32)

Values description

Sub - Index	0
Description	Default value: 80h + node-ID [read/write]
Value range	Unsigned32
Mandatory range	None

Object 1400: Communication parameter RxPDO1

Communication parameter from receive PDO 1 (event controlled, defaulty digital outputs). The communication can be amended **freely** => switch off, synchronous or event driven.

The identifier (COB-ID PDO, see sub index 1) is encoded as follows:

Unsigned32

	MSB				LSB
Bits	31	30	29	28-11	10-0
11-bit-ID	0/1	0/1	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	11-Bit Identifier
29-bit-ID	0/1	0/1	1	29-Bit Identifier	

Bit number	Value	Signification
31 (MSB)	0	PDO active
	1	PDO not active
30	0	RTR allowed on this PDO
	1	no RTR allowed on this PDO
29	0	11-bit ID (CAN 2.0A)
	1	29-bit ID (CAN 2.0B)
28 - 11	0	If bit 29=0
	X	If bit 29=1: bits 28-11 of 29 bit-COB-IDs
10-0 (LSB)	X	Bits 10-0 of COB-ID

PDO: Structure of the COB-ID registration

The transmission type (see sub index 2) defines the emitting behaviour of the corresponding process data object.

Object description

INDEX	1400h
Record name	PDO1 communications parameter
Object dode	9 (record)
Data type index	7 (unsigned32), 6 (unsigned16), 5(unsigned8)

Values description

Sub - Index	0
Description	Default value: 03h, number of the communication parameter
Value range	Unsigned8
Mandatory range	2-4

Sub - Index	1
Description	Default value: 00'00'02'xxh [read/write], COB-ID PDO1
Value range	Unsigned32
Mandatory range	None

MSB
LSB
 xx: 0 <Modul - ID>

Sub - Index	2
Description	Default value: FFh[read/write], transmission type (see chapter 7)
Value range	Unsigned8
Mandatory range	0-240, 255

Sub - Index	3
Description	Default value: 00'00h[read/write], inhibit time
Value range	Unsigned16
Mandatory range	None

x: Depending on node-ID

Object 1401: Communication parameter RxPDO2

Communication parameter from receive PDO 2 (event controlled, defaulty analog outputs). The communication parameter can be amended by the user **freely** => switch off,

synchronous or event controlled.

The structure of the identifier registration (COB-ID PDO, see sub index 1) can be found in the index 1400h.

Object description

INDEX	1401h
Record name	PDO2 communication parameter
Object dode	9 (record)
Data type index	7 (unsigned32), 6 (unsigned16), 5(unsigned8)

Values description

Sub - Index	0
Description	Default value: 3h, number of the communication parameters
Value range	Unsigned8
Mandatory range	2-4

Sub - Index	1
Description	Default value: 80'00'03'xxh [read/write], COB-ID PDO2
Value range	Unsigned32
Mandatory range	None

MSB LSB

xx:

0 <Modul - ID>

Sub - Index	2
Description	Default value: FFh[read/write], transmission type
Value range	Unsigned8
Mandatory range	0-240, 255

Sub - Index	3
Description	Default value: 00'00h[rad/wite], inhibit time
Value range	Unsigned16
Mandatory range	None

x: Depending on modules ID

Object 1402: Communication parameter RxPDO3

Communication parameter of receive PDO 3 (event controlled, defaulty digital outputs). The communication parameter can be amended by the user **freely** => switch off, synchronous or event controlled.

The structure of the identifier registration (COB-ID PDO, see sub index 1) can be found in index 1400h.

Object description

INDEX	1402h
Record name	PDO3 communication parameter
Objekt code	9 (record)
Data type index	7 (unsigned32), 6 (unsigned16), 5(unsigned8)

Values description

Sub - Index	0
Description	Default value: 3h, number of the communication parameter
Value range	Unsigned8
Mandatory range	2-4

Sub - Index	1
Description	Default value: 80'00'04'xxh [read/write], COB-ID PDO3
Value range	Unsigned32
Mandatory range	None

MSB LSB

xx:

0 <Module - ID>

Sub - Index	2
Description	Default value: FFh [read/write], transmission type
Value range	Unsigned8
Mandatory range	0-240, 255

Sub - Index	3
Description	Default value: 00'00h[read/write], inhibit time
Value range	Unsigned16
Mandatory range	None

x: Depending on the modules ID

Object 1403: Communication parameter RxPDO4

Communication parameter of receive PDO 4 (event controlled, defaulty analog output). The communication parameter can be amended **freely** by the user switch off, synchronous or event controlled).

The structure of the identifier registration (COB-ID PDO, see sub index 1) can be found in index 1400h.

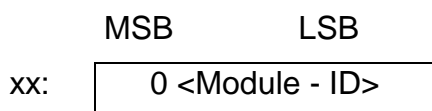
Object description

INDEX	1401h
Record name	PDO2 communication parameter
Objekt code	9 (record)
Data type index	7 (unsigned32), 6 (unsigned16), 5(unsigned8)

Values description

Sub - Index	0
Beschreibung	Default value: 3h, number of the communication parameter
Value range	Unsigned8
Mandatory range	2-4

Sub - Index	1
Description	Default value: 80'00'05'xxh [read/write], COB-ID PDO4
Value range	Unsigned32
Mandatory range	None



Sub - Index	2
Description	Default value: FFh [read/write], transmission type
Value range	Unsigned8
Mandatory range	0-240, 255

Sub - Index	3
Description	Default value: 00'00h [read/write], inhibit time
Value range	Unsigned16
Mandatory range	None

x: Depending on the module ID

Object 1404: Communication parameter RxPDO5

Communication parameter of receive PDO 5 (event controlled, defaulty analog output). The communication parameters can be amended **freely** by the user => switch off, synchronous or event controlled.

The structure of the identifier registration (COB-ID PDO, siehe Subindex 1) can be found in the index 1400h.

Object description

INDEX	1404h
Record name	PDO5 communication parameters
Object code	9 (record)
Data type index	7 (unsigned32), 6 (unsigned16), 5(unsigned8)

Values description

Sub - Index	0
Description	Default value: 3h, number of communication parameters
Value range	Unsigned8
Mandatory range	2-4

Sub - Index	1
Description	Default value: 80'00'07'FFh [read/write], COB-ID PDO5
Value range	Unsigned32
Mandatory range	None

Sub - Index	2
Description	Default value: FFh [read/write], transmission type
Value range	Unsigned8
Mandatory range	0-240, 255

Sub - Index	3
Description	Default value: 00'00h [read/write], inhibit time
Value range	Unsigned16
Mandatory range	None

Object 1405: Communication parameter RxPDO6

Communication parameters of receive PDO 6 (event controlled, defaulty analog outputs). The communication parameter can be amended **freely** by the user => switch off, synchronous or event controlled.

The structure of the identifier registration (COB-ID PDO, see sub index 1) can be found in index 1400h.

Object description

INDEX	1405h
Record name	PDO6 communication parameters
Object code	9 (record)
Data type index	7 (unsigned32), 6 (unsigned16), 5(unsigned8)

Values description

Sub - Index	0
Description	Default value: 3h, number of the communication parameters
Value range	Unsigned8
Mandatory range	2-4

Sub - Index	1
Description	Default value: 80'00'07'FFh[read/write], COB-ID PDO6
Value range	Unsigned32
Mandatory range	None

Sub - Index	2
Description	Default value: FFh[read/write], transmission type
Value range	Unsigned8
Mandatory range	0-240, 255

Sub - Index	3
Description	Default value: 00'00h[read/write], inhibit time
Value range	Unsigned16
Mandatory range	None

Object 1600: Mapping RxPDO1

Mapping of RxPDO 1 (digital outputs). Can be read by the user only.

The structure of the registration in the sub:

MSB

LSB

Index (16 bit)	sub index (8 bit)	object length (8 bit)
----------------	-------------------	-----------------------

The object length is encoded as unsigned8. Admitted value 8h (byte wise mapping).

Object description

INDEX	1600h
Record name	RxPDO1 mapping
Object code	8 (array)
Data type index	7 (unsigned32), 5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: - [read only], number of objects
Value range	Unsigned8
Mandatory range	1-8

Sub - Index	1
Description	Default value: 62'00'01'08h[read only], 1 st assigned object
Value range	Unsigned32
Mandatory range	None

Sub - Index	2
Description	Default value: 62'00'02'08h[read only], 2 nd assigned object
Value range	Unsigned32
Mandatory range	None

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↓

Sub - Index	8
Description	Default value: 62'00'08'08h[read only], 8 th assigned object
Value range	Unsigned32
Mandatory range	None

Object 1601: Mapping RxPDO2

Mapping of the RxPDO 2 (analog outputs). Can be read only by the user.

The structure of the registration in sub index 1h-4h is as follows:

MSB

LSB

Index (16 bit)	Sub index (8 bit)	Object length (8 bit)
----------------	-------------------	-----------------------

The object length is encoded as unsigned8. Admitted value: 10h (mapping of 16 bit objects).

Object description

INDEX	1601h
Record name	RxPDO2 mapping
Object code	8 (array)
Data type index	7 (unsigned32), 5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: - [read only], number of objects
Value range	Unsigned8
Mandatory range	1-4

Sub - Index	1
Description	Default value: 64'11'01'10h[read only], 1 st assigned object
Value range	Unsigned32
Mandatory range	None

Sub - Index	2
Description	Default value: 64'11'02'10h[read only], 2 nd assigned object
Value range	Unsigned32
Mandatory range	None

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↓

Sub - Index	4
Description	Default value: 64'11'04'10h[read only], 4 th assigned object
Value range	Unsigned32
Mandatory range	None

Object 1602: Mapping RxPDO3

Mapping of RxPDO 3 (digital outputs). Can be read only by the user.

The structure of the registration in sub index 1h-8h is as follows:

MSB

LSB

Index (16 Bit)	Sub index (8 Bit)	Object length (8 bit)
----------------	-------------------	-----------------------

The object length is encoded as unsigned8. Admitted value: 8h (byte wise mapping).

Object description

INDEX	1602h
Record name	RxPDO3 mapping
Object code	8 (array)
Data type index	7 (unsigned32), 5 (unsigned8)

Value description

Sub - Index	0
Description	Default value: - [read only], number of objects
Value range	Unsigned8
Mandatory range	1-8

Sub - Index	1
Description	Default value: 62'00'09'08h[read only], 9 th assigned object
Value range	Unsigned32
Mandatory range	None

Sub - Index	2
Description	Default value: 62'00'0A'08h[read only], 10 th assigned object
Value range	Unsigned32
Mandatory range	None



Sub - Index	8
Description	Default value: 62'00'10'08h[read only], 16 th assigned object
Value range	Unsigned32
Mandatory range	None

Objekt 1603: Mapping RxPDO4

Mapping of RxPDO 4 (analog outputs). Can be read only by the user.

The structure of the registration in sub index 1h-4h is as follows:

MSB

LSB

Index (16 bit)	Sub index (8 bit)	Object length (8 bit)
----------------	-------------------	-----------------------

The object length is encoded as unsigned8. Admitted value: 10h (mapping of 16-bit objects).

Object description

INDEX	1603h
Record name	RxPDO4 mapping
Object code	8 (array)
Data type index	7 (unsigned32), 5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: - [read only], number of objects
Value range	Unsigned8
Mandatory range	1-4

Sub - Index	1
Description	Default value: 64'11'05'10h[read only], 5 th assigned object
Value range	Unsigned32
Mandatory range	None

Sub - Index	2
Description	Default value: 64'11'06'10h[Read Only], 6 th assigned object
Value range	Unsigned32
Mandatory range	None



Sub - Index	4
Description	Default value 64'11'08'10h[read only], 8 th assigned object
Value range	Unsigned32
Mandatory range	None

Object 1604: Mapping RxPDO5

Mapping of RxPDO 5 (analog outputs). Can be read only by the user.

The structure of the registration in sub index 1h-4h is as follows:

MSB

LSB

Index (16 bit)	Sub index (8 bit)	Object lenght (8 bit)
----------------	-------------------	-----------------------

The object length is encoded as unsigned8. Admitted value: (mapping of 16 bit objects).

Object description

INDEX	1604h
Record name	RxPDO5 mapping
Objekt code	8 (array)
Data type index	7 (unsigned32), 5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: - [read only], number of the objects
Value range	Unsigned8
Mandatory range	1-4

Sub - Index	1
Description	Default value: 64'11'09'10h[read only], 9 th assigned object
Value range	Unsigned32
Mandatory range	None

Sub - Index	2
Description	Default value: 64'11'0A'10h[read only], 10 th assigned object
Value range	Unsigned32
Mandatory range	None

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Sub - Index	4
Description	Default value: 64'11'0C'10h[read only], 12 th assigned object
Value range	Unsigned32
Mandatory range	None

Object 1605: Mapping RxPDO6

Mapping of RxPDO 6 (analog outputs). Can be read only by the user.

The structure of the registration in sub index 1h-4h is as follows:

MSB

LSB

Index (16 bit)	Sub index (8 bit)	Object length (8 bit)
----------------	-------------------	-----------------------

The object length is encoded as unsigned8. Admitted value: 10h (mapping of 16 bit objects).

Object description

INDEX	1605h
Record name	RxPDO6 mapping
Objekt code	8 (array)
Data type index	7 (unsigned32), 5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: - [read only], number of objects
Value range	Unsigned8
Mandatory range	1-2

Sub - Index	1
Description	Default-Wert: 64'11'0D'10h[read only], 13 th assigned objects
Value range	Unsigned32
Mandatory range	None

Sub - Index	2
Description	Default value: 64'11'0E'10h[read only], 14 th assigned object
Value range	Unsigned32
Mandatory range	None

Object 1800: Communication parameter TxPDO1

Communication parameters of transmit PDO 1 (event controlled, according to default digital inputs). The communication parameters can be amended **freely** by the user => switch off, synchronous, event controlled or poll mode (RTR).

The structure of the identifier registration (COB-ID PDO, see sub index 1) can be found in index 1400h.

Object description

INDEX	1800h
Record name	PDO1 communication parameters
Object code	9 (record)
Data type index	7 (unsigned32), 6 (unsigned16), 5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: 3h, number of communication parameters
Value range	Unsigned8
Mandatory range	2-4

Sub - Index	1
Description	Default value: 00'00'01'xxh (00'00'01'81 ... 00'00'01'FFh) [read/write], COB-ID TxPDO1
Value range	Unsigned32
Mandatory range	None

MSB LSB

xx: 1 <Modul - ID>

Sub - Index	2
Description	Default value: FFh[read/write], transmission type
Value range	Unsigned8
Mandatory range	0...240, 253, 255

Sub - Index	3
Description	Default value: 00'00h[read/write], inhibit time
Value range	Unsigned16
Mandatory range	None

x: Depending on modules ID

Object 1801: Communication parameter TxPDO2

Communication parameters of transmit PDO 2 (analog inputs, default: standard data format). According the default the telegram releasing events are switched off via the 'global analog interrupt enable' (index 6423h), the modules does not announce the analog inputs according to default by itself. The communication parameters can be amended **freely** by the user => switch off, synchronous, event controlled or poll mode (RTR).

The structure of the identifier registration (COB-ID PDO, see sub index 1) can be found in index 1400h.

Object description

INDEX	1801h
Record name	PDO2 communication parameters
Object code	9 (record)
Data type index	7 (unsigned32), 6 (unsigned16), 5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: 3h, number of the communication parameters
Value range	Unsigned8
Mandatory range	2-4

Sub - Index	1
Description	Default value: 80'00'02'xxh (00'00'02'81 ... 00'00'02'FFh) [read/write], COB-ID TxPDO2
Value range	Unsigned32
Mandatory range	None

MSB LSB

xx: 1 <Module - ID>

Sub - Index	2
Description	Default value: FFh[read/write], transmission type
Value range	Unsigned8
Mandatory range	0...240, 253, 255

Sub - Index	3
Description	Default value: 00'00h[read/write], inhibit time
Value range	Unsigned16
Mandatory range	None

x: Depending on modules ID

Object 1802: Communication parameters TxPDO3

Communication parameters of transmit PDO 3 (event controlled, according to default digital inputs). The communication parameters can be amended **freely** by the user => switch off synchronous, event controlled or poll mode (RTR).

The structure of the identifier registration (COB-ID PDO, see sub index 1) can be found in index 1400h.

Object description

INDEX	1802h
Record name	PDO3 communication parameters
Object code	9 (record)
Data type index	7 (unsigned32), 6 (unsigned16), 5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: 3h, number of communication parameters
Value range	Unsigned8
Mandatory range	2-4

Sub - Index	1
Description	Default value: 80'00'03'xxh (00'00'03'81 ... 00'00'03'FFh) [read/write], COB-ID TxPDO3
Value range	Unsigned32
Mandatory range	None

MSB
LSB
 xx: 1 <Module - ID>

Sub - Index	2
Description	Default value: FFh[read/write], transmission type
Value range	Unsigned8
Mandatory range	0...240, 253, 255

Sub - Index	3
Description	Default value: 00'00h[read/write], inhibit time
Value range	Unsigned16
Mandatory range	None

x: Depending on module ID

Object 1803: Communication parameter TxPDO4

Communication parameters of transmit PDO 4 (analog inputs, default: standard data format). According to default the telegram releasig events are switched off via the parameter 'global analog interrupt Enable' (index 6423h), the module does not announce the analog inputs according to default by itself. The communication parameters can be amended **freely** by the user => switch off, synchronous, event controlled or poll mode (RTR).

The structure of the identifier registration (COB-ID PDO, see sub index 1) can be found in index 1400h.

Object description

INDEX	1803h
Record name	PDO4 communications parameters
Object code	9 (record)
Data type index	7 (unsigned32), 6 (unsigned16), 5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: 3h, number of communication parameters
Value range	Unsigned8
Mandatory range	2-4

Sub - Index	1
Description	Default value: 80'00'04'xxh (00'00'04'81 ... 00'00'04'FFh) [read/write], COB-ID TxPDO4
Value range	Unsigned32
Mandatory range	None

MSB LSB

xx:

1 <Modul - ID>

Sub - Index	2
Description	Default value: FFh[read/write], transmission type
Value range	Unsigned8
Mandatory range	0...240, 253, 255

Sub - Index	3
Description	Default value: 00'00h[read/write], inhibit time
Values rnage	Unsigned16
Mandatory range	None

x: Depending on modules ID

Object 1804-9: Communication parameters TxPDO5-10

Communication parameters of transmit PDO 5-10 (analog inputs, default: standard data format). Defaultly the telegram releasing events via the 'global analog interrupt enable' (index 6423h) switched off, the module does not announce the analog inputs according to default by itself. The communication parameters can be amended **freely** by the user => switch off, synchronous, event controlled or poll mode (RTR).

The structure of the identifier registration (COB-ID PDO, see sub index 1) can be found in index 1400h.

Object description

INDEX	1804 - 1810h
Record name	PDO5 - PDO10 communication parameters
Object code	9 (record)
Data type index	7 (unsigned32), 6 (unsigned16), 5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: 3h, number of communication parameters
Value range	Unsigned8
Mandatory range	2-4

Sub - Index	1
Description	Default value: 80'00'07'FFh[read/write], COB-ID TxPDO5-10
Value range	Unsigned32
Mandatory range	None

MSB LSB

xx: 1 <Modul - ID>

Sub - Index	2
Description	Default value: FFh[read/write], transmission type
Value range	Unsigned8
Mandatory range	0...240, 253, 255

Sub - Index	3
Description	Default value: 00'00h[read/write], inhibit time
Value range	Unsigned16
Mandatory range	None

Object 1A00: Mapping TxPDO1

Mapping of transmit-PDO 1 (digital inputs). Sub index 0 contains defaultly the actual length of the PDOs (i.e. the number of the digital input modules)

The structure of the registration in sub index 1h-8h is as follows:

MSB

LSB

Index (16 bit)	Subindex (8 bit)	Object length (8 bit)
----------------	------------------	-----------------------

The object length is encoded as unsigned8: Admitted value: 8h (byte wise mapping).

Object description

INDEX	1A00h
Record name	TxPDO 1 mapping
Object code	8 (array)
Data type index	7 (unsigned32), 5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: 0xh [read only], number of objects
Value range	Unsigned8
Mandatory range	1-8

x = number of the input modules (default mapping)

x = number of the mapping structure (user specific mapping)

Sub - Index	1
Description	Default value: 60'00'01'08h[read only], 1 st assigned object
Value range	Unsigned32
Mandatory range	None

Sub - Index	2
Description	Default value: 60'00'02'08h[read only], 2 nd assigned object
Value range	Unsigned32
Mandatory range	None

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Sub - Index	8
Description	Default value: 60'00'08'08h[read only], 8 th assigned object
Value range	Unsigned32
Mandatory range	None

Objekt 1A01: Mapping TxPDO2

Mapping of transmit PDO 2 (event control analog inputs).

The structure of the registration in sub index 1h-4h is as follows:

MSB

LSB

Index (16 bit)	Sub index (8 bit)	Object length (8 bit)
----------------	-------------------	-----------------------

The object length is encoded as unsigned8. Admitted value: (mapping of 16 bit objects).

Object description

INDEX	1A01h
Record name	TxPDO 2 mapping
Object code	8 (array)
Data type index	7 (unsigned32), 5 (unsigned8)

Value description

Sub - Index	0
Description	Default value 4[read only], number of objects
Value range	Unsigned8
Mandatory range	1-4

Sub - Index	1
Description	Default value: 64'01'01'10h[rad oly], 1 st assigned object
Value range	Unsigned32
Mandatory range	None

Sub - Index	2
Description	Default value: 64'01'02'10h[read only], 2 nd assigned object
Value range	Unsigned32
Mandatory range	None



Sub - Index	4
Description	Default value: 64'01'04'10h[read only], 4 th assigned object
Value range	Unsigned32
Mandatory range	None

Object 1A02: Mapping TxPDO3

Mapping of the transmit PDO 3 (digital inputs). Sub index 0 contains by default the actual length of the PDOs (i.e. the number of digital input modules).

The structure of the registration in sub index 1h-8h is as follows:

MSB

LSB

Index (16 bit)	Sub index (8 bit)	Object length (8 bit)
----------------	-------------------	-----------------------

The object length is encoded as unsigned8. Admitted value: 8h (byte wise mapping)

Object description

INDEX	1A02h
Record name	TxPDO 3 mapping
Object code	8 (array)
Data type index	7 (unsigned32), 5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: 0xh [read only], number of objects
Value range	Unsigned8
Mandatory range	1-8

x = Number of input modules (default mapping)

x = Number of registrations in the mapping structure (user specific mapping)

Sub - Index	1
Description	Default value: 60'00'09'08h[read only], 9 th assigned object
Value range	Unsigned32
Mandatory range	None

Sub - Index	2
Description	Default value: 60'00'0A'08h[read only], 10 th assigned object
Value range	Unsigned32
Mandatory range	None

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Sub - Index	8
Description	Default value: 60'00'10'08h[read only], 16 th assigned object
Value range	Unsigned32
Mandatory range	None

Object 1A03: Mapping TxPDO4

Mapping of the transmit PDO 4 (event controlled analog inputs).

The structure of the registration in sub index 1h-4h is as follows:

MSB

LSB

Index (16 Bit)	Sub index (8 bit)	Object length (8 bit)
----------------	-------------------	-----------------------

The object length is encoded as unsigned8. Admitted value: 10h (mapping of 16 bit objects).

Object description

INDEX	1A03h
Record Name	TxPDO 4 mapping
Object code	8 (array)
Data type index	7 (unsigned32), 5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: 04h[read only], number of the objects
Value range	Unsigned8
Mandatory range	1-4

Sub - Index	1
Description	Default value: 64'01'05'10h[read only], 5 th assigned object
Value range	Unsigned32
Mandatory range	None

Sub - Index	2
Description	Default value: 64'01'06'10h[read only], 6 th assigned object
Value range	Unsigned32
Mandatory range	None



Sub - Index	4
Description	Default value: 64'01'08'10h[read only], 8 th assigned object
Value range	Unsigned32
Mandatory range	None

Object 1A04-9: Mapping TxPDO5-10

Mapping of transmit PDO 5-10 (event controlled analog inputs).

The structure of the registration in sub index 1h-4h is as follows:

MSB

LSB

Index (16 Bit)	Sub index (8 bit)	Object lenght (8 bit)
----------------	-------------------	-----------------------

The object length is encoded as unsigned8. Admitted value: 10h (mapping of 16 bit objects).

Object description

INDEX	1A04 - 1A10h
Record name	TxPDO 5-10 mapping
Object code	8 (array)
Data type index	7 (unsigned32), 5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: 04h[read only], number of objects
Value range	Unsigned8
Mandatory range	1-4

Sub - Index	1
Description	Default value: 64'01'09'10h[read only], 9 th assigned object - 64'01'1D'10h[read only], 29 th assigned object.
Value range	Unsigned32
Mandatory range	None

Sub - Index	2
Description	Default value: 64'01'0A'10h[read only], 10 th assigned object - 64'01'1E'10h[Read Only], 30 th assigned object
Value range	Unsigned32
Mandatory range	None

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↓

Sub - Index	4
Description	Default value: 64'01'0C'10h[read only], 12 th assigned object - 64'01'20'10h[read only], 32 nd assigned object
Value range	Unsigned32
Mandatory range	None

Object 5DFE: Sample time

By writing a value on a sub index the waiting time between two transductions can be adjusted (sample control).

Dabei gilt: $t_{\text{Transductiontime}} = t_{\text{Basistransductiontime}} * \text{value}$

The transduction times (software) are different depending on the modules.

Modules	$t_{\text{BasisTransduction time}}$
AIT 701	20ms
AIT 704	40ms

$t_{\text{Transducer time}}$

Object description

INDEX	5DFEh
Record name	Additional transducer waiting time
Object code	9 (record)
Data type index	5 (unsigned8), 6 (unsigned16)
Length	5

Values description

Sub - Index	0
Description	Default value: 4 [read only], number of the inputs
Value range	Unsigned8
Mandatory range	4

Sub - Index	1
Description	Default value: 0 [read/write], additional waiting time on channel 1
Value range	Unsigned16
Mandatory range	None



Sub - Index	56
Description	Default value: 0 [read/write], additional waiting time on channel 56
Value range	Unsigned16
Mandatory range	None

Object 5DFF: Mean value function

By writing a value > 0 on the sub index the mean value generation is switched on at the corresponding input channel via 5 values. The switching off of the mean value generation will be caused if zero is written on the sub index.

Object description

INDEX	5DFFh
Record name	Mean value formation
Object code	8 (array)
Data type index	5 (unsigned8)
Length	5

Values description

Sub - Index	0
Descriptipm	Default value: 4 [read only], number of inputs
Value range	Unsigned8
Mandatory range	4

Sub - Index	1
Description	Default value: 0 [read/write], set/reset mean value formation on channel 1
Value range	Unsigned8
Mandatory range	0 ... 255



Sub - Index	56
Description	Default value: 0 [read/write], set/reset mean value formation on channel 56
Value range	Unsigned8
Mandatory range	0 ... 255

Mean value formation:

For the generation of the mean value generation five new values are collected each and then the mean value formed via these five new values. The last announced value has no influence on the new value. By the activation of the mean value formation we receive new values only each $x \cdot (t_{\text{basis transducer time}} \cdot 5)$ ms.

Object 5EFF: Additional input filter enable

Indicates at which digital inputs an additional filter time constant of 5ms should be switched on (0 = switched off; 1 = switched on).

Object description

INDEX	5EFFh
Variable name	Filter digital inputs
Object code	8 (array)
Number of elements	8
Data type index	5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: - [read only], number of input modules (blocks of eight) ¹⁾
Value range	Unsigned8
Mandatory range	0 ... 7

Sub - Index	1
Description	Default value: 00h [read/write], filter first input module (inputs 0 ... 7)
Value range	Unsigned8
Mandatory range	0 ... 255

Sub - Index	2
Description	Default value: 00h [read/write], filter second input module (inputs 8 ... 15, if existing)
Value range	Unsigned8
Mandatory range	0 ... 255



Sub - Index	n (Max. 16)
Description	Default value: 00h [read/write], filter of the last input module
Value range	Unsigned8
Mandatory range	0 ... 255

- 1) An input module of 16 bit width corresponds to two input modules, whereas the lower sub index refers to the inputs 0 ... 7 and the higher sub index the inputs 8 ... 15

Object 5FF0: Module type code

Each Selectron module type (depending of input, output, driver performance) has an own code, whereby it can be recognized if the correct module type had been connected.

The module type code is encoded as Unsigned8 (codes see appendix).

Object description

INDEX	5FF0h
Array name	Module type code
Object code	9 (record)
Data type index	5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: - [read only], number of sub indices
Value range	Unsigned8
Mandatory range	None

Sub - Index	1
Description	xxh [read only], code node modules
Value range	Unsigned8
Mandatory range	None

Sub - Index	2
Description	xxh [read only], code 1 expansion modules
Value range	Unsigned8
Mandatory range	None



Sub - Index	8
Description	xxh [read only], code 7 expansion modules
Value range	Unsigned8
Mandatory range	None

Object 5FFB: Reset input analog function

By writing whatever value on a sub index, all new configured functions will be reset, at the corresponding analog input modules (default condition).

Object description

INDEX	5FFBh
Array name	Cancellation of all programmed functions.
Objekt code	8 (array)
Data type index	5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: - [read only], Number of the analog input modules
Value range	Unsigned8
Mandatory range	4

Sub - Index	1
Description	Default value: - [write only], => reset of the programmed functions of the first analog input modules
Values description	Unsigned8
Mandatory range	0 ... 255



Sub - Index	n
Description	Default value: - [write only], => reset of the programmed function of the n analog input modules.
Value range	Unsigned8
Mandatory range	0 ... 255

Object 5FFE: Reset output error mode

By writing whatever value on this object the outputs will be set from the error condition into the standard mode.

Object description

INDEX	5FFEh
Variable name	Set outputs in standard mode
Object code	7 (var)
Data type index	5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: - [write only].
Value range	Unsigned8
Mandatory range	None

Object 6000: Read input byte

Reads 8 inputs as one byte.

Object description

INDEX	6000h
Variable name	Input byte
Object code	8 (array)
Data type index	5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: - [read only], number of the input modules (blocks of eight)
Value range	Unsigned8
Mandatory range	0 ... 7

Sub - Index	1
Description	Default value: - [read only], condition first input module (inputs 0 ... 7)
Value range	Unsigned8
Mandatory range	0 ... 255

Sub - Index	2
Description	Default value: - [read only], condition second input module (inputs 8 ... 15, if existing)
Value range	Unsigned8
Mandatory range	0 ... 255



Sub - Index	n (Max. 16)
Description	Default value: - [read only], condition of the n. input module (inputs $(n-1)*8 \dots (n*8)-1$)
Value range	Unsigned8
Mandatory range	0 ... 255

- 1) An input module of 16 bits width corresponds to two input modules whereas the lower sub index refers to the inputs 0 ... 7 and the higher sub index the inputs 8 ... 15.

Object 6005: Global interrupt enable digital

In the event controlled mode the module sends messages on input changes in dependence of the interrupt as well as the transmission manner. Through object 6005h this interrupt behaviour can be globally enabled resp. disabled, without changing the interrupt masks.

Global Interrupt Enable > 0 => Interrupt behaviour switched on.

Global Interrupt Enable = 0 => Interrupt behaviour switched off.

Object description

INDEX	6005h
Variable name	Global interrupt enable digital
Object code	7 (var)
Data type index	5 (unsigned8)

Values description

Description	Default value: 1 [read/write].
Value range	Unsigned8
Mandatory range	0 .. 1

Object 6200: Write output byte

Writes a data byte to a group of 8 outputs

Object description

INDEX	6200h
Variable name	Write output byte
Object code	8 (array)
Data type index	5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: - [read only], number of the output modules (blocks of eight) ¹⁾
Value range	Unsigned8
Mandatory range	0 ... 7

Sub - Index	1
Description	Reset value: 00h [read/write], condition of the first output module (Output 0 ... 7)
Value range	Unsigned8
Mandatory range	0 ... 255

Sub - Index	2
Description	Reset value: 00h [read/write], condition of the second output module (outputs 8 ... 15, if existing)
Value range	Unsigned8
Mandatory range	0 ... 255



Sub - Index	n (Max. 16)
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Description	Default value: - [read/write], condition of the n. output module (outputs $(n-1)*8 \dots (n*8)-1$)
Value range	Unsigned8
Mandatory range	0 ... 255

- 1) An output module of 16 bit width corresponds to two output modules whereas the lower sub index refers to the outputs 0 ... 7 and the higher sub index the outputs 8 ... 15.

Object 6206: Enable output error mode

Indicates, whether a digital output is set to a pre-defined condition in case of an error or whether the output ‚freezes‘ in case of an error.

1 = Has to take the pre-defined condition on an error detection.

0 = Output ‚freezes‘ in case of an error.

Object description

INDEX	6206h
Variable name	Output behaviour in case of error
Object code	8 (array)
Data type index	5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: - [read only], number of output modules (blocks of eight) ¹⁾
Value range	Unsigned8
Mandatory range	0 ... 7

Sub - Index	1
Description	Reset value: FFh [read/write], behaviour of the outputs on the first module (outputs 0 ... 7)
Value range	Unsigned8
Mandatory range	0 ... 255

Sub - Index	2
Description	Reset value: FFh [read/write], behaviour of the outputs on the second module (outputs 8 ... 15, if existing)
Value range	Unsigned8
Mandatory range	0 ... 255

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Sub - Index	n (max. 16)
Description	Reset value: FFh [read/write], behaviour of the outputs on n module (outputs (n-1)*16 ... (n*16)-1)
Value range	Unsigned8
Mandatory range	0 ... 255

- ¹⁾ An output module of 16 bit width corresponds to two output modules, whereas the lower sub index refers to the outputs 0 ... 7 and the higher sub index the outputs 8 ... 15.

Object 6207: Output error state

Indicates the pre-defined condition of the digital output, in case the detection of abnormal behaviour.

0 = Output goes on '0' in case of an error, if enabled (default) in the object 6206

1 = Output goes on '1' in case of an error, if enabled in the object 6206.

Object description

INDEX	6207h
Variable name	Output condition in case of error
Object code	8 (array)
Data type index	5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: - [read only], number output modules (blocks of eight) ¹⁾
Value range	Unsigned8
Mandatory range	0 ... 8

Sub - Index	1
Description	Reset value: 00h [read/write], condition of the outputs on first module (outputs 0 ... 7)
Value range	Unsigned8
Mandatory range	0 ... 255

Sub - Index	2
Description	Reset value: 00h [read/write], condition of the outputs on second module (outputs 8 ... 15, if existing)
Value range	Unsigned8
Mandatory range	0 ... 255

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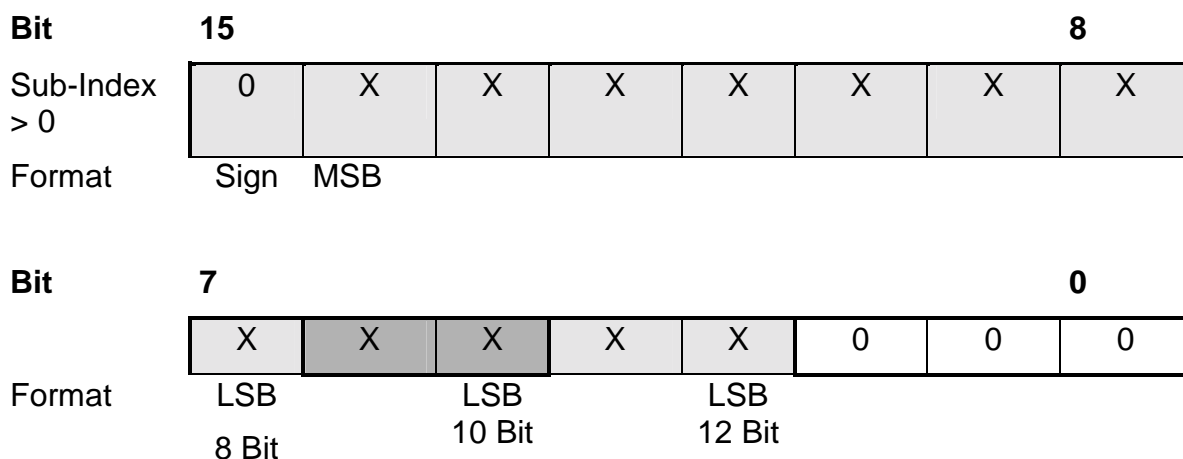
Sub - Index	n (max. 16)
Description	Reset value: 00h [read/write], condition of the outputs on n. module (outputs (n-1)*16 ... (n*16)-1)
Value range	Unsigned8
Mandatory range	0 ... 255

- 1) An output module of 16 bit width corresponds to two output modules, whereas the lower sub index refers to the outputs 0 ... 7 and the higher sub index the outputs 8 to 15.

Object 6401: Read standard analog input

Presents values of the analog inputs (0...10V) resp. 0...20mA) and reproduces them left sided pre-signed.

Presentation in standard format (as per CiA-DS 401):



MSB: Most significant Bit

LSB: Least significant Bit

X: Depending of the changed value (10/12bit)

Object description

INDEX	6401h
Record name	Standard analog input value
Object code	8 (array)
Data type index	5 (unsigned8), 6 (unsigned16, left sided)

Values description

Sub - Index	0
Description	Default value: - [read only], number of input channels
Value range	Unsigned8
Mandatory value	4

Sub - Index	1
Description	Default value: - [read only], reads value of channel 1 (left sided)
Value range	Unsigned16
Mandatory range	None

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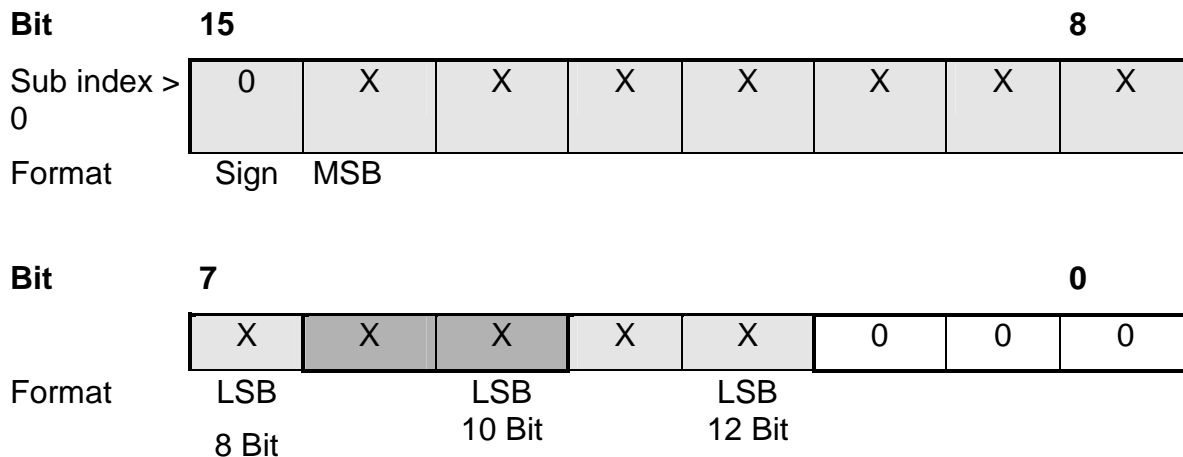
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Sub - Index	32
Description	Default value: - [read only], reads value of channel 32 (left sided)
Value range	Unsigned16
Mandatory range	None

Object 6411: Write standard analog output

Writes output value left sided, pre-signed.

Presentation in standard format (as per CiA-DS 401):



MSB: Most significant bit

LSB: Least significant bit

X: depending of the changed value

Object description

INDEX	6411h
Record name	Writes output values plus minus signed
Object code	8 (array)
Data type index	5 (unsigned8), 6 (unsigned16, left sided)

Values description

Sub - Index	0
Description	Default value: - [read only], number of the output channels
Value range	Unsigned8
Mandatory range	0 ... 14

Sub - Index	1
Description	Default value: 0 [read/write], output value of channel 1 (left sided)
Value range	Integer16
Mandatory range	none

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Sub - Index	14
Description	Default value: 0 [read/write on process output], output value of channel 14 (left sided)
Value range	Integer16
Mandatory range	none

Object 6423: Global interrupt enable analog

In the event controlled mode the modules send messages on input changes, depending on the adjusted behaviour in the object 6426h (delta function).

Through object 6423h this interrupt behaviour can be globally enabled respectively disabled, without changing the interrupt masks.

Global Interrupt Enable > 0 => Interrupt behaviour switched on.

Global Interrupt Enable = 0 => Interrupt behaviour switched off.

Object description

INDEX	6423h
Variable name	Global interrupt enable analog
Object code	7 (Var)
Data type index	5 (unsigned8)

Values description

Description	Default value: 0 [read/write].
Value range	Unsigned8
Mandatory range	0 .. 1

Object 6426: Input interrupt delta

Releases an interrupt, if an analog input has changed more than the indicated value since the last interrupt, inasmuch as this functionality is switched on. Value > 0 signifies function switched on, value = 0 Function switched off. Only 8 bits are evaluated.

Attention: Function is only active, when interrupts had been activated (object 5423h).
The activation of the mean value formation excludes the activating of the delta function.

Presentation	MSB				LSB
Unsigned32	reserved	reserved	reserved	Delta	

Example:

Delta value	1	100	200
Amendment in %	0,1	10	20

Object description

INDEX	6426h
Record Name	Defined input change (delta interrupt)
Object code	8 (array)
Data type index	5 (unsigned8), 7 (unsigned32)

Values Description

Sub - Index	0
Description	Default value: - [read only], number of input channels
Value range	Unsigned8
Mandatory range	0 ... 32

Sub - Index	1
Description	Default value: 00h [read/write], necessary delta of input 1
Value range	Unsigned32
Mandatory range	0 ... FFh

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Sub - Index	32
Description	Default value: 00h [read/write], necessary delta of input 32
Value range	Unsigned32
Mandatory range	0 ... FFh

Object 6443: Enable Output Error Mode

Indicates whether an analog output is set to a pre-defined error value in case of error. Error value see object 6444h.

0 => Output value will be 'frozen' in case of errors

> 0 => Has to take the pre-defined condition in case of error.

Object description

INDEX	6443h
Record name	Output behaviour in case of error
Object code	8 (array)
Data type index	5 (unsigned8)

Values description

Sub - Index	0
Description	Default value: - [read only], number of output channels
Value range	Unsigned8
Mandatory range	0 ... 14



Sub - Index	1
Description	Default value 1h [read/write], behaviour output 1
Value range	Unsigned
Mandatory range	None

Sub - Index	14
Description	Default value: 01h [read/write], behaviour output 14
Value range	Unsigned8
Mandatory range	None

Object 6444: Output error value

Indicates pre-defined error value of the output (in combination with object 6443)

The format of the data corresponds to the standard value (object 6411).

Object description

INDEX	6444h
Record name	Output condition in case of error
Object code	8 (array)
Data type index	5 (unsigned8), 7 (unsigned32)

Values description

Sub - Index	0
Description	Default value: - [read only], number of the output channels
Value range	Unsigned8
Mandatory range	0 ... 14

Sub - Index	1
Description	Default value: 00'00h [read/write], condition output 1 (0V)
Value range	Unsigned32
Mandatory range	None

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Sub - Index	14
Description	Default value: 00'00h [read/write], condition output 14 (0V)
Value range	Unsigned32
Mandatory range	None

Appendix

Module type code

Short description	Article number	Encoding
DDC 711	412.0035	D1h
DIT 701	412.0004	81h
DIT 702	412.0005	82h
DIT 703	412.0006	83h
DOT 701	412.0010	01h
DOT 702	412.0011	02h
DOT 703	412.0012	03h
AIT 701		B8h
AIT 702		A8h
AIT 703		A9h
AIT 704		AAh
AOT 701		38h
AOT 704		29h

Table: module type code