CiA Draft Standard 401

CANopen

Device Profile for Generic I/O Modules

Version 2.0

Date: 20 December 1999

Errata Sheet for CiA DS-401 V 2.0 (Date: 2000-05-22)
CANopen Device Profile for Generic I/O Modules

Chapter	Page	Action	Text
5.2	9	Delete	· Stop_Remote_Node indication
5.2	9	Add	**Object 1029h: Error Behaviour** This object specifies to which state an I/O module shall be set, when a communication error, output error or input error is detected. 0 = pre-operational (only if current state is operational) 1 = no state change 2 = stopped In addition to the specification in /2/ the following Sub-indexes may be implemented. Sub-Index: 2h Description: Output Error Access: rw Entry Category: Optional PDO Mapping: No Value Range: 0h to 2h Default Value: 0h Sub-Index: 3h Description: Input Error Access: rw Entry Category: Optional PDO Mapping: No Value Range: 0h to 2h Default Value: 0h Note: If the object 1029h is not implemented the device shall be set into pre-operational state in the case a communication error is detected.
7.1.2	17	Change	In the figure the object 6007h shall be the interrupt mask ***low-to-high*** and the object 6008h shall be the interrupt mask ***high-to-low***.
7.1.2	18	Change	The data type of the objects 6120h, 6122h, and 6123h is ***Unsigned32***
7.1.4	21	Change	In the figure the operator shall be '≥'.
8.1.6	29	Change	Sub-Index FEh value range: ***Unsigned8***
8.2.5	52	Change	***0 = Output shall be set to '0' in case of fault, if Object 6206h is enabled*** ***1 = Output shall be set to '1' in case of fault, if Object 6206h is enabled***
8.2.6	53	Change	***1 = Output shall be set to the received output value***
8.2.10	57	Change	***If corresponding Object (6250h .. 6257h) is enabled***
8.3.2	70	Change	Sub-Index 2h .. 1Ch Access: ***ro***
8.4.4	77	Change	This object shall write the ***Float*** value to the output channel 'n'.
8.5.2	80	Change	Default values of Sub-indexes 1h to FEh shall be ***7h***
8.5.3	81	Change	Type errors: ***determine*** - ***shall***
8.5.3	81	Delete	The duplicated Default value in Sub-index 0h table
8.5.5	83	Add	when the analogue input ***is equal or*** rises above the given value.
8.5.16	94	Change	Default values of Sub-indexes 1h to FEh shall be ***1.0***
8.5.19	97	Change	Default values of Sub-indexes 1h to FEh shall be ***1***
8.6.3	100	Change	Default values of Sub-indexes 1h to FEh shall be ***1.0***
8.6.4	101	Add	or a Remote_stop_node_indication.
8.6.10	105	Change	Default values of Sub-indexes 1h to FEh shall be ***1***
8.6.11	106	Delete	The object 6450h is substituted by the object 1029h.

Table of contents

1 Scope

This document represents the CANopen device profiles for generic digital and analogue input and output modules. All these devices use communication techniques, which conform to those described in the CANopen Communication Profile (CiA Draft Standard DS-301). In addition, programmable I/O devices may use communication techniques, which conform to those described in the Framework for programmable CANopen Devices (CiA Draft Standard Proposal DSP-302). These specifications should be consulted in parallel to this device profile specification.

In the appendices, some specific I/O devices are defined.

2 Normative references

/1/: IS 11898, Road vehicles – Interchange of digital information – Controller area network (CAN), November 1993.

/2/: CiA DS-301 V4.0, CANopen application layer and communication profile, June 1999.

/3/ CiA DRP-303-2 V1.0, Representation of SI Units and Prefixes, July 1999.

/4/ CiA DSP-302 V2.0, Framework for programmable CANopen devices, November 1998

3 Definitions, acronyms and abbreviations

CAN

Controller Area Network. Data link layer protocol for serial communication as specified in ISO 11898-1 (1999).

CiA

CAN in Automation international users and manufacturers group e.V. Non-profit association promoting Controller Area Network (CAN).

COB

Communication Object, which is made of one or more CAN frames. Any information transmitted via CANopen has to be mapped into COBs.

COB-ID

COB-Identifier. Identifies a COB uniquely in a CAN network. The identifier determines the priority of that COB in the data link layer, too.

SDO

Service Data Object. Peer-to-peer communication with access to the Object Dictionary of a CANopen device.

I/O

Input and output

RPDO

Receive Process Data Object. Communication object of a device, which contains output data.

SDO

Service Data Object. Peer-to-peer communication with access to the Object Dictionary of a CANopen device.

TPDO

Transmit Process Data Object. Communication object of a device, which contains input data.

4 Operating principle

4.1 Introduction

The purpose of I/O modules is to connect sensors and actuators to CANopen networks. In operational mode, input data can be transmitted from the inputs via TPDOs (Transmit Process Data Object). By default, the PDO transmission is triggered by an interrupt (event). Optionally PDOs may be transmitted synchronously or remotely requested. In addition, it is possible to read input data via SDO (Service Data Object) communication from another module, or to write data via SDO to the network, if the module provides SDO client functionality.

Output data can be received via RPDO (Receive Process Data Object) by those I/O modules that have output capabilities. Output data also can be received via SDO communication services.

However, the main purpose of SDO communication is to configure an I/O module. The module can receive via SDO I/O configuration data, parameters for converting data into meaningful measurements and so on. I/O modules compliant with this device profile use pre-defined PDOs. The default mapping of Application Objects into Transmit PDOs (TPDO) resp. Receive PDOs (RPDO) may be changed via SDO, if variable PDO mapping is supported. An I/O module may provide optionally Sync Producer/Consumer, Time-Stamp Producer/Consumer and Emergency Producer/Consumer functionality. For new designs, it is highly recommended to support Heartbeat functionality.

5 Error handling

5.1 Principle

Emergency Messages shall be triggered by internal errors in the device and they are assigned the highest possible priority to ensure that they get access to the bus without latency. By default, the Emergency Messages shall contain the error field with pre-defined error numbers and additional information.

5.2 Error behaviour

If a serious device failure is detected the module shall enter by default autonomously the pre-operational state. If object 67FEh is implemented, the device can be configured to enter alternatively the stopped state or remain in the current state in case of an device failure. Device failures shall include the following communication errors:

- Bus-off conditions of the CAN interface
- Life guarding event with the state ‘occurred’
- Heartbeat event with state ‘occurred’
- Stop_Remote_Node indication

Serious device errors also can be caused by device internal failures.

5.3 Additional error code meanings

Error Code	Meaning
2310h	Current at outputs to high (overload)
2320h	Short circuit at outputs
2330h	Load dump at outputs
3110h	Input voltage to high
3120h	Input voltage to low
3210h	Internal voltage to high
3220h	Internal voltage to low
3310h	Output voltage to high
3320h	Output voltage to low

6 Predefinitions

6.1 Introduction

If a device supports a specific type of I/O functionality (analogue/digital I/O) it shall support the related default PDOs. However, the module can support additional manufacturer-specific PDOs. If variable PDO mapping is supported the PDO default settings can be changed by means of configuration.

There shall be up to 4 enabled TPDOs and up to 4 enabled RPDOs with default mappings. If a module did not support a specific I/O function, the related default PDOs shall remain unused. If a device supports more then the default digital input or output channels, the related analogue default PDOs shall remain unused and the additional digital I/Os can use additional PDOs. This shall be the same for additional analogue channels.

All TPDOs with transmission type 255 shall be transmitted when entering the OPERATIONAL state.

6.2 Pre-defined communication objects

Modules compliant with this device profile shall come with default values for some communication objects (1000h to 1FFFh), which are not specified in all details in /2/.

6.2.1 Object 1000h: Device Type

The object at index 1000h describes the type of device and its functionality. For multiple device modules the Additional Information parameter shall contain FFFFh. In this case, the object 67FFh shall be implemented.

Additional Information		General Information
Specific Functionality	I/O Functionality	Device Profile Number

31 24 23 16 15 8 7 0

MSB LSB

General Information
Device Profile Number: 401d

Additional Information
1 = function is implemented
0 = function is not implemented

I/O Functionality:
- 16th Bit: Digital input
- 17th Bit: Digital output
- 18th Bit: Analogue input
- 19th Bit: Analogue output
- Rest: Reserved

Any combination of digital/analogue, inputs and outputs is allowed.

Specific Functionality:

Code	Function	Reference
0h	No specific function	-
1h	Joystick	Appendix A
2h .. FFh	Reserved	-

6.2.2 Object 1001h: Error Register

The device-specific bits in the status word are reserved for future use.

6.2.3 1st RPDO mapping (digital outputs)

This RPDO receives asynchronously the values of maximum 64 digital outputs to I/O module. The default transmission type shall be 255. The default values of the mapped outputs are described in the Default State objects. ***Note:*** After power-on and application reset these default objects are valid.

Index	Sub-Index	Comment	Default Value
1600h	0h	number of mapped objects	No
	1h	1st object to be mapped	6200 01 08h

	2h	2nd object to be mapped	6200 02 08h
	3h	3th object to be mapped	6200 03 08h
	4h	4th object to be mapped	6200 04 08h
	5h	5th object to be mapped	6200 05 08h
	6h	6th object to be mapped	6200 06 08h
	7h	7th object to be mapped	6200 07 08h
	8h	8th object to be mapped	6200 08 08h

The number of mapped objects into the PDO depends on the hardware.

6.2.4 1st TPDO mapping (digital inputs)

This TPDO transmits event-driven the values of maximum 64 digital inputs. The default transmission type shall be 255; the default values for inhibit and event timer are 0. If one digital input changes its value, this PDO shall be transmitted immediately. If an interrupt mask is enabled, the PDO shall be transmitted only if the interrupt condition is fulfilled.

Index	Sub-Index	Comment	Default Value
1A00h	0h	number of mapped objects	No
	1h	1st object to be mapped	6000 01 08h
	2h	2nd object to be mapped	6000 02 08h
	3h	3th object to be mapped	6000 03 08h
	4h	4th object to be mapped	6000 04 08h
	5h	5th object to be mapped	6000 05 08h
	6h	6th object to be mapped	6000 06 08h
	7h	7th object to be mapped	6000 07 08h
	8h	8th object to be mapped	6000 08 08h

The number of mapped objects into the PDO depends on the hardware.

6.2.5 2nd RPDO mapping (analogue outputs)

This RPDO receives asynchronously the 16-bit values of maximum 4 analogue outputs to the module. The default transmission type shall be 255. The default values of the mapped outputs are described in the Default State objects. ***Note:*** After power-on and application reset these default objects are valid.

Index	Sub-Index	Comment	Default Value
1601h	0h	number of mapped objects	No
	1h	1st object to be mapped	6411 01 10h
	2h	2nd object to be mapped	6411 02 10h
	3h	3rd object to be mapped	6411 03 10h
	4h	4th object to be mapped	6411 04 10h

The number of mapped objects into the PDO depends on the hardware.

6.2.6 2nd TPDO mapping (analogue inputs)

This TPDO transmits event-driven the 16-bit values of maximum 4 analogue inputs. The default transmission type shall be 255; the default values for inhibit and event timer are 0. By default the interrupt source (object 6423h) is disabled. If one analogue input changes its value and object 6423h is enabled, the PDO shall be transmitted immediately. If an analogue interrupt condition is enabled, the PDO shall be transmitted only if this interrupt condition is fulfilled. If more than one interrupt condition is enabled, the PDO shall be transmitted if one of these conditions is fulfilled.

Index	Sub-Index	Comment	Default Value
1A01h	0h	number of mapped objects	No
	1h	1st object to be mapped	6401 01 10h
	2h	2nd object to be mapped	6401 02 10h
	3h	3rd object to be mapped	6401 03 10h
	4h	4th object to be mapped	6401 04 10h

The number of mapped objects into the PDO depends on the hardware.

6.2.7 3rd RPDO mapping (analogue outputs)

This RPDO receives asynchronously the 16-bit values of maximum 4 analogue outputs to the module. The default transmission type shall be 255.

Index	Sub-Index	Comment	Default Value
1602h	0h	number of mapped objects	No
	1h	1st object to be mapped	6411 05 10h
	2h	2nd object to be mapped	6411 06 10h
	3h	3rd object to be mapped	6411 07 10h
	4h	4th object to be mapped	6411 08 10h

The number of mapped objects into the PDO depends on the hardware.

6.2.8 3rd TPDO mapping (analogue inputs)

This TPDO transmits event-driven the 16-bit values of maximum 4 analogue inputs. The default transmission type shall be 255. By default the interrupt source (object 6423h) is disabled. If one analogue input changes its value and object 6423h is enabled, the PDO shall be transmitted immediately. If an analogue interrupt condition is enabled, the PDO shall be transmitted only if this interrupt condition is fulfilled. If more than one interrupt condition is enabled, the PDO shall be transmitted if one of these conditions is fulfilled.

Index	Sub-Index	Comment	Default Value
1A02h	0h	number of mapped objects	No
	1h	1st object to be mapped	6401 05 10h
	2h	2nd object to be mapped	6401 06 10h
	3h	3rd object to be mapped	6401 07 10h
	4h	4th object to be mapped	6401 08 10h

The number of mapped objects into the PDO depends on the hardware.

6.2.9 4th RPDO mapping (analogue outputs)

This RPDO receives asynchronously the 16-bit values of maximum 4 analogue outputs to the module. The default transmission type shall be 255.

Index	Sub-Index	Comment	Default Value
1603h	0h	number of mapped objects	No
	1h	1st object to be mapped	6411 09 10h
	2h	2nd object to be mapped	6411 0A 10h
	3h	3rd object to be mapped	6411 0B 10h
	4h	4th object to be mapped	6411 0C 10h

The number of mapped objects into the PDO depends on the hardware.

6.2.10 4th TPDO mapping (analogue inputs)

This TPDO transmits event-driven the 16-bit values of maximum 4 analogue inputs. The default transmission type shall be 255. By default the interrupt source (object 6423h) is disabled. If one analogue input changes its value and object 6423h is enabled, the PDO shall be transmitted immediately. If an analogue interrupt condition is enabled, the PDO shall be transmitted only if this interrupt condition is fulfilled. If more than one interrupt condition is enabled, the PDO shall be transmitted if one of these conditions is fulfilled.

Index	Sub-Index	Comment	Default Value
1A03h	0h	number of mapped objects	No
	1h	1st object to be mapped	6401 09 10h
	2h	2nd object to be mapped	6401 0A 10h
	3h	3rd object to be mapped	6401 0B 10h
	4h	4th object to be mapped	6401 0C 10h

The number of mapped objects into the PDO depends on the hardware.

7 Object dictionary

Each I/O module compliant with this device profile shall share the CANopen Object Dictionary entries from 6000h to 67FFh. These entries are common to all I/O modules and each module only implements those objects relevant to its functions. Object Description and Entry Description are specified in /2/.

7.1 Input and output function principles

7.1.1 Object dictionary for the digital input and output modules

Command sequence
It is possible to switch the modules output or input polarity. This feature is the one which is nearest to the sensors and actuators, e.g. if the polarity of an output is enabled and the output is set to high, then the output level is '0'.

The following table shows the profile command sequence.

Commands	Polarity Switch	Process
Read Input	enabled: 0 change to 1	Sensor or Actuator
Write Output	1 change to 0	
Interrupt Mask	disabled: 0 remains 0	
Error Mode	1 remains 1	

Example of the polarity with a digital output:

Access to 1-, 8-, 16- and 32-points
There are different objects to allow 1-bit, 8-bit, 16-bit or 32-bit access to digital inputs or outputs (e.g. definition of polarity). If these objects define the same function, they access single database. Example: If the Object 6002h (Change Polarity Input 8-Bit) Subindex 1h has the value AAh and Subindex 2h the value 0Fh, Object 6102 (Change Polarity Input 16-Bit) Subindex 1h will have the value 0FAAh.

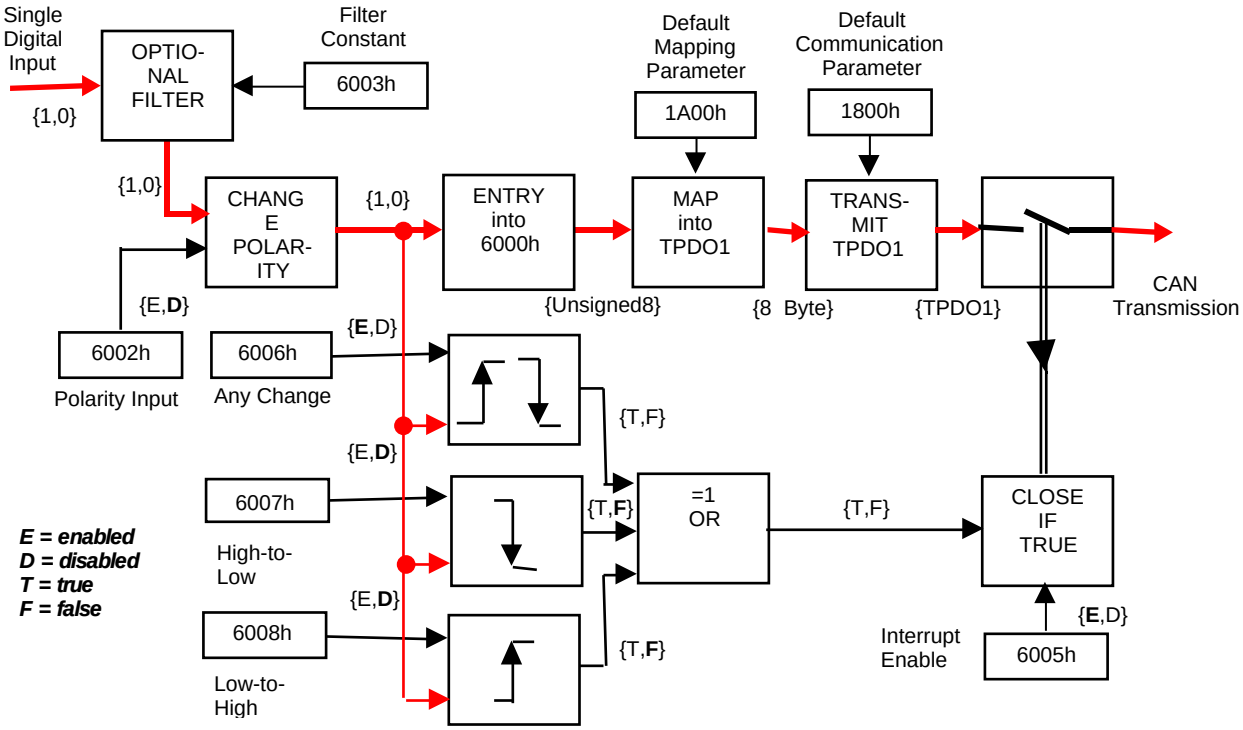
7.1.2 Digital input module

There are different access methods defined. By default, 8-bit access shall be supported; the other access methods are optional. The tables list the digital input objects.

The following table lists the objects for 8-bit access.

Index	Object Code (OC)	Name	Data Type	Category
6000h	Array	Read Input 8-bit	Unsigned8	C: DI
6001h	-	Reserved	-	-
6002h	Array	Polarity Input 8-bit	Unsigned8	O
6003h	Array	Filter Constant Input 8-bit	Unsigned8	O
6004h	-	Reserved	-	-
6005h	Var	Global Interrupt Enable Digital	Boolean	O
6006h	Array	Interrupt Mask Any Change 8-bit	Unsigned8	O
6007h	Array	Interrupt Mask Low-to-High 8-bit	Unsigned8	O
6008h	Array	Interrupt Mask High-to-Low 8-bit	Unsigned8	O
6009h	-	Reserved	-	-
to				
601Eh	-	Reserved	-	-

The figure shows the relationship between the digital input objects for an 8-bit access.



The following table lists the objects for 1-bit, 16-bit and 32-bit access.

Index	OC	Name	Data Type	Category
601Fh	-	Reserved	-	-
6020h	Array	Read Input Bit 1 to 128	Boolean	O
		to		
6027h	Array	Read Input Bit 897 to 1024	Boolean	O
6028h	-	Reserved	-	-
		to		
602Fh	-	Reserved	-	-
6030h	Array	Polarity Input Bit 1 to 128	Boolean	O
		to		
6037h	Array	Polarity Input Bit 897 to 1024	Boolean	O
6038h	Array	Filter Constant Input Bit 1 to 128	Boolean	O
		to		
6045h	Array	Filter Constant Input Bit 897 to 1024	Boolean	O
604Fh	-	Reserved	-	-
6050h	Array	Interrupt Mask Input Bit 1 to 128 Any Change	Boolean	O
		to		
6057h	Array	Interrupt Mask Input Bit 897 to 1024 Any Change	Boolean	O
6058h	-	Reserved	-	-
		to		
605Fh	-	Reserved	-	-
6060h	Array	Interrupt Mask Input Bit 1 to 128 Low-to-High	Boolean	O
		to		
6067h	Array	Interrupt Mask Input Bit 897 to 1024 Low-to-High	Boolean	O
6068h	-	Reserved	-	-
		to		
606Fh	-	Reserved	-	-
6070h	Array	Interrupt Mask Input Bit 1 to 128 High-to-Low	Boolean	O
		to		
6077h	Array	Interrupt Mask Input Bit 897 to 1024 High-to-Low	Boolean	O
6078h	-	Reserved	-	-
		to		
60FFh	-	Reserved	-	-
6100h	Array	Read Input 16-Bit	Unsigned16	O
6101h	-	Reserved	-	-
6102h	Array	Polarity Input 16-Bit	Unsigned16	O
6103h	Array	Filter Constant Input 16-Bit	Unsigned16	O
6104h	-	Reserved	-	-
6105h	-	Reserved	-	-
6106h	Array	Interrupt Mask Input 16-Bit Any Change	Unsigned16	O
6107h	Array	Interrupt Mask Input 16-Bit Low-to-High	Unsigned16	O
6108h	Array	Interrupt Mask Input 16-Bit High-to–Low	Unsigned16	O
6109h	-	Reserved	-	-
		to		
611Fh	-	Reserved	-	-
6120h	Array	Read Input 32-Bit	Unsigned16	O
6121h	-	Reserved	-	-
6122h	Array	Polarity Input 32-Bit	Unsigned16	O
6123h	Array	Filter Constant Input 32-Bit	Unsigned16	-
6124h	-	Reserved	-	-
6125h	-	Reserved	-	-
6126h	Array	Interrupt Mask Input 32-Bit Any Change	Unsigned32	O
6127h	Array	Interrupt Mask Input 32-Bit Low-to-High	Unsigned32	O
6128h	Array	Interrupt Mask Input 32-Bit High-to-Low	Unsigned32	O
6129h	-	Reserved	-	-
		to		
61FFh	-	Reserved	-	-

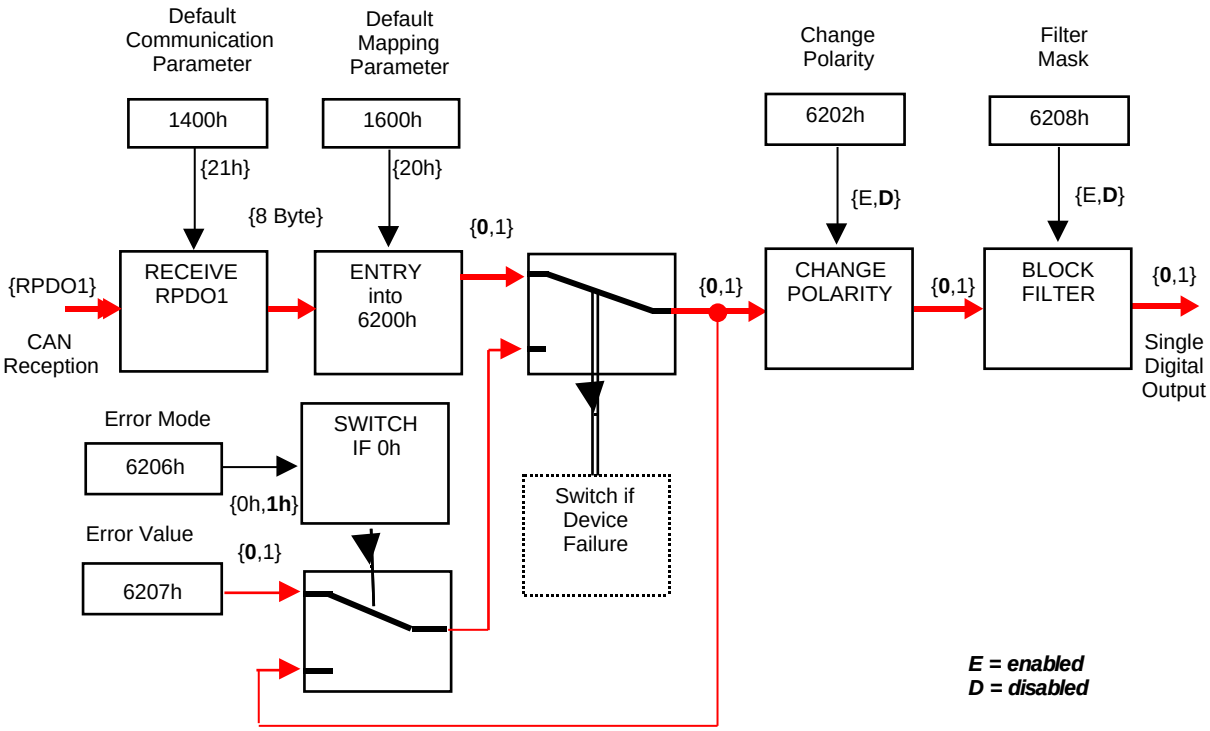
7.1.3 Digital output module

There are different access methods defined. By default, 8-bit access shall be supported; the other access methods are optional. The tables list the digital output objects.

The following table lists the objects for 8-bit access.

Index	Object Code (OC)	Name	Data Type	Category
6200h	Array	Write Output 8-Bit	Unsigned8	C: DO
6201h	-	Reserved	-	-
6202h	Array	Change Polarity Output 8-Bit	Unsigned8	O
6203h		Reserved	-	-
to				
6205h	-	Reserved	-	-
6206h	Array	Error Mode Output 8-Bit	Unsigned8	O
6207h	Array	Error State Output 8-Bit	Unsigned8	O
6208h	Array	Filter Constant Output 8-Bit	Unsigned8	O
6209h	-	Reserved	-	-
to				
621Eh	-	Reserved	-	-

The figure shows the relationship between the digital output objects for an 8-bit access.



The following table lists the objects for 1-, 16- and 32-Bit access.

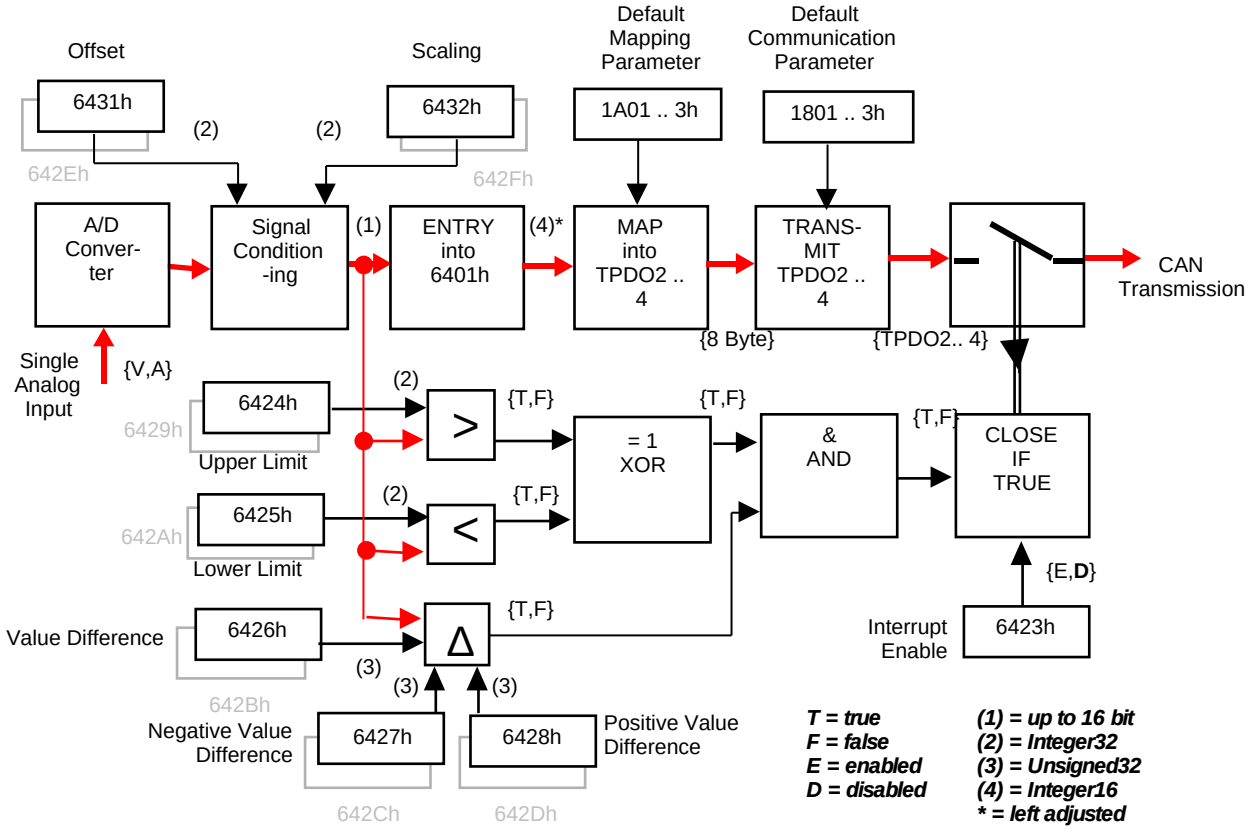
Index	OC	Name	Data Type	Category
621Fh	-	Reserved	-	
6220h	Array	Write Output Bit 1 to 128	Boolean	O
to				
6227h	Array	Write Output Bit 897 to 1024	Boolean	O
6228h	-	Reserved	-	-
to				
623Fh	-	Reserved	-	-
6240h	Array	Change Polarity Output Bit 1 to 128	Boolean	O
to				
6247h	Array	Change Polarity Output Bit 897 to 1024	Boolean	O
6248h	-	Reserved	-	-
to				
624Fh	-	Reserved	-	-
6250h	Array	Error Mode Output Bit 1 to 128	Boolean	O
to				
6257h	Array	Default Mode Output Bit 897 to 1024	Boolean	O
6258h	-	reserved	-	-
to				
625Fh	-	reserved	-	-
6260h	Array	Error Value Output Bit 1 to 128	Boolean	O
to				
6267h	Array	Error Value Output Bit 897 to 1024	Boolean	O
6268h	-	Reserved	-	-
to				
626Fh	-	Reserved	-	-
6270h	Array	Filter Constant Output Bit 1 to 128	Boolean	O
to				
6277h	Array	Filter Constant Output Bit 897 to 1024	Boolean	O
6278h	-	Reserved	-	-
to				
62FFh	-	Reserved	-	-
6300h	Array	Write Output 16-Bit	Unsigned16	O
6301h	-	Reserved	-	-
6302h	Array	Change Polarity Output 16-Bit	Unsigned16	O
6303h	-	Reserved	-	-
to				
6305h	-	Reserved	-	-
6306h	Array	Error Mode Output 16-Bit	Unsigned16	O
6307h	Array	Error Value Output 16-Bit	Unsigned16	O
6308h	Array	Filter Constant Output 16-Bit	Unsigned16	O
6309h	-	Reserved	-	-
to				
631Fh	-	Reserved	-	-
6320h	Array	Write Output 32-Bit	Unsigned32	O
6321h	-	Reserved	-	-
6322h	Array	Change Polarity Output 32-Bit	Unsigned32	O
6323h	-	Reserved	-	-
to				
6325h	-	Reserved	-	-
6326h	Array	Error Mode Output 32-Bit	Unsigned32	O
6327h	Array	Error State Output 32-Bit	Unsigned32	O
6328h	Array	Filter Constant Output 32-Bit	Unsigned32	O
6329h	-	Reserved	-	-
to				
63FFh	-	Reserved	-	-

7.1.4 Analogue input module

There are different access methods defined. By default, 16-bit access shall be supported; the other access methods are optional.

Index	Object Code	Name	Data Type	Category
6400h	Array	Read Analogue Input 8-Bit	Integer8	O
6401h	Array	Read Analogue Input 16-Bit	Integer16	C: AI
6402h	Array	Read Analogue Input 32-Bit	Integer32	O
6403h	Array	Read Analogue Input Float	Float	O
6404h	Array	Read Manufacturer-specific Analogue Input	specific	O

The figure shows the relationship between the analogue input objects for an Integer16 access.

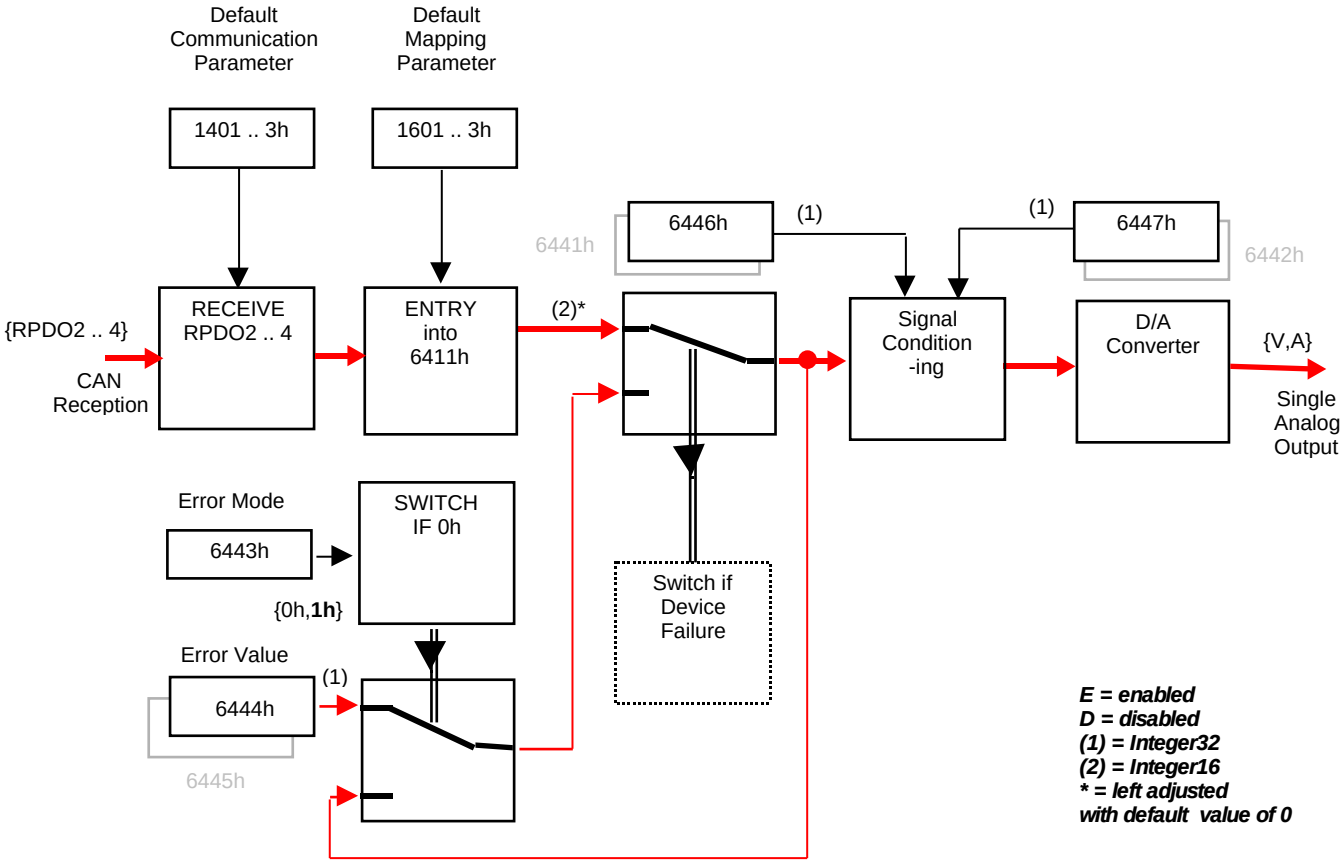


7.1.5. Analogue output module

There are different access methods defined. By default, 16-bit access shall be supported; the other access methods are optional.

Index	Object Code	Name	Data Type	Category
6410h	Array	Write Analogue Output 8-Bit	Integer8	O
6411h	Array	Write Analogue Output 16-Bit	Integer16	C:AO
6412h	Array	Write Analogue Output 32-Bit	Integer32	O
6413h	Array	Write Analogue Output Float	Float	O
6414h	Array	Write Manufacturer-specific Analogue Output	specific	O

The figure shows the relationship between the analogue output objects for an Integer16 access.



7.1.6 Analogue input set-ups

Index	Object Code	Name	Data Type	Category
6420h	-	Reserved for compatibility reason	-	-
6421h	Array	Analogue Input Interrupt Trigger Selection	Unsigned8	O
6422h	Array	Analogue Input Interrupt Source	Unsigned32	O
6423h	Var	Analogue Input Global Interrupt Enable	Boolean	C: AI
6424h	Array	Analogue Input Interrupt Upper Limit Integer	Integer32	O
6425h	Array	Analogue Input Interrupt Lower Limit Integer	Integer32	O
6426h	Array	Analogue Input Interrupt Delta Unsigned	Unsigned32	O
6427h	Array	Analogue Input Interrupt Negative Delta Unsigned	Unsigned32	O
6428h	Array	Analogue Input Interrupt Positive Delta Unsigned	Unsigned32	O
6429h	Array	Analogue Input Interrupt Upper Limit Float	Float	O
642Ah	Array	Analogue Input Interrupt Lower Limit Float	Float	O
642Bh	Array	Analogue Input Interrupt Delta Float	Float	O
642Ch	Array	Analogue Input Interrupt Negative Delta Float	Float	O
642Dh	Array	Analogue Input Interrupt Positive Delta Float	Float	O
642Eh	Array	Analogue Input Offset Float	Float	O
642Fh	Array	Analogue Input Scaling Float	Float	O
6430h	Array	Analogue Input SI Unit	Unsigned32	O
6431h	Array	Analogue Input Offset Integer	Integer32	O
6432h	Array	Analogue Input Scaling Integer	Integer32	O
6433h	-	Reserved	-	-
to				
673Fh	-	Reserved	-	-

7.1.7 Analogue output set-ups

Index	Object Code	Name	Data Type	Category
6440h	-	Reserved for compatibility reason	-	-
6441h	Array	Analogue Output Offset Float	Float	O
6442h	Array	Analogue Output Scaling Float	Float	O
6443h	Array	Analogue Output Error Mode	Unsigned8	O
6444h	Array	Analogue Output Error Value Integer	Integer32	O
6445h	Array	Analogue Output Error Value Float	Float	O
6446h	Array	Analogue Output Offset Integer	Integer32	O
6447h	Array	Analogue Output Scaling Integer	Integer32	O
6448h	-	Reserved	-	-
to				
644Fh	-	Reserved	-	-
6450h	Array	Analogue Output SI Unit	Unsigned32	O
6451h	-	Reserved	-	-
to				
67FDh	-	Reserved	-	-

7.1.8 General device profile objects

Index	Object Code	Name	Data Type	Category
67FEh	Array	Error Behaviour	Unsigned8	O
67FFh	Var	Device Type (see /2/)	Unsigned32	O

8 Object descriptions

8. 1 Digital input module

8.1.1 Object 6000h: Read Input 8-Bit

This object shall read groups of 8 input lines as 8-bit information. A maximum of 254 x 8-Bit inputs is addressable (2032 inputs). This object is mandatory for digital input modules and shall support all implemented input lines.

Object Description

INDEX	6000h
Name	Read Input 8 Bit
Object Code	Array
Data Type	Unsigned8
Category	Conditional: Device with digital inputs

Entry Description

Sub-Index	0h
Description	Number of Input 8 Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Read Input 1h to 8h
Access	ro
Entry Category	Mandatory
PDO Mapping	Default
Value Range	Unsigned8
Default Value	No

Sub-Index	2h .. 8h
Description	Read Input 9h to 10h .. Read Input 39h to 40h
Access	ro
Entry Category	Optional
PDO Mapping	Default
Value Range	Unsigned8
Default Value	No

to

Sub-Index	9h .. FEh
Description	Read Input 41h to 48h .. Read Input Read Input 7E8h to 7F0h
Access	ro
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default value	No

8.1.2 Object 6002h: Polarity Input 8-Bit

This object shall define the polarity of a group of 8 input lines. Input polarity can be inverted individually.

1 = input inverted

0 = input not inverted

If the object is not supported the device shall behave accordingly to the default value.

Object Description

INDEX	6002h
Name	Polarity Input 8-Bit
Object Code	Array
Data Type	Unsigned8
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input 8-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Polarity Input 1h to 8h
Access	rw
Entry Category	Mandatory
PDO Mapping	Possible
Value Range	Unsigned8
Default Value	0h

Sub-Index	2h
Description	Polarity Input 9h to 10h
Access	rw
Entry Category	Optional
PDO Mapping	Possible
Value Range	Unsigned8
Default Value	0h

to

Sub-Index	FEh
Description	Polarity Input 7E8h to 7F0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	0h

8.1.3 Object 6003h: Filter Constant Input 8-Bit

This object defines that an additional configurable filter constant shall be enabled or disabled.

1 = enabled

0 = disabled

Object Description

INDEX	6003h
Name	Filter Constant Input 8-Bit
Object Code	Array
Data Type	Unsigned8
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input 8-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Filter Constant Input 1h to 8h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	0h

Sub-Index	2h
Description	Filter Constant Input 9h to 10h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	0h

to

Sub-Index	FEh
Description	Filter Constant Input 7E8h to 7F0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	0h

8.1.4 Object 6005h: Global Interrupt Enable Digital 8-Bit

This object shall enable and disable globally the interrupt behaviour without changing the interrupt masks. In event-driven mode the device transmits the input values depending on the interrupt masks in objects 6006h, 6007h, and 6008h (resp. 6050h .. 6057h, 6060h .. 6067h, 6070h .. 6077h, or 6106h, 6107h, 6108h, or 6126h, 6127h, 6127h) and the PDO transmission type.

TRUE = global interrupt enabled

FALSE = global interrupt disabled

Object Description

INDEX	6005h
Name	Global Interrupt Enable Digital 8-Bit
Object Code	Variable
Data Type	Boolean
Category	Optional

Entry Description

Sub-Index	0h
Access	rw
PDO Mapping	No
Value Range	Boolean
Default Value	TRUE

8.1.5 Object 6006h: Interrupt Mask Any Change 8-Bit

This object determines, which input port lines shall activate an interrupt by positive or/and negative edge detection.

1 = interrupt enabled

0 = interrupt disabled

If the object is not supported the device shall behave accordingly to the default value.

Object Description

INDEX	6006h
Name	Interrupt Mask Any Change 8-Bit
Object Code	Array
Data Type	Unsigned8
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input 8-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Interrupt Any Change 1h to 8h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	FFh

Sub-Index	2h
Description	Interrupt Any Change 9h to 10h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	FFh

to

Sub-Index	FEh
Description	Interrupt Any Change 7E8h to 7F0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	FFh

8.1.6 Object 6007h: Interrupt Mask Low-to-High 8-Bit

This object determines, which input port lines shall activate an interrupt by positive edge detection (logical 0 to 1). Done for groups of 8 lines. The values shall be in an ”OR” connection to the values of object 6006h (Interrupt Mask Any Change 8-Bit). If inputs are inverted by object 6002h (Polarity Input 8-Bit), the positive logical edge shall correspond to negative physical edge.

1 = interrupt enabled

0 = interrupt disabled

Object Description

INDEX	6007h
Name	Interrupt Mask Low to High 8-Bit
Object Code	Array
Data Type	Unsigned8
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input 8-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Interrupt Low to High 1h to 8h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	0h

Sub-Index	2h
Description	Interrupt Low to High 9h to 10h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	0h

to

Sub-Index	FEh
Description	Interrupt Low to High 7E8h to 7F0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned
Default Value	0h

8.1.7 Object 6008h: Interrupt Mask High-to-Low 8-Bit

This object determines, which input port lines shall activate an interrupt by negative edge detection (logical 1 to 0). Done for groups of 8 lines. The values shall be in an ”OR” connection to the values of object 6006h (Interrupt Mask Any Change 8-Bit). If inputs are inverted by object 6002h (Polarity Input 8-Bit), the negative logical edge shall correspond to positive physical edge.

1 = interrupt enabled

0 = interrupt disabled

Object Description

INDEX	6008h
Name	Interrupt Mask High to Low 8-Bit
Object Code	Array
Data Type	Unsigned8
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input 8-bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Interrupt High to Low 1h to 8h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	0h

Sub-Index	2h
Description	Interrupt High to Low 9h to 10h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	0h

to

Sub-Index	FEh
Description	Interrupt High to Low 7F1h to 7F8h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	0h

8.1.8 Object 6020h .. Object 6027: Read Input Bit 1 to 128 .. Read Input Bit 896 to 1024

These objects shall read single input lines information. A maximum of 128 input lines is addressable at one index. The Object 6020h shall address the input lines 1 to 128, the Object 6021h shall address the input lines 129 to 256, etc.

Object Description

INDEX	6020h
Name	Read Input Bit 1h to 80h
Object Code	Array
Array	Boolean
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to 80h
Default Value	No

Sub-Index	1h
Description	Read Input 1h
Access	ro
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Boolean
Default Value	No

Sub-Index	2h
Description	Read Single Input 2h
Access	ro
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	No

to

Sub-Index	80h
Description	Read Single Input 80h
Access	ro
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	No

8.1.9 Object 6030h .. Object 6037h: Polarity Input Bit 1 to 128 .. Polarity Input Bit 897 to 1024

These objects shall define the polarity of single input lines. A maximum of 128 input lines is addressable at one index. The Object 6030h shall address the input lines 1 to 128, the Object 6031h shall address the input lines 129 to 256, etc.

TRUE = input inverted

FALSE = input not inverted

If these objects are not supported the device shall behave accordingly to the default value.

Object Description

INDEX	6030h
Name	Polarity Input Bit 1h to 80h
Object Code	Array
Data Type	Boolean
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to 80h
Default Value	No

Sub-Index	1h
Description	Polarity Input Bit 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

Sub-Index	2h
Description	Polarity Input Bit 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

to

Sub-Index	80h
Description	Polarity Input Bit 80h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

8.1.10 Object 6038h .. Object 6045h: Filter Constant Input Bit 1 to 128 .. Filter Constant Input Bit 897 to 1024

These objects shall set filter constants for input modules. This defines that an additional configurable filter constant can be enabled or disabled. The Object 6038h shall address the input lines 1 to 128, the Object 6039h shall address the input lines 129 to 256, etc.

TRUE = enabled

FALSE = disabled

Object Description

INDEX	6038h
Name	Filter Constant Input Bit 1h to 80h
Object Code	Array
Data Type	Boolean
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to 80h
Default Value	No

Sub-Index	1h
Description	Filter Constant Input Bit 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

Sub-Index	2h
Description	Filter Constant Input Bit 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

to

Sub-Index	80h
Description	Filter Constant Input Bit 80h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

8.1.11 Object 6050h to Object 6057h: Interrupt Mask Input Any Change Bit 1 to 128 .. Interrupt Mask Input Any Change Bit 897 to 1024

These objects shall set interrupt masks for single input lines. A maximum of 128 Bit inputs is addressable at one index. The Object 6050h shall address the input lines 1 to 128, the Object 6051h shall address the input lines 129 to 256, etc.

TRUE = interrupt enabled

FALSE = interrupt disabled

Object Description

INDEX	6050h
Name	Interrupt Mask Input Bit Any Change 1h to 80h
Object Code	Array
Data Type	Boolean
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to 80h
Default Value	No

Sub-Index	1h
Description	Interrupt Mask Any Change Input Bit 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Boolean
Default Value	TRUE

Sub-Index	2h
Description	Interrupt Mask Any Change Input Bit 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	TRUE

to

Sub-Index	80h
Description	Interrupt Mask Any Change Input 80h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	TRUE

8.1.12 Object 6060h .. Object 6067h: Interrupt Mask Input Low-to-High Bit 1 to 128 .. Interrupt Mask Input Low-to-High Bit 897 to 1024

These objects shall set interrupt masks for a single input line. A maximum of 128 Bit inputs is addressable at one index. The Object 6060h shall address the input lines 1 to 128, the Object 6061h shall address the input lines 129 to 256, etc. The values shall be in an ”OR” connection to the values of object 6050h to 6057h (Interrupt Mask Any Change). If inputs are inverted by object 6030h to 6037h (Polarity Input), the positive logical edge shall correspond to negative physical edge.

TRUE = interrupt enabled

FALSE = interrupt disabled

Object Description

INDEX	6060h
Name	Interrupt Mask Input Low to High Bit 1h to 80h
Object Code	Array
Data Type	Boolean
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input Bit
Access	rw
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to 80h
Default Value	No

Sub-Index	1h
Description	Interrupt Mask Low to High Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

Sub-Index	2h
Description	Interrupt Mask Low to High Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

to

Sub-Index	80h
Description	Interrupt Mask Low to High Input 80h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

8.1.13 Object 6070h .. Object 6077h: Interrupt Mask Input High-to-Low Bit 1 to 128 .. Interrupt Mask Input High-to-Low Bit 897 to 1024

The Objects shall set interrupt masks for single input lines. A maximum of 128 Bit inputs is addressable at one index. The Object 6070h shall address the input lines 1 to 128, the Object 6071h shall address the input lines 129 to 256, etc. The values shall be in an ”OR” connection to the values of object 6050h to 6057h (Interrupt Mask Any Change). If inputs are inverted by object 6030h to 6037h (Polarity Input), the negative logical edge shall correspond to positive physical edge.

TRUE = interrupt enabled

FALSE = interrupt disabled

Object Description

INDEX	6060h
Name	Interrupt Mask Input High to Low Bit 1h to 80h
Object Code	Array
Data Type	Boolean
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input Bit
Access	rw
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to 80h
Default Value	No

Sub-Index	1h
Description	Interrupt Mask High to Low Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

Sub-Index	2h
Description	Interrupt Mask High to Low Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

to

Sub-Index	80h
Description	Interrupt Mask High to Low Input 80h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE
Default Value	FALSE

8.1.14 Object 6100h: Read Input 16-bit

The object shall read a group of 16 input lines as a 16-bit information. A maximum of 254 x 16-Bit words is addressable (4064 inputs).

1 = input inverted

0 = input not inverted

If the object is not supported the device shall behave accordingly to the default value.

Object Description

INDEX	6100h
Name	Read Input 16-bit
Object Code	Array
Data Type	Unsigned16
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input 16-bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Read Input 1h to 10h
Access	ro
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	No

Sub-Index	2h
Description	Read Input 11h to 20h
Access	ro
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	No

to

Sub-Index	FEh
Description	Read Input FD0h to FE0h
Access	ro
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	No

8.1.15 Object 6102h: Polarity Input 16-bit

This object shall define the polarity for a group of 16 input lines. Inputs can be inverted individually.

1 = input inverted

0 = input not inverted

If the object is not supported the device shall behave accordingly to the default value.

Object Description

INDEX	6102h
Name	Polarity Input 16-bit
Object Code	Array
Data Type	Unsigned16
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input 16-bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Polarity Input 1h to 10h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

Sub-Index	2h
Description	Polarity Input 11h to 20h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

to

Sub-Index	FEh
Description	Polarity Input FD1h to FF0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

8.1.16 Object 6103h: Filter Constant Input 16-bit

This object defines that an additional configurable filter constant shall be enabled or disabled.

1 = enabled

0 = disabled

Object Description

INDEX	6103h
Name	Filter Constant Input 16-bit
Object Code	Array
Data Type	Unsigned16
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input 16-bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Filter Constant Input 1h to 10h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

Sub-Index	2h
Description	Filter Constant Input 11h to 20h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

to

Sub-Index	FEh
Description	Filter Constant Input FD1h to FE0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

8.1.17 Object 6106h: Interrupt Mask Input Any Change 16-bit

This object determines, which input port lines shall activate an interrupt. Done for groups of 16 lines and for any change of a digital input line.

1 = interrupt enabled

0 = interrupt disabled

Object Description

INDEX	6106h
Name	Interrupt Mask Input Any Change 16-bit
Object Code	Array
Data Type	Unsigned16
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input 16-bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Interrupt Any Change Inputs 1h to 10h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	FFFFh

Sub-Index	2h
Description	Interrupt Any Change Inputs 11h to 20h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	FFFFh

to

Sub-Index	FEh
Description	Interrupt Any Change Inputs FD1h to FE0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	FFFFh

8.1.18 Object 6107h: Interrupt Mask Input Low-to-High 16-bit

This object determines, which input port lines shall activate an interrupt. Done for groups of 16 lines and for a change from low-to-high of a digital input line. The values shall be in an ”OR” connection to the values of object 6106h (Interrupt Mask Any Change 16-Bit). If inputs are inverted by object 6102h (Polarity Input 16-Bit), the positive logical edge shall correspond to negative physical edge.

1 = interrupt enabled

0 = interrupt disabled

Object Description

INDEX	6107h
Name	Interrupt Mask Input Low to High 16-bit
Object Code	Array
Data Type	Unsigned16
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input 16-bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Interrupt Low to High Inputs 1h to 10h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

Sub-Index	2h
Description	Interrupt Low to High Inputs 11h to 20h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

to

Sub-Index	FEh
Description	Interrupt Low to High Inputs FD1h to FE0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

8.1.19 Object 6108h: Interrupt Mask Input High-to-Low 16-bit

This object determines, which input port lines shall activate an interrupt. Done for groups of 16 lines and for a change from high-to-low of a digital input line. The values shall be in an ”OR” connection to the values of object 6106h (Interrupt Mask Any Change 16-Bit). If inputs are inverted by object 6102h (Polarity Input 16-Bit), the negative logical edge shall correspond to positive physical edge.

1 = interrupt enabled

0 = interrupt disabled

Object Description

INDEX	6108h
Name	Interrupt Mask Input High to Low 16-bit
Object Code	Array
Data Type	Unsigned16
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input 16-bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Interrupt High to Low Inputs 1h to 10h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

Sub-Index	2h
Description	Interrupt High to Low Inputs 11h to 20h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

to

Sub-Index	FEh
Description	Interrupt High to Low Inputs FD1h to FE0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

8.1.20 Object 6120h: Read Input 32-bit

This object shall read a group of 32 input lines as 32-bit information. A maximum of 254 x 32-Bit words is addressable (8128 inputs).

Object Description

INDEX	6120h
Name	Read Input 4 Byte
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input 32-bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Read Inputs 1h to 20h
Access	ro
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	No

Sub-Index	2h
Description	Read Inputs 21h to 40h
Access	ro
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	No

to

Sub-Index	FEh
Description	Read Inputs 1FA0h to 1FC0h
Access	ro
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	No

8.1.21 Object 6122h: Polarity Input 32-bit

This object shall define the polarity for a group of 32 input lines. Inputs can be inverted individually.

1 = input inverted

0 = input not inverted

If the object is not supported the device shall behave accordingly to the default value.

Object Description

INDEX	6122h
Name	Polarity Input 32-bit
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input 32-bit
Access	ro
PDO Mapping	No
Value Range	1h to FEh
Default Value	0h

Sub-Index	1h
Description	Polarity Inputs 1h to 20h
Access	rw
Entry Category	Mandatory
PDO Mapping	No
Value Range	Unsigned32
Default Value	0h

Sub-Index	2h
Description	Polarity Inputs 21h to 40h
Access	rw
Entry Category	Optional
PDO Mapping	No
Value Range	Unsigned32
Default Value	0h

to

Sub-Index	FEh
Description	Polarity Inputs 1FA0h to 1FC0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

8.1.22 Object 6123h: Filter Constant Input 32-bit

This object defines that an additional configurable filter constant shall be enabled and disabled.

1 = enabled

0 = disabled

Object Description

INDEX	6123h
Name	Filter Constant Input 32-bit
Object Code	Array
Data Type	Unsinged32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input 32-bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Filter Constant Inputs 1h to 20h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

Sub-Index	2h
Description	Filter Constant Inputs 21h to 40h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

to

Sub-Index	FEh
Description	Filter Constant Inputs 1FA1h to 1FC0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

8.1.23 Object 6126h: Interrupt Mask Input Any Change 32-bit

This object determines which input port lines shall activate an interrupt. Done for groups of 32 lines and for any change of a digital input line.

1 = interrupt enabled

0 = interrupt disabled

Object Description

INDEX	6126h
Name	Interrupt Mask Input Any Change 32-bit
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input 32-bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Interrupt Any Change Input 1h to 20h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	FFFF FFFFh

Sub-Index	2h
Description	Interrupt Any Change Input 21h to 40h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	FFFF FFFFh

to

Sub-Index	FEh
Description	Interrupt Any Change Input 1FA1h to 1FC0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	FFFF FFFFh

8.1.24 Object 6127h: Interrupt Mask Input Low-to-High 32-bit

This object determines, which input port lines shall activate an interrupt. Done for groups of 32 lines and for a change from low-to-high of a digital input line. The values shall be in an ”OR” connection to the values of object 6126h (Interrupt Mask Any Change 32-Bit). If inputs are inverted by object 6122h (Polarity Input 32-Bit), the positive logical edge shall correspond to negative physical edge.

1 = interrupt enabled

0 = interrupt disabled

Object Description

INDEX	6127h
Name	Interrupt Mask Input Low to High 32-bit
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input 32-bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Interrupt Low to High Input 1h to 20h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	oh

Sub-Index	2h
Description	Interrupt Low to High Input 21h to 40h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

to

Sub-Index	FEh
Description	Interrupt Low to High Input 1FA1h to 1FC0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

8.1.25 Object 6128h: Interrupt Mask Input High-to-Low 32-bit

This object determines, which input port lines shall activate an interrupt. Done for groups of 32 lines and for a change from high-to-low of a digital input line. The values shall be in an ”OR” connection to the values of object 6126h (Interrupt Mask Any Change 32-Bit). If inputs are inverted by object 6122h (Polarity Input 32-Bit), the negative logical edge shall correspond to positive physical edge.

1 = interrupt enabled

0 = interrupt disabled

Object Description

INDEX	6128h
Name	Interrupt Mask Input High to Low 32-bit
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Input 32-bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Interrupt High to Low Input 1h to 20h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range Default Value	Unsigned32 0h

Sub-Index	2h
Description	Interrupt High to Low Input 21h to 40h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range Default Value	Unsigned32 0h

to

Sub-Index	FEh
Description	Interrupt High to Low Input 1FA1h to 1FC0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unisgned32
Default Vlaue	0h

8.2 Digital output module

8.2.1 Object 6200h: Write Output 8-Bit

This object shall set a group of 8 output lines as a Byte of information. A maximum of 254 x 8 Bit output blocks is addressable.

Object Description

INDEX	6200h
Name	Write Output 8-Bit
Object Code	Array (8h)
Data Type	Unsigned8
Category	Conditional: Device with digital outputs

Entry Description

Sub-Index	0h
Description	Number of Output 8-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Write Output 1h to 8h
Access	rw
Entry Category	Mandatory
PDO Mapping	Default
Value Range	Unsigned8
Default Value	0h

Sub-Index	2h .. 8h
Description	Write Output 9h to 10h .. Write Output 39h to 40h
Access	rw
Entry Category	Optional
PDO Mapping	Default
Value Range	Unsigned8
Default Value	0h

to

Sub-Index	9h .. FEh
Description	Write Output 41h to 48h .. Write Output 7E9h to 7F0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	0h

8.2.3 Object 6202h: Change Polarity Output 8-Bit

This object shall define the polarity of a group of 8 output lines. Output polarity can be inverted individually.

1 = output inverted

0 = output not inverted

If the object is not supported the device behaves accordingly to the default value.

Object Description

INDEX	6202h
Name	Change Polarity Output 8-Bit
Object Code	Array
Data Type	Unsigned8
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output 8-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Change Polarity Output 1h to 8h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	0h

Sub-Index	2h
Description	Change Polarity Output 9h to 10h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	0h

to

Sub-Index	FEh
Description	Change Polarity Output 7E9h to 7F0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	0h

8.2.4 Object 6206h: Error Mode Output 8-Bit

This object indicates, whether an output is set to a pre-defined error value (see object 6207h) in case of an internal device failure.

1 = output value shall take the pre-defined condition specified in object 6207h

0 = output value shall be kept if an error occurs

Object Description

INDEX	6206h
Name	Error Mode Output 8-Bit
Object Code	Array
Data Type	Unsigned8
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output 8-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Error Mode Output 1h to 8h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	FFh

Sub-Index	2h
Description	Error Mode Output 9h to 10h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	FFh

to

Sub-Index	FEh
Description	Error Mode Output 7E9h to 7F0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	FFh

8.2.5 Object 6207h: Error Value Output 8-Bit

On condition that the corresponding Error Mode is active, device failures (see chapter 5.2) shall set the outputs to the value configured by this object.

0 = Output is set to '0' in case of fault, if Object 6206h is enabled

1 = Output is set to '1' in case of fault, if Object 6206h is enabled

Object Description

INDEX	6207h
Name	Error Value Output 8-Bit
Object Code	Array
Data Type	Unsigned8
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output 8-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Error Value Output 1h to 8h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	0h

Sub-Index	2h
Description	Error Value Output 9h to 10h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	0h

to

Sub-Index	FEh
Description	Error Value Output 7E9h to 7F0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	0h

8.2.6 Object 6208h: Filter Mask Output 8-Bit

This object defines an additional configurable output filter mask for a group of 8 outputs.

1 = output shall set to the received output value

0 = don't care the received output value is neglected for the appropriated output channel, the old output value shall be kept.

Object Description

INDEX	6208h
Name	Filter Mask Output 8-Bit
Object Code	Array
Data Type	Unsigned8
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output 8-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Filter Mask Output 1h to 8h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	FF

Sub-Index	2h
Description	Filter Mask Output 9h to 10h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	FF

to

Sub-Index	FEh
Description	Filter Mask Output 7E9h to 7F0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	FF

8.2.7 Object 6220h .. Object 6227h: Write Output Bit 1 to 128 .. Write Output Bit 897 to 1024

These objects shall set single output lines information. A maximum of 128 outputs is addressable at one index. The Object 6220h shall address output lines 1 to 128, the Object 6221h shall address output lines 129 to 256, etc.

Object Description

INDEX	6220h
Name	Write Output Bit 1 to 128
Object Code	Array
Data Type	Boolean
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to 80h
Default Value	No

Sub-Index	1h
Description	Write Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

Sub-Index	2h
Description	Write Output 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

to

Sub-Index	80h
Description	Write Output 80h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

8.2.8 Object 6240h .. Object 6247h: Change Polarity Output Bit 1 to 128 .. Change Polarity Output Bit 897 to 1024

These objects shall set the polarity of single output lines. A maximum of 128 outputs is addressable at one index. The Object 6240h shall address output lines 1 to 128, the Object 6241h shall address output lines 129 to 256, etc.

1 = output inverted

0 = output not inverted

If these objects are not supported the device shall behave accordingly to the default value.

Object Description

INDEX	6240h
Name	Change Polarity Output Bit 1 to 128
Object Code	Array
Data Type	Boolean
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to 80h
Default Value	No

Sub-Index	1h
Description	Change Polarity Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

Sub-Index	2h
Description	Change Polarity Output 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

to

Sub-Index	80h
Description	Change Polarity Output 80h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

8.2.9 Object 6250h .. Object 6257: Error Mode Output Bit 1 to 128 .. Error Mode Output Bit 897 to 1024

These objects indicate, whether is set to a pre-defined error (see object 6260h .. 6267h) in case of an internal device failure. A maximum of 128 outputs is addressable at one index. The Object 6250h shall address output lines 1 to 128, the Object 6251h shall address output lines 129 to 256, etc.

1 = output value shall take the pre-defined condition as specified in objects 6260h .. 6267h

0 = output value shall be kept if an error occurs

Object Description

INDEX	6250h
Name	Error Mode Output Lines 1 to 128
Object Code	Array
Data Type	Boolean
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1 to 80h
Default Value	No

Sub-Index	1h
Description	Error Mode Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Boolean
Default Value	TRUE

Sub-Index	2h
Description	Error Mode Output 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	TRUE

to

Sub-Index	80h
Description	Error Mode Output 80h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	TRUE

8.2.10 Object 6260h .. Object 6267h: Error Value Output Bit 1 to 128 .. Error Value Output Bit 897 to 1024

On condition that the corresponding Error Mode is active, device failures (see chapter 5.2) shall set the outputs to the value configured by this object. A maximum of 128 outputs is addressable at one index. The Object 6260h shall address output lines 1 to 128, the Object 6261h shall address output lines 129 to 256, etc.

0 = Output shall be set to '0' in case of fault, if the corresponding Object (6250h .. 6257h) is enabled

1= Output shall be set to '1' in case of fault, if corresponding Object (6250h .. 6257h) is disabled

Object Description

INDEX	6260h
Name	Error Value Output Bit 1 to 128
Object Code	Array
Data Type	Boolean
Categrory	Optional

Entry Description

Sub-Index	0h
Description	Number of Output Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to 80h
Default Value	No
Default Value	No

Sub-Index	1h
Description	Error Value Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

Sub-Index	2h
Description	Error Value Output 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

to

Sub-Index	80h
Description	Error Value Output 80h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

8.2.11 Object 6270h .. Object 6277h: Filter Mask Output Bit 1 to 128 .. Filter Constant Mask Bit 897 to 1024

This object defines an additional configurable output filter mask for a single output.

1 = output shall set to the received output value

0 = don't care the received output value is neglected for the appropriated output channel, the old output value shall be kept.

A maximum of 128 outputs is addressable at one index. The Object 6270h shall address output lines 1 to 128, the Object 6271h shall address output lines 129 to 256, etc.

Object Description

INDEX	6270h
Name	Filter Constant Output Bit 1 to 128
Object Code	Array
Data Type	Boolean
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1 to 80h
Default Value	No

Sub-Index	1h
Description	Filter Constant Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Boolean
Default Value	TRUE

Sub-Index	2h
Description	Filter Constant Output 2h
Data Type	Boolean
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	TRUE

to

Sub-Index	80h
Description	Filter Constant Output 80h
Data Type	Boolean
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Boolean
Default Value	TRUE

8.2.12 Object 6300h: Write Output 16-bit

Shall write a group of 16 output lines as 2-Byte information. A maximum of 255 x 16-Bit words is addressable (4080 outputs).

Object Description

INDEX	6300h
Name	Write Output 16-Bit
Object Code	Array
Data Type	Unsigned16
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output 16-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Write Output 1h to 10h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

Sub-Index	2h
Description	Write Output 11h to 20h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

to

Sub-Index	FEh
Description	Write Output FE0h to FF0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

8.2.13 Object 6302h: Change Polarity Output 16-Bit

This object shall define the polarity for a group of 16 output lines. Input polarity can be inverted individually

1 = enabled

0 = disabled

If the object is not supported the device shall behave accordingly to the default value.

Object Description

INDEX	6302h
Name	Change Polarity Output 16-Bit
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output 16-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Polarity Output 1h to 10h
Data Type	Unsigned16 (6h)
Access	rw
Entry Category	Mandatory
PDO Mapping	No
Value Range	Unsigned16
Default Value	0h

Sub-Index	2h
Description	Polarity Output 11h to 20h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsinged16
Default Value	0h

to

Sub-Index	FEh
Description	Polarity Output FE0h to FF0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsinged16
Default Value	0h

8.2.14 Object 6306h: Error Mode Output 16-Bit

These objects indicate, whether an output is set to a pre-defined error value (see object 6307h) in case of an internal device failure.

1 = output value shall take the pre-defined condition as specified in object 6307h
0 = output value shall be kept if an error occurs

Object Description

INDEX	6306h
Name	Error Mode Output 16-Bit
Object Code	Array
Data Type	Unsigned16
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output 16-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Error Mode Output 1h to 10h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	FFFFh

Sub-Index	2h
Description	Error Mode Output 11h to 20h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	FFFFh

to

Sub-Index	FEh
Description	Error Mode Output FE0h to FF0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	FFFFh

8.2.15 Object 6307h: Error Value Output 16-Bit

On condition that the corresponding Error Mode is active, device failures (see chapter 5.2) shall set the outputs to the value configured by this object.

0 = Output shall be set to '0' in case of fault, if Object 6306h is enabled

1 = Output shall be set to '1' in case of fault, if Object 6306h is enabled

Object Description

INDEX	6307h
Name	Error Value Output 16-Bit
Object Code	Array
Data Type	Unsigned16
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output 16-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Error Value Output 1h to 10h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

Sub-Index	2h
Description	Error Value Output 11h to 20h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

to

Sub-Index	FEh
Description	Error Value Output FE0h to FF0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	0h

8.2.16 Object 6308h: Filter Mask Output 16-Bit

This object defines an additional configurable output filter mask for a group of 16 outputs.

1 = output is shall set to the received output value

0 = don't care the received output value is neglected for the appropriated output channel, the old output value shall be kept.

Object Description

INDEX	6308h
Name	Filter Mask Output 16-Bit
Object Code	Array
Data Type	Unsigned16
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output 16-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Filter Mask Output 1h to 10h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	FFFFh

Sub-Index	2h
Description	Filter Mask Output 11h to 20h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	FFFF

to

Sub-Index	FEh
Description	Filter Mask Output FE0h to FF0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned16
Default Value	FFFFh

8.2.17 Object 6320h: Write Output 32-Bit

This object shall write a group of 32 output lines as 4-Byte information. A maximum of 255 x 32-Bit words is addressable (8160 outputs).

Object Description

INDEX	6320h
Name	Write Output 32-Bit
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output 32-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1 to FEh
Default Value	No

Sub-Index	1h
Description	Write Output 1h to 20h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

Sub-Index	2h
Description	Write Output 21h to 40h
Data Type	Unsigned32
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

to

Sub-Index	FEh
Description	Write Output 1FC0h to 1FE0h
Data Type	Unsigned32
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

8.2.21 Object 6322h: Change Polarity Output 32-Bit

This object shall define the polarity for a group of 32 output lines. Input polarity can be inverted individually.

1 = enabled

0 = disabled

If the object is not supported the device shall behave accordingly to the default value.

Object Description

INDEX	6322h
Name	Change Polarity Output 32-Bit
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output 32-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Polarity Output 1h to 20h
Access	rw
Entry Category	Mandatory
PDO Mapping	No
Value Range	Unsinged32
Default Value	0h

Sub-Index	2h
Description	Polarity Output 21h to 40h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

to

Sub-Index	FEh
Description	Polarity Output 1FC0h to 1FE0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

8.2.22 Object 6326h: Error Mode Output 32-Bit

These objects indicate, whether an output is set to a pre-defined error value (see also object 6327h) in case of an internal device failure.

1 = output value shall take the pre-defined condition as specified in Object 6327h

0 = output value shall be kept if an error occurs

Object Description

INDEX	6326h
Name	Error Mode Output 32-Bit
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output 32-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Error Mode Output 1h to 20h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	FFFF FFFFh

Sub-Index	2h
Description	Error Mode Output 21h to 40h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	FFFF FFFFh

to

Sub-Index	FEh
Description	Error Mode Output 1FC0h to 1FE0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	FFFF FFFFh

8.2.23 Object 6327h: Error Value Output 32-Bit

On condition that the corresponding Error Mode is active, device failures (see chapter 5.2) shall set the outputs to the value configured by this object.

0 = Output shall be set to '0' in case of fault, if Object 6326h is enabled

1 = Output shall be set to '1' in case of fault, if Object 6326h is enabled

Object Description

INDEX	6327h
Name	Error Value Output 32-Bit
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output 32-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Error Value Output 1h to 20h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

Sub-Index	2h
Description	Error Value Output 21h to 40h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

to

Sub-Index	FEh
Description	Error Value Output 1FC0h to 1FE0h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

8.2.24 Object 6328h: Filter Mask Output 32-Bit

This object defines an additional configurable output filter mask for a group of 32 outputs.

1 = output shall be set to the received output value

0 = don't care the received output value is neglected for the appropriated output channel, the old output value shall be kept.

Object Description

INDEX	6328h
Name	Filter Mask Output 32-Bit
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Output 32-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Filter Mask Output 1h to 20h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	FFFF FFFFh

Sub-Index	2h
Description	Filter Mask Output 21h to 40h
Data Type	Unsigned32
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	FFFF FFFFh

to

Sub-Index	FEh
Description	Filter Mask Output 1FC0h to 1FE0h
Data Type	Unsigned32
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	FFFF FFFFh

8.3 Analogue input module

8.3.1 Object 6400h: Read Analogue Input 8-Bit

This object shall read the value of the input channel 'n'. Value is 8-Bit or less in size. The value shall be always left adjusted. The remaining bits at the right side of the LSB shall be set to zero.

Object Description

INDEX	6400h
Name	Read Analogue Input 8-Bit
Object Code	Array
Data Type	Integer8
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Input 8-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Integer8
Default Value	No

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer8
Default Value	No

8.3.2 Object 6401h: Read Analogue Input 16-Bit

This object shall read the value of the input channel 'n'. Value is 16-Bit wide or less. The value shall be always left adjusted. The remaining bits at the right side of the LSB shall be set to zero.

Object Description

INDEX	6401h
Name	Read Analogue Input 16-Bit
Object Code	Array
Data Type	Integer16
Category	Conditional: Device with analog input

Entry Description

Sub-Index	0h
Description	Number of Analogue Input 16-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Default
Value Range	Integer16
Default Value	No

Sub-Index	2h .. 1Ch
Description	Analogue Input 2h .. Analogue Input 1Ch
Access	rw
Entry Category	Optional
PDO Mapping	Default
Value Range	Integer
Default Value	No

to

Sub-Index	1Dh .. FEh
Description	Analogue Input 1Dh .. Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer
Default Value	No

8.3.3 Object 6402h: Read Analogue Input 32-Bit

This object shall read the value of the input channel 'n'. Value is 32-Bit wide or less. The value shall be always left adjusted. The remaining bits at the right side of the LSB shall be set to zero.

Object Description

INDEX	6402h
Name	Read Analogue Input 32-Bit
Object Code	Array
Data Type	Integer32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Input 32-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Integer32
Default Value	No

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default Value	No

8.3.4 Object 6403h: Read Analogue Input Float

This object shall read the Float value of the input channel 'n'.

Float value = Integer value x Input scale + Offset value

Object Description

INDEX	6403h
Name	Read Analogue Input Float
Object Code	Array
Data Type	Float
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Input Float
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Float
Default Value	No

Sub-Index	2h
Description	Analogue Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	No

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	No

8.3.5 Object 6404h: Read Manufacturer-specific Analogue Input

This object shall read the manufacturer-specific value of the input channel 'n'.

Object Description

INDEX	6404h
Name	Read Manufacturer Specific Analogue Input
Object Code	Record
Data Type	Manufacturer-specific
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Input
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Manufacturer-specific
Default Value	No

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Manufacturer-specific
Default Value	No

8.4 Analogue output module

8.4.1 Object 6410h: Write Analogue Output 8-Bit

This object shall write an Integer8 value to the output channel 'n'. The value shall be always left adjusted.

Object Description

INDEX	6410h
Name	Write Analogue Output 8-Bit
Object Code	Array
Data Type	Integer8
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Output 8-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Integer8
Default Value	0h

Sub-Index	2h
Description	Analogue Output 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer8
Default Value	0h

to

Sub-Index	FEh
Description	Analogue Output FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer8
Default Value	0h

8.4.2 Object 6411h: Write Analogue Output 16-Bit

This object shall write an Integer16 value to the output channel 'n'. The value shall be always left adjusted.

Object Description

INDEX	6411h
Name	Write Analogue Output 16-Bit
Object Code	Array
Data Type	Integer16
Category	Conditional: Device with analogue output

Entry Description

Sub-Index	0h
Description	Number of Analogue Output 16-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Default
Value Range	Integer16
Default Value	0h

Sub-Index	2h .. 1Ch
Description	Analogue Output 2h .. Analogue Output 1Ch
Access	rw
Entry Category	Default
PDO Mapping	Optional
Value Range	Integer
Default Value	0h

to

Sub-Index	1Dh .. FEh
Description	Analogue Output 1Dh .. Analogue Output FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer
Default Value	0h

8.4.3 Object 6412h: Write Analogue Output 32-Bit

This object shall write an Integer32 value to the output channel 'n'. The value shall be always left adjusted.

Object Description

INDEX	6412h
Name	Write Analogue Output 32-Bit
Object Code	Array
Data Type	Integer32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Output 32-Bit
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

Sub-Index	2h
Description	Analogue Output 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

to

Sub-Index	FEh
Description	Analogue Output FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

8.4.4 Object 6413h: Write Analogue Output Float

This object shall write the Integer value to the output channel 'n'.

$$\text{Integer value} = \frac{\text{Float value} - \text{Output offset}}{\text{Output scale}}$$

Object Description

INDEX	6413h
Name	Write Analogue Output Float
Object Code	Array
Data Type	Float
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Output Float
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

Sub-Index	2h
Description	Analogue Output 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

to

Sub-Index	FEh
Description	Analogue Output FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

8.4.5 Object 6414h: Write Manufacturer-specific Analogue Output

Writes the manufacturer-specific value to the output channel 'n'.

Object Description

INDEX	6414h
Name	Write Manufacturer Specific Analogue Output
Object Code	Record or Array
Data Type	Manufacturer-specific
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Output
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Manufacturer-specific
Default Value	Manufacturer-specific

Sub-Index	2h
Description	Analogue Output 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Manufacturer-specific
Default Value	Manufacturer-specific

to

Sub-Index	FEh
Description	Analogue Output FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Manufacturer-specific
Default Value	Manufacturer-specific

8.5 Analogue input set-ups

8.5.1 Object 6420h

Reserved for compatibility reason.

8.5.2 Object 6421h: Analogue Input Interrupt Trigger Selection

This object determines, which events shall cause an interrupt for a specific channel. Bits set in the list below shall refer to ways in which interrupts may be triggered.

Bit no.	Interrupt trigger
0	Upper limit exceeded
1	Input below lower limit
2	Input changed by more than delta
3	Input reduced by more than negative delta
4	Input increased by more than positive delta
5 to 7	reserved for future use.

Object Description

INDEX	6421h
Name	Interrupt Trigger Selection
Object Code	Array
Data Type	Unsigned8
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Input
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	See above
Default Value	No

Sub-Index	2h
Description	Analogue Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	See above
Default Value	No

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	See above
Default Value	No

8.5.3 Object 6422h: Analogue Input Interrupt Source

This object shall determine, which channel has produced an interrupt. Bits set shall relate to the number of any channels that have produced interrupts. The bits shall be reset automatically after read by SDO or transmitted by means of a PDO.

1 = interrupt produced

0 = no interrupt produced

Object Description

INDEX	6422h
Name	Analogue Input Interrupt Source
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Interrupt Source Banks
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to 8h
Default Value	No

Sub-Index	1h
Description	Interrupt Source Bank 1
Access	ro
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

Sub-Index	2h
Description	Interrupt Source Bank 2
Access	ro
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

to

Sub-Index	8h
Description	Interrupt Source Bank 8
Access	ro
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

8.5.4 Object 6423h: Analogue Input Global Interrupt Enable

This object shall enable and disable globally the interrupt behaviour without changing the interrupt mask. By default, no analogue input activates an interrupt.

TRUE = global interrupt enabled

FALSE = global interrupt disabled

If the object is not supported the device shall behave accordingly to the default value.

Object Description

INDEX	6423h
Name	Analogue Input Global Interrupt Enable
Object Code	Var
Data Type	Boolean
Category	Conditional: Device with analogue input

Object Description

Sub-Index	0h
Access	rw
PDO Mapping	Optional
Value Range	Boolean
Default Value	FALSE

8.5.5 Object 6424h: Analogue Input Interrupt Upper Limit Integer

When enabled (see Object 6423h), an interrupt is triggered when the analogue input rises above the given value. The value shall be always left adjusted. As long as the trigger condition is meet, every change of the analogue input data generates a new interrupt, as long as there is no additional trigger condition, e.g. an input interrupt delta (6426h).

Note: Configuration of the Analogue Input Interrupt Upper Limit Float object (6429h) shall cause also value change in object 6424h and vice versa.

Object Description

INDEX	6424h
Name	Analogue Input Interrupt Upper Limit Integer
Object Code	Array
Data Type	Integer32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Input
Access	ro
Entry Category	Manadatory
PDO Mapping	No
Value Range	1h to FEh
Default	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

Sub-Index	2h
Description	Analogue Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

8.5.6 Object 6425h: Analogue Input Interrupt Lower Limit Integer

When enabled (see Object 6423h), an interrupt is triggered when the analogue input falls below the given value. The value shall be always left adjusted. As long as the trigger condition is meet, every change of the analogue input data generates a new interrupt, as long as there is no additional trigger condition, e.g. an input interrupt delta (6426h).

Note: Configuration of the Analogue Input Interrupt Lower Limit Float object (642Ah) shall cause also value change in object 6425h and vice versa.

Object Description

INDEX	6425h
Name	Analogue Input Interrupt Lower Limit Integer
Object Code	Array
Data Type	Integer32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Input
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

Sub-Index	2h
Description	Analogue Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

8.5.7 Object 6426h: Analogue Input Interrupt Delta Unsigned

This object shall set the delta value (rising or falling above or below the last communicated value) for interrupt-enabled analogue inputs (see Object 6423h).

Note: Configuration of the Analogue Input Interrupt Delta Float object (642Bh) shall cause also value change in object 6426h and vice versa.

Object Description

INDEX	6426h
Name	Analogue Input Interrupt Delta Unsigned
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Input
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

Sub-Index	2h
Description	Analogue Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned
Default Value	0h

8.5.8 Object 6427h: Analogue Input Interrupt Negative Delta Unsigned

This object shall set the negative delta value (falling below the last communicated value) for interrupt-enabled analogue inputs (see Object 6423h).

Note: Configuration of the Analogue Input Interrupt Negative Delta Float object (642Ch) shall cause also value change in object 6427h and vice versa.

Object Description

INDEX	6427h
Name	Analogue Input Interrupt Negative Delta Unsigned
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Inputs
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Manadatory
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

Sub-Index	2h
Description	Analogue Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

8.5.9 Object 6428h: Analogue Input Interrupt Positive Delta Unsigned

This object shall set the positive delta value (rising above the last communicated value) for interrupt-enabled analogue inputs (see Object 6423h).

Note: Configuration of the Analogue Input Interrupt Positive Delta Float object (642Dh) shall cause also value change in object 6428h and vice versa.

Object Description

INDEX	6428h
Name	Analogue Input Interrupt Positive Delta Unsigned
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Input
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

Sub-Index	2h
Description	Analogue Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

8.5.10 Object 6429h: Analogue Input Interrupt Upper Limit Float

This object shall set the converted upper limits for interrupt-enabled analogue inputs (see Object 6423h). As long as the trigger condition is meet, every change of the analogue input data generates a new interrupt, as long as there is no additional trigger condition, e.g. an input interrupt delta (642Bh).

Note: Configuration of the Analogue Input Interrupt Upper Limit Integer object (6424h) shall cause also value change in object 6429h and vice versa.

Object Description

INDEX	6429h
Name	Analogue Input Interrupt Upper Limit Float
Object Code	Array
Data Type	Float
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Input
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

Sub-Index	2h
Description	Analogue Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

8.5.11 Object 642Ah: Analogue Input Interrupt Lower Limit Float

This object shall set the lower limits for interrupt-enabled analogue inputs (see Object 6423h). As long as the trigger condition is meet, every change of the analogue input data generates a new interrupt, as long as there is no additional trigger condition, e.g. an input interrupt delta (642Bh).

Note: Configuration of the Analogue Input Interrupt Lower Limit Integer object (6425h) shall cause also value change in object 642Ah and vice versa.

Object Description

INDEX	642Ah
Name	Analogue Input Interrupt Lower Limit Float
Object Code	Array
Data Type	Float
Category	Optional

Entry Description

Sub-Index	0h
Description	Number Analogue Inputs
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

Sub-Index	2h
Description	Analogue Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

8.5.12 Object 642Bh: Analogue Input Interrupt Delta Float

This object shall set the delta value (rising or falling above or below the last sample) in Float format for interrupt-enabled analogue inputs (see Object 6423h).

Note: Configuration of the Analogue Input Interrupt Delta Unsigned object (6426h) shall cause also value change in object 642Bh and vice versa.

Object Description

INDEX	642Bh
Name	Analogue Input Interrupt Delta Float
Object Code	Array
Data Type	Float
Catagory	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Input
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

Sub-Index	2h
Description	Analogue Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

8.5.13 Object 642Ch: Analogue Input Interrupt Negative Delta Float

This object shall set the negative delta value (falling below the last sample) in Float format for interrupt-enabled analogue inputs (see Object 6423h).

Note: Configuration of the Analogue Input Interrupt Negative Delta Unsigned object (6427h) shall cause also value change in object 642Ch and vice versa.

Object Description

INDEX	642Ch
Name	Analogue Input Interrupt Negative Delta Float
Object Code	Array
Data Type	Float
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Inputs
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

Sub-Index	2h
Description	Analogue Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

8.5.14 Object 642Dh: Analogue Input Interrupt Positive Delta Float

This object shall set the positive delta value (rising above the last sample) in Float format for interrupt-enabled analogue inputs (see Object 6423h).

Note: Configuration of the Analogue Input Interrupt Positive Delta Unsigned object (6428h) shall cause also value change in object 642Dh and vice versa.

Object Description

INDEX	642Dh
Name	Analogue Input Interrupt Positive Delta Float
Object Code	Array
Data Type	Float
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Input
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

Sub-Index	2h
Description	Analogue Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

8.5.15 Object 642Eh: Analogue Input Offset Float

This object shall set the offsets in Float format for input data (Object 6403h) for channel 'n'.

Note: Configuration of the Analogue Input Offset Integer object (6431h) shall cause also value change in object 642Eh and vice versa.

Object Description

INDEX	642Eh
Name	Analogue Input Offset Float
Object Code	Array
Data Type	Float
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Input
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

Sub-Index	2h
Description	Analogue Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

8.5.16 Object 642Fh: Analogue Input Scaling Float

This object shall set the scaling in Float format for input data (Object 6403h).

Note: Configuration of the Analogue Input Scaling Integer object (6432h) shall cause also value change in object 642Fh and vice versa.

Object Description

INDEX	642Fh
Name	Analogue Input Scaling Float
Object Code	Array
Data Type	Float
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Input
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

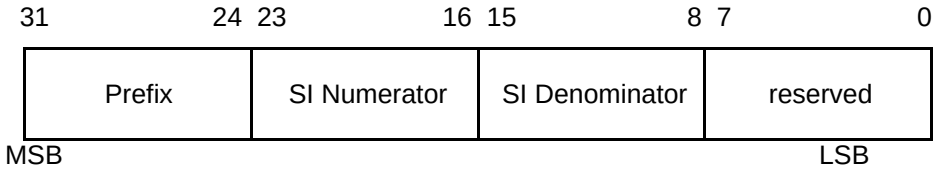
Sub-Index	2h
Description	Analogue Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

8.5.17 Object 6430h: Analogue Input SI Unit

This object shall assign SI units and prefixes for analogue inputs. The structure of the SI unit entry shall be as followed:



The values for prefix, SI numerator, and SI denominator are specified in /3/.

Object Description

INDEX	6430h
Name	Analogue Input SI Unit
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Input
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

Sub-Index	2h
Description	Analogue Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

8.5.18 Object 6431h: Analogue Input Offset Integer

This object shall set the offset in Integer format for input data (Object 6403h).

Note: Configuration of the Analogue Input Offset Float object (642Eh) shall cause also value change in object 6431h and vice versa.

Object Description

INDEX	642Eh
Name	Analogue Input Offset Integer
Object Code	Array
Data Type	Integer32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Input
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

Sub-Index	2h
Description	Analogue Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

8.5.19 Object 6432h: Analogue Input Scaling Integer

This object shall set the scaling in Integer format or input data (Object 6403h).

Note: Configuration of the Analogue Input Scaling Float object (642Fh) shall cause also value change in object 6432h and vice versa.

Object Description

INDEX	642Fh
Name	Analogue Input Scaling Integer
Object Code	Array
Data Type	Integer32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Input
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Input 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

Sub-Index	2h
Description	Analogue Input 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

to

Sub-Index	FEh
Description	Analogue Input FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

8.6 Analogue output set-ups

8.6.1 Object 6440h

Reserved for compatibility reason.

8.6.2 Object 6441h: Analogue Output Offset Float

This object shall set the offset in Float format for output data (Object 6413h).

Note: Configuration of the Analogue Output Offset Integer object (6446h) shall cause also value change in object 6441h and vice versa.

Object Description

INDEX	6441h
Name	Analogue Output Offset Float
Object Code	Array
Data Type	Float
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Output
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

Sub-Index	2h
Description	Analogue Output 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

to

Sub-Index	FEh
Description	Analogue Output FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

8.6.3 Object 6442h: Analogue Output Scaling Float

This object shall set the scaling in Float format for output data (Object 6413h).

Note: Configuration of the Analogue Output Scaling Integer object (6447h) shall cause also value change in object 6442h and vice versa.

Object Description

INDEX	6442h
Name	Analogue Output Scaling Float
Object Code	Array
Data Type	Float
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Output
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

Sub-Index	2h
Description	Analogue Output 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default	0.0

to

Sub-Index	FEh
Description	Analogue Output FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default	0.0

8.6.4 Object 6443h: Analogue Output Error Mode

This object defines, whether an output is set to a pre-defined error value (see object 6444h) in case of an internal device failure.

0h = actual value rest

1h = reverts to error value integer (6444h)

others = reserved

Object Description

INDEX	6443h
Name	Analogue Output Error Mode
Object Code	Array
Data Type	Unsigned8
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Outputs
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Error Mode Analogue Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	1h

Sub-Index	2h
Description	Error Mode Analogue Output 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	1h

to

Sub-Index	FEh
Description	Error Mode Analogue Output FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned8
Default Value	1h

8.6.5 Object 6444h: Analogue Output Error Value Integer

On condition that the corresponding Error Mode is active, device failures (see chapter 5.2) shall set the outputs to the value configured by this object..

Note: Configuration of the Analogue Output Error Value Float object (6445h) shall cause also value change in object 6444h and vice versa.

Object Description

INDEX	6444h
Name	Analogue Output Error Value Integer
Object Code	Array
Data Type	Integer32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Output
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

Sub-Index	2h
Description	Analogue Output 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

to

Sub-Index	FEh
Description	Analogue Output FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

8.6.8 Object 6445h: Analogue Output Error Value Float

On condition that the corresponding Error Mode is active, device failures (see chapter 5.2) shall set the outputs to the value configured by this object.

Note: Configuration of the Analogue Output Error Value Integer object (6444h) shall cause also value change in object 6445h and vice versa.

Object Description

INDEX	6445h
Name	Analogue Output Error Value Float
Object Code	Array
Data Type	Float
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Outputs
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

Sub-Index	2h
Description	Analogue Output 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

to

Sub-Index	FEh
Description	Analogue Output FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Float
Default Value	0.0

8.6.9 Object 6446h: Analogue Output Offset Integer

This object shall set the offset in Integer format for output data (Object 6413h).

Note: Configuration of the Analogue Output Offset Float object (6441h) shall cause also value change in object 6446h and vice versa.

Object Description

INDEX	6446h
Name	Analogue Output Offset Integer
Object Code	Array
Data Type	Integer32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Output
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

Sub-Index	2h
Description	Analogue Output 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

to

Sub-Index	FEh
Description	Analogue Output FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

8.6.10 Object 6447h: Analogue Output Scaling Integer

This object shall set the scaling in Integer format for output data (Object 6413h).

Note: Configuration of the Analogue Output Scaling Float object (6442h) shall cause also value change in object 6447h and vice versa.

Object Description

INDEX	6447h
Name	Analogue Output Scaling Integer
Object Code	Array
Data Type	Integer32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Output
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Integer32
Default Value	0h

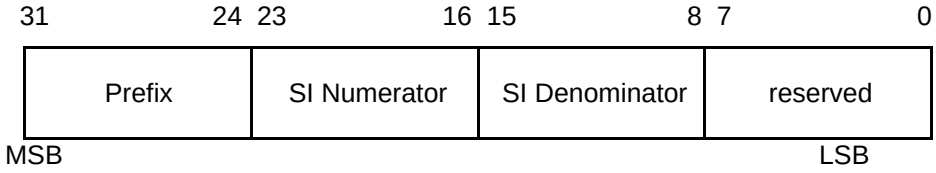
Sub-Index	2h
Description	Analogue Output 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default	0h

to

Sub-Index	FEh
Description	Analogue Output FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Integer32
Default	0h

8.6.11 Object 6450h: Analogue Output SI Unit

This object shall assign SI units and prefixes for analogue outputs. The structure of the SI unit entry shall be as followed:



The values for prefix, SI numerator, and SI denominator are specified in /3/.

Object Description

INDEX	6430h
Name	Analogue Output SI Unit
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Analogue Output
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to FEh
Default Value	No

Sub-Index	1h
Description	Analogue Output 1h
Access	rw
Entry Category	Mandatory
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

Sub-Index	2h
Description	Analogue Output 2h
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

to

Sub-Index	FEh
Description	Analogue Output FEh
Access	rw
Entry Category	Optional
PDO Mapping	Optional
Value Range	Unsigned32
Default Value	0h

8.7 General device profile objects

8.7.1 Object 67FEh: Error Behaviour

This object specifies to which state an I/O module shall be set, when a communication error, output error or input error is detected.

0 = pre-operational (only if current state is operational)

1 = no state change

2 = stopped

Object Description

INDEX	67FEh
Name	Error Behaviour
Object Code	Array
Data Type	Unsigned8
Category	Optional

Entry Description

Sub-Index	0h
Description	Number of Error Classes
Access	ro
Entry Category	Mandatory
PDO Mapping	No
Value Range	1h to 3h
Default Value	No

Sub-Index	1h
Description	Communication Error
Access	rw
Entry Category	Mandatory
PDO Mapping	No
Value Range	0h to 2h
Default Value	0h

Sub-Index	2h
Description	Output Error
Access	rw
Entry Category	Optional
PDO Mapping	No
Value Range	0h to 2h
Default Value	0h

Sub-Index	3h
Description	Input Error
Access	rw
Entry Category	Optional
PDO Mapping	No
Value Range	0h to 2h
Default Value	0h

Note: If this object is not implemented the device shall be set into pre-operational state in the case a communication error is detected.

8.7.2 Object 67FF: Device Type

This objects shall describe the first virtual device in a multiple device module according to /2/

Appendix A informative): Joystick

This appendix proposes the use of DS-401 for joysticks adopted as a special input module. This input module supports digital inputs and analogue inputs. The digital inputs are the buttons of the joystick and the analogue inputs are the proportional input values.

A1 Pre-defined communication objects

A1.1 Index 1000h (device type)

The specific functionality is defined as a joystick with digital and analogue inputs.

Additional Information		Device Profile Number
Specific Functionality	I/O Functionality	
1h	5h	192h

A2 Buttons

The buttons uses the functionality for digital inputs with 8-bit access. It is mandatory to support object 6000h and optionally the related configuration objects.

A3 Proportional inputs

The proportional inputs use the functionality for analogue inputs with 16-bit access. It is mandatory to support object 6401h and optionally all related configuration objects.

The default value for the object 6430h (Analogue Input SI Unit) is:

31 24	23 16	15 8	7 0
00h	00h	00h	00h

MSB LSB

A4 Mapping

A4.1 1st TPDO mapping (buttons)

The first TPDO transmits the values of maximum 8 x 8 buttons. The first 8 buttons (Index 6000h sub-index 1h) are specified for the following purpose, all other buttons provide manufacturer-specific behaviour:

7							0
unused	unused	unused	unused	unused	memory z-axis	memory y-axis	memory x-axis

MSB LSB

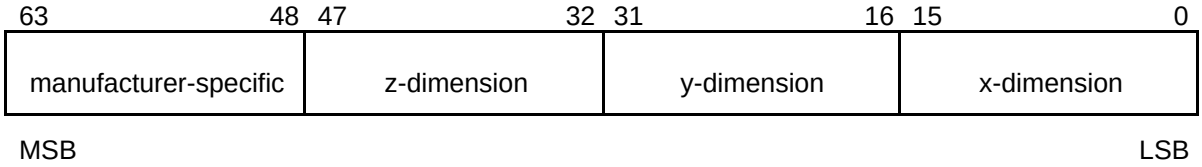
The memory buttons for x-, y-, and z-axes shall save the proportional values of the related axes:

0 = save value

1 = release value

A4.2 2nd TPDO mapping (proportional inputs)

The second TPDO transmits the 16-bit values of maximum 4 proportional inputs. The first 3 analogue values (Index 6010h sub-index 1h .. 3h) are used for the three dimensions (x, y, z), the other analogue value is manufacturer-specific.



A4.3 Implementation hints

A4.3.1 Periodical PDO transmission

If periodical PDO transmission is requested, the event timer should be set to ≠ 0.

A4.3.2 Additional proportional inputs

If additional proportional inputs are required, the pre-defined 3rd and 4th TPDO should be used.

A4.3.3 Transmission of proportional inputs

In order to transmit only the first proportional value different from 0, the analogue input set-up objects should be used.