CANopen

Device Profile for I/O Modules

CiA Draft Standard Proposal 401

Version 1.4

Date: 1st December 1996

History

date	*chapter*	*changes*
Dec 96	*8.1.3.*	*New Filter Constant for Input Modules Object (6003H)*
Dec 96	*8.1.10.*	*New Filter Constant for Input Modules Object (6038H)*
Dec 96	*8.1.18.*	*New Filter Constant for Input Modules Object (6103H)*
Dec 96	*8.1.24.*	*New Filter Constant for Input Modules Object (6123H)*
Dec 96	*8.5.1.*	*Setting of input range/capability for channel 'n' expanded for temperature and resistance, and codings specified*
Dec 96	*8.5.4.*	*Default value in Object 6423H added*
Dec 96	*8.6.1.*	*Codings of output driver range/capability for channel 'n' specified*
Dec 96	*8.6.4.*	*Value ranges changed to Unsigned8*

0 TABLE OF CONTENTS

1 SCOPE

This document represents the CANopen device profiles for digital and analogue Input and Output modules.

All the above devices use communication techniques which conform to those described in the CiA Draft Standard DS-301 (CANopen communication profile for industrial systems based on CAL). This document should be consulted in parallel to this profile.

2 REFERENCES

/1/: ISO 7498, Information Processing Systems - Open Systems Interconnection - Basic Reference Model, 1984

/2/: ISO 11898: Road Vehicles Interchange of Digital Information - Controller Area Network (CAN) for high-speed Communication, November 1993

/3/: Robert Bosch GmbH, CAN Specification 2.0 Part A and B, September 1991

/4/: CiA DS-102 V2.0, CAN Physical Layer for Industrial Applications, April 1994

/5/: CiA DS-201 V1.1, CAN Reference Model, February 1996

/6/: CiA DS-202-1 V1.1, CMS Service Specification, February 1996

/7/: CiA DS-202-2 V1.1, CMS Protocol Specification, February 1996

/8/: CiA DS-202-3 V1.1, CMS Encoding Rules, February 1996

/9/: CiA DS-203-1 V1.1, NMT Service Specification, February 1996

/10/: CiA DS-203-2 V1.1, NMT Protocol Specification, February 1996

/11/: CiA DS-204-1 V1.1, DBT Service Specification, February 1996

/12/: CiA DS-204-2 V1.1, DBT Protocol Specification, February 1996

/13/: CiA DS-205-1 V1.1, LMT Service Specification, February 1996

/14/: CiA DS-205-2 V1.1, LMT Protocol Specification, February 1996

/15/: CiA DS-206 V1.1, Application Specific Data Types, February 1996

/16/: CiA DS-207 V1.1, Application Layer Naming Specification, February 1996

/17/: CiA/DS-301 V2.0, CANopen Communication Profile based on CAL, December 1996

/18/: DIN IEC 751, Industrielle Platin-Widerstandsthermometer und Platin-Meßwiderstände, December 1990

3 DEFINITIONS, ACRYNOMS AND ABBREVIATIONS

CAL

CAN Application Layer. The application layer for CAN-based networks as specified by CiA in Draft Standard 201 ... 207.

CAN

Controller Area Network. Data link layer protocol for serial communication as specified in ISO 11898.

CiA

CAN in Automation international manufacturer and user organisation e.V.: non-profit association for Controller Area Network (CAN).

CMS

CAN-based Message Specification. One of the service elements of the application layer in the CAN Reference Model.

COB

Communication Object. (CAN Message) A unit of transportation in a CAN Network. Data must be sent across a Network inside a COB.

COB-ID

COB-Identifier. Identifies a COB uniquely in a Network. The identifier determines the priority of that COB in the MAC sub-layer too.

DBT

Distributor. One of the service elements of the application in the CAN Reference Model. Its the responsibility of the DBT to distribute COB-ID's to the COB's that are used by CMS.

LMT

Layer Management. One of the service elements of the application in the CAN Reference Model. It serves to configure parameters of each layer in the CAN Reference Model.

NMT

Network Management. One of the service elements of the application in the CAN Reference Model. It performs initialisation, configuration and error handling in a CAN network.

PDO

Process Data Object. Object for data exchange between several devices

SDO

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

4 OPERATING PRINCIPLE

4.1 Introduction

The purpose of the I/O modules is to connect sensors and actors to the CAN bus. They can receive configuration information via the service data objects such as I/O configurations, conversion parameters for converting data into meaningful measurements and so on. At run time, data can be read from the sensor over the CAN bus by either a request or interrupt (event) mechanism. The I/O modules also have an process data object mapping which may be configured over an service data object for real time operation.

Data can also be sent via the CAN bus to those I/O modules that have output capabilities. Output data can be sent to an I/O module via service data objects or process data objects.

The I/O modules themselves are controlled by either the configuration master or put as remote modules for an Intelligent Peripheral Device.

4.2 Standardisation Via Profiling

The two principal advantages of the profile approach to device specification are in the areas of system integration and device standardisation. If two independent device manufacturers are to design products which are to communicate with each other then each manufacturer must be provided with a specification of the other manufacturers device. This specification could take many forms if left to individual manufacturers to produce. The concept of device profiling provides a standard for producing such specifications. By adopting this approach all manufacturers will specify their devices in a similar fashion which greatly reduces the effort involved in system integration.

The other clear advantage of the profile approach to device specification is that it can be used to guide manufacturers into producing standardised devices. The advantages of standardised devices are numerous. Perhaps most importantly the idea of a standardised device decouples a system integrator from a specific supplier. If one supplier cannot meet product demand, for example, the integrator can use devices from another supplier without having to re-configure network software. On the other hand the supplier is not forced any more to implement a private protocol for each customer.

A device profile defines a *standard device*. This standard device specifies a basic functionality which every device within a class must exhibit. This mandatory functionality is necessary to ensure at least simple non-manufacturer-specific operation of a device is possible[1].

[1]For example the standard drive unit provides a 'HALT' function to stop a drive from moving. This function is defined as mandatory such that any drive unit supporting the drive profile can be halted using the same message.

The concept of device standardisation is extended by the notion of optional functionality defined within the standard device profiles. Such optional functionality does not have to be implemented by all manufacturers. However, if a manufacturer wishes to implement such functionality he must do so in the manner defined for the standard device.

The concept of optional functionality provides a very powerful mechanism to ensure all manufacturers implementing particular functionality do so in a defined fashion[2].

The device profiles provide a mechanism by which manufacturers wishing to implement truly manufacturer specific functionality can do so. This is clearly necessary since it would be impossible to anticipate all possible device functionality and define this in the optional category of each device class. This approach guarantees that the standard device profiles are 'future-proof'.

By defining mandatory device characteristics basic network operation is guaranteed. By defining optional device features a degree of defined flexibility can be built in. By leaving 'hooks' for manufacturer specific functionality manufacturers will not be constrained to an out-of-date standard.

4.3 The Object Dictionary

The most important part of a device profile is the object dictionary description. The object dictionary is essentially a grouping of objects accessible via the network in an ordered pre-defined fashion. Each object within the dictionary is addressed using a 16-bit index.

[2] For example, the standard digital I/O module may define optional functionality to cater for units with up to 64 I/O channels (This is specified in the device profile). Whilst many units will not use anything like this number of I/O the definition ensures that 64-channel I/O modules developed by independent manufacturers will be largely interchangeable.

The overall layout of the standard object dictionary is shown below. This layout closely conforms with DRIVECOM and Profibus:

Index (hex)	Object
0000	not used
0001-001F	Static Data Types
0020-003F	Complex Data Types
0040-005F	Manufacturer Specific Data Types
0060-0FFF	Reserved for further use
1000-1FFF	Communication Profile Area
2000-5FFF	Manufacturer Specific Profile Area
6000-9FFF	Standardised Device Profile Area
A000-FFFF	Reserved for further use

Table 4.1: Object Dictionary Structure

The Standard Object Dictionary may contain a maximum of 65536 entries which are addressed through a 16bit index.

The Static Data Types at indices 0001h through 001Fh contain type definitions for standard data types like Boolean, integer, floating point, string, etc. These entries are included for reference only, they cannot be read or written.

Complex Data Types at indices 0020h through 003Fh are pre-defined structures that are composed of standard data types and are common to all devices.

Manufacturer Specific Data Types at indices 0040h through 005Fh are also structures composed of standard data types but are specific to a particular device.

The Communication Profile Area at indices 1000 through 1FFF contains the communication specific parameters for the CAN network. These entries are common to all devices.

The Standardised Device Profile Area at indices 6000h through 9FFFh contains all data objects common to a class of devices that can be read or written via the network.

The object dictionary for each device type has a range of mandatory entries. These entries ensure that all devices of a particular type behave in a defined manner (at least from a basic functionality viewpoint). The object dictionary concept caters for optional device features which means a manufacturer does not have to provide certain extended functionality on his devices but if he wishes to do so he must do it in a pre-defined fashion[3].

[3]For example the mandatory part of the object dictionary for a digital output module could define how to access a minimum number of outputs (8 for example). Manufacturers wishing to implement devices with

By defining object dictionary entries for anticipated increased functionality in an optional category manufacturers wishing to implement enhanced functionality will all do so in the same way[4].

4.3.1 Index and Sub-Index Usage

A 16-bit index is used to address all entries within the object dictionary. In case of a simple variable this references the value of this variable directly. In case of records and arrays however, the index addresses the whole data structure. To allow individual elements of structures of data to be accessed via the network a sub-index has been defined. For single object dictionary entries such as an unsigned8, Boolean, integer32 etc. the value for the sub-index is always zero. For complex object dictionary entries such as arrays or records with multiple data fields the sub-index references fields within a data-structure pointed to the main index. For example on a analogue module exist a data-structure at index 640CH which defines the upper limit of an analogue value. If the analogue input rises above this value a PDO message is triggered. The sub-index concept can be used to access these individual fields[5] as shown below:

Main Index	Sub Index	Variable Accessed	Data Type
640C	0	Number of analogue inputs	Unsigned8
	1	Analogue input 1	Unsigned32
	2	Analogue input 2	Unsigned32
	3	Analogue input 3	Unsigned32

Table 4.2: Use of Index and Sub-Index

eight outputs would merely conform with the defined standard. However manufacturers wishing to make modules with a greater number of outputs would have no standard to operate within. They would be free to define the communication with the other output signals as they wished. This could lead to module incompatibility problems.

[4]Space is left in the object dictionary at indices 2000h through 5FFFh for truly manufacturer specific functionality.

[5]The fields accessed by the sub-index can be of differing data types.

5 EMERGENCY MESSAGES

5.1 Principle

Emergency Messages are 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 contain the error field with pre-defined error numbers and additional information's. See also /17/.

5.2 Error Code meanings

Error Code (hex)	Meaning	Defined By
0000	NO Error	Comm. Prof.
1000	Generic Error	Comm. Prof.
2000	Current	Comm. Prof.
2100	Device input current	Comm. Prof.
2110	Short circuit	I/O Prof.
2200	Device internal current	Comm. Prof.
2300	Device output current	Comm. Prof.
2310	Current at Outputs to high (Overload)	I/O Prof.
2320	Short Circuit at Outputs	I/O Prof.
2330	Load dump at Outputs	I/O Prof.
3000	Voltage	Comm. Prof.
3100	Device input voltage (Mains) out of range	Comm. Prof.
3110	Input voltage too high	I/O Prof.
3120	Input voltage too low	I/O Prof.
3200	Device internal voltage out of range	Comm. Prof.
3210	Internal voltage too high	I/O Prof.
3220	Internal voltage too low	I/O Prof.
3300	Device output voltage out of range	Comm. Prof.
3310	Output voltage too high	I/O Prof.
3320	Outout voltage too low	I/O Prof.
3330	Output voltage missing	I/O Prof.
4000	Temperature	Comm. Prof.
4200	Temp. inside the device out of range	Comm. Prof.
5000	Device Hardware	Comm. Prof.
6000	Device Software	Comm. Prof.
7000	Additional Modules	Comm. Prof.
8000	Monitoring	Comm. Prof.
9000	External Error	Comm. Prof.
F000	Additional Functions	Comm. Prof.
FFFF	Device specific.	Comm. Prof.

6 PREDEFINITIONS

6.1 Principle

If a device supports a specific type of I/O (analogue/digital/input/output) it must support the related default PDO. If one device support e.g. digital inputs, digital outputs an analogue inputs it has to support the default PDO for these „channels“. It is open to a manufacturer to specify additional PDO mappings and it is also open to a user to change these default settings by changing the mapping structure, if the module supports variable mapping on these PDOs.

There are four default PDOs for I/O devices, two for digital inputs/outputs and two for analogue inputs/outputs. If a device supports no digital I/Os, PDO_001 should remain unused. If a device supports more then 64 I/Os and no analogue I/Os, PDO_002 should remain unused and the additional Data should use PDO_003 and so forth.

6.2 Naming conventions

The first three characters of CMS name is an device profile identification (See /17/) and is defined for this device profile as: <401>. (According to the number of this Standard).

6.3 Mapping

The default mapping defines default values for communication objects (1000H to 1FFF) which are not defined by the communication profile. (See /17/).

6.3.1 Index 1000H (Device type)

The object at index 1000H describes the type of device and its functionality.

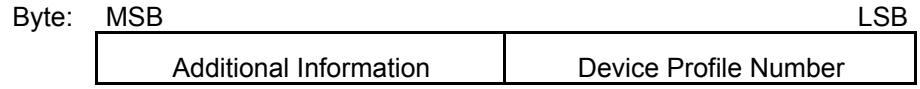


Figure 11.2: Structure of the Device Type Parameter

Device Profile Number: 401D

Additional Information:
- 1st Bit: digital input
- 2nd Bit: digital output
- 3rd Bit: analogue input
- 4th Bit: analogue output
- Rest: reserved for future use

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

6.3.2 Index 1001 (Status)

The device specific bit in the status word is reserved for future use.

6.3.3 1st receive PDO mapping (digital outputs)

This PDO[6] receives the values of maximum 64 digital outputs from a other device in a asynchronous way.

Note: Next to the default mapping, the outputs have to follow the default settings in the object dictionary (Index 6000 to 6BFF)

Index	Sub-Index	Comment	Default Value
1400H	0	COB-ID used by PDO	See /17/
	1	transmission type	255H
	2	inhibit time	See /17/
	3	CMS priority group	3H[7]

Index	Sub-Index	Comment	Default Value
1600H	0	number of mapped objects	6001 00H[8]
	1	1st object to be mapped	6001 01H
	2	2nd object to be mapped	6001 02H
	8	8th object to be mapped	6001 08H

The number of mapped objects in to the PDO depends on the hardware.

[6] According to the naming convention the CMS Name is 401RPDO001xxx, where xxx is the module-id.

[7] Nodes which support DBT slave capabilities should apply for this CMS priority group during NMT Bootup.

[8] The default value correspond to a index and subindex in the object dictionary of this device profile. E.g. „6001 00“ is Index 6001, Subindex 00. (The space between the two numbers is just to simplify the reading.)

6.3.4 1st transmit PDO mapping (digital inputs)

This PDO transmit the values of maximum 64 digital inputs in a event driven way.

Note: Next to the default mapping, the outputs have to follow the default settings in the object dictionary (Index 6000 to 6BFF)

Index	Sub-Index	Comment	Default Value
1800H	0	COB-ID used by PDO	See /17/
	1	transmission type	255H
	2	inhibit time	See /17/
	3	CMS priority group	3H

Index	Sub-Index	Comment	Default Value
1A00H	0	number of mapped objects	6000 00H
	1	1st object to be mapped	6000 01H
	2	2nd object to be mapped	6000 02H
	8	8th object to be mapped	6000 08H

The number of mapped objects in to the PDO depends on the hardware.

6.3.5 2nd receive PDO mapping (analogue outputs)

This PDO[9] receives the values of maximum 4 analogue outputs in a asynchronous way.

Note: Next to the default mapping, the outputs have to follow the default settings in the object dictionary (Index 6C00 to 6FFF)

Index	Sub-Index	Comment	Default Value
1401H	0	COB-ID used by PDO	See /17/
	1	transmission type	255H
	2	inhibit time	See /17/
	3	CMS priority group	3H

Index	Sub-Index	Comment	Default Value
1601H	0	number of mapped objects	6411 00H
	1	1st object to be mapped	6411 01H
	2	2nd object to be mapped	6411 02H
	4	4th object to be mapped	6411 04H

The number of mapped objects in to the PDO depends on the hardware.

[9] According to the naming convention the CMS Name is 401RPDO002xxx, where xxx is the module-id.

6.3.6 2nd transmit PDO mapping (analogue inputs)

This PDO[10] transmit the values of maximum 4 analogue inputs on request. (Request by remote frame)

Note: Next to the default mapping, the outputs have to follow the default settings in the object dictionary (Index 6C00 to 6FFF)

Index	Sub-Index	Comment	Default Value
1801H	0	COB-ID used by PDO	See /17/
	1	transmission type	255H
	2	inhibit time	See /17/
	3	CMS priority group	3H

Index	Sub-Index	Comment	Default Value
1A01H	0	number of mapped objects	6401 00H
	1	1st object to be mapped	6401 01H
	2	2nd object to be mapped	6401 02H
	4	4th object to be mapped	6401 04H

The number of mapped objects in to the PDO depends on the hardware.

[10] According to the naming convention the CMS Name is 401TPDO002xxx, where xxx is the module-id.

7 OBJECT DICTIONARY

Each module shares the dictionary entries from 6000H to 63FFH. These entries are common to all I/O modules and each module only implements the part of the dictionary relevant to its functions. See also /17/. NOTE that all indices shown in the 'Index' column are hexadecimal.

The entries for each individual module are shown below. The M and O stand for mandatory and optional commands respectively. Mandatory commands have been kept to a minimum to allow for maximum flexibility.
If a Object is of type ‘Array’ or ‘Record’, the first subindex contains the total number of subindexes. If an Object of this type is used in a implementation, the first subindex is always mandatory.

7.1 The Digital Input/Output Module

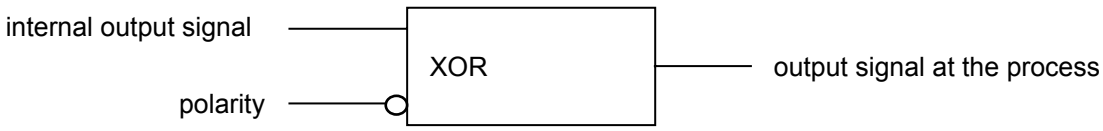
7.1.1 Object Dictionary for the Digital Input and Output Modules

Data Format
The data transmitted in the SDO to control and parameterize the modules is binary coded.
‘1’ means a feature is enabled
‘0’ means disabled
Example:
Command: Write State 8 Output Lines
Data: 00010011
Meaning: 1st, 2nd and 5th output lines are set high

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 Write Output Interrupt Mask Fault Mode.....	enabled: 0 change to 1 1 change to 0 disabled: 0 remains 0 1 remains 1	Sensor or Actuator

Example of the polarity with a digital outPut:



Access to 1-, 8-, 16- and 32-points

Thee are different objects to allow 1-, 8-, 16- or 32-bit access to inputs or outputs (e.g. definition of polarity). If these objects define the same function, they accessingle data base. Example: If object 6002H (polarity 8 bit) subindex 1 has the value and subindex 2 the value 0FH, object 6102 (polarity 16 bit) subindex 1 will have the value 0FH

7.1.2 Digital Input Module

8 bit commands

Index	Object	Name	Type	M/O
6000H	Array	Read State 8 Input Lines	Unsigned8	O
6001H		reserved		
6002H	Array	Polarity 8 Input Lines	Unsigned8	O
6003H	Array	Filter Constant 8 Input Lines		
6004H		reserved		
6005H	Var.	Enable Digital Input Interrupts	Boolean	
6006H	Array	Input Interrupt Mask 8 Input Lines any change	Unsigned8	O
6007H	Array	Input Interrupt Mask 8 Input Lines low to high	Unsigned8	O
6008H	Array	Input Interrupt Mask 8 Input Lines high to low	Unsigned8	O
6009H		reserved		

The following table describes the commands for a 1, 16 and 32 bit access.

:	:	:	:	:
601FH		reserved		
6020H	Record	Read State 1 Input Line 1-128		O
6021H	Record	Read State 1 Input Line 128-256		O
:	:	:	:	:
6027H	Record	Read State 1 Input Line 896-1024		O
6028H		reserved		
:	:	:	:	:
602FH		reserved		
6030H	Record	Polarity 1 Input Line 1-128		O
:	:	:	:	:
6037H	Record	Polarity 1 Input Line 896-1024		O
6038H	Record	Filter Constant 1 Input Line 1-128		
:	:	:	:	:
6045H	Record	Filter Constant 1 Input Line 896-1024		
604FH		reserved		
6050H	Record	Interrupt Mask 1 Input Line 1-128 (any change)		O
:	:	:	:	:
6057H	Record	Interrupt Mask 1 Input Line 896-1024 (any change)		O
6058H		reserved		
:	:	:	:	:
605FH		reserved		
6060H	Record	Interrupt Mask 1 Input Line 1-128 (low to high)		O
:	:	:	:	:
6067H	Record	Interrupt Mask 1 Input Line 896-1024 (low to high)		O
6068H		reserved		
:	:	:	:	:
606FH		reserved		
6070H	Record	Interrupt Mask 1 Input Line 1-128 (high to low)		O
6071H	Record	Interrupt Mask 1 Input Line 128-256 (high to low)		O
:	:	:	:	:
6077H	Record	Interrupt Mask 1 Input Line 896-1024 (high to low)		O
6078H		reserved		
:	:	:	:	:
60FFH		reserved		
6100H	Record	Read State 16 Input Lines		O
6101H		reserved		
6102H	Record	Polarity 16 Input Lines		O
6103H	Record	Filter Constant 16 Input Lines		
6104H		reserved		
6105H		reserved		
6106H	Record	Input Interrupt Mask 16 Input Lines any change		O

6107H	Record	Input Interrupt Mask 16 Input Lines low to high		O
6108H	Record	Input Interrupt Mask 16 Input Lines high to low		O
6109H		reserved		
:	:	:	:	:
611FH		reserved		
6120H	Record	Read State 32 Input Lines		O
6121H		reserved		
6122H	Record	Polarity 32 Input Lines		O
6123H	Record	Filter Constant 32 Input Lines		
:	:	:	:	:
6125H		reserved		
6126H	Record	Input Interrupt Mask 32 Input Lines any change		O
6127H	Record	Input Interrupt Mask 32 Input Lines low to high		O
6128H	Record	Input Interrupt Mask 32 Input Lines high to low		O
:	:	:	:	:
61FFH		reserved		

7.1.3 Digital Output Module

8 bit commands

Index	Object	Name	Type	M/O
6200H	Array	Write State 8 Output Lines	Unsigned8	O
6201H	Array	Toggle State 8 Output Lines	Unsigned8	O
6202H	Array	Polarity 8 Output Lines	Unsigned8	O
6203H		reserved		
:	:	:	:	:
6205H		reserved		
6206H	Array	Fault Mode 8 Output Lines	Unsigned8	O
6207H	Array	Fault State 8 Output Lines	Unsigned8	O
6208H	Array	Filter Constant 8 Output Lines	Unsigned8	O
6209H		reserved		

The following table describes the commands for a 1, 16 and 32 bit access.

:	:	:	:	:
621FH		reserved		
6220H	Record	Write State 1 Output Line 1-128		O
6221H	Record	Write State 1 Output Line 128-256		O
:	:	:	:	:
6227H	Record	Write State 1 Output Line 896-1024		O
6228H		reserved		
6229H		reserved		
6230H	Record	Toggle State 1 Output Line 1-128		O
6231H	Record	Toggle State 1 Output Line 128-256		O
:	:	:	:	:
6237H	Record	Toggle State 1 Output Line 896-1024		O
6238H		reserved		
:	:	:	:	:
623FH		reserved		
6240H	Record	Polarity 1 Output Line 1-128		O
6241H	Record	Polarity 1 Output Line 128-256		O
:	:	:	:	:
6247H	Record	Polarity 1 Output Line 896-1024		O
6248H		reserved		
:	:	:	:	:
624FH		reserved		
6250H	Record	Fault Mode 1 Output Line 1-128		O
6251H	Record	Fault Mode 1 Output Line 128-256		O
:	:	:	:	:

6257H	Record	Fault Mode 1 Output Line 896-1024		O
6258H		reserved		
:	:	:	:	:
625FH		reserved		
6260H	Record	Fault State 1 Output Line 1-128		O
6261H	Record	Fault State 1 Output Line 128-256		O
:	:	:	:	:
6267H	Record	Fault State 1 Output Line 896-1024		O
6268H		reserved		
:	:	:	:	:
626FH		reserved		
6270H	Record	Filter Constant 1 Output Line 1-128		O
6271H	Record	Filter Constant 1 Output Line 128-256		O
:	:	:	:	:
6277H	Record	Filter Constant 1 Output Line 896-1024		O
6278H		reserved		
:	:	:	:	:
62FFH		reserved		
6300H	Record	Write State 16 Output Lines		O
6301H	Record	Toggle State 16 Output Lines		O
6302H	Record	Polarity 16 Output Lines		O
6303H		reserved		
6304H		:	:	
6305H		reserved		O
6306H	Record	Fault Mode 16 Output Lines		O
6307H	Record	Fault State 16 Output Lines		O
6308H	Record	Filter Constant 16 Output Lines		
6309H		reserved		
:	:	:	:	:
631FH		reserved		
6320H	Record	Write State 32 Output Lines		O
6321H	Record	Toggle State 32 Output Lines		O
6322H	Record	Polarity 32 Output Lines		O
6323H		reserved		
:	:	:	:	:
6325H		reserved		
6326H	Record	Fault Mode 32 Output Lines		O
6327H	Record	Fault State 32 Output Lines		O
6328H	Record	Filter Constant 32 Output Lines		O
6329H		reserved		
:	:	:	:	:
63FFH		reserved		

7.1.4 Analogue Input Module

Index	Object	Name	Type	M/O
6400H	Record	Read Input 8		O
6401H	Record	Read Input 16		O
6402H	Record	Read Input 32		O
6403H	Record	Read Input - Converted		O
6404H	Record	Read Input Manufacturer specific		O

7.1.5 Analogue Output Module

6410H	Record	Write Output 8		O
6411H	Record	Write Output 16		O
6412H	Record	Write Output 32		O
6413H	Record	Write Output - Converted		O
6414H	Record	Write Output Manufacturer specific		

7.1.6 Analogue Input Set-ups

6420H	Record	Input Range		O
6421H	Array	Interrupt Trigger Selection	Unsigned8	O
6422H	Record	Interrupt Source		O
6423H	Var.	Global Interrupt Enable	Boolean	O
6424H	Record	Input Interrupt Upper Limit		O
6425H	Record	Input Interrupt Lower Limit		O
6426H	Record	Input Interrupt Delta		O
6427H	Record	Input Interrupt Negative Delta		O
6428H	Record	Input Interrupt Positive Delta		O
6429H	Record	Input Interrupt Upper Limit Converted		O
642AH	Record	Input Interrupt Lower Limit Converted		O
642BH	Record	Input Interrupt Delta Converted		O
642CH	Record	Input Interrupt Negative Delta Converted		O
642DH	Record	Input Interrupt Positive Delta Converted		O
642EH	Record	Input Conversion Offsets		O
642FH	Record	Input Conversion Scaling		O

7.1.7 Analogue Output Set-ups

6440H	Record	Output Range		O
6441H	Record	Output Conversion Offsets		O
6442H	Record	Output Conversion Scaling		O
6443H	Array	Output Fault Mode	Unsigned8	O
6444H	Record	Default Output Fault State Unconverted		O
6445H	Record	Default Output Fault State Converted		O
6446H	:	Reserved for future use		
to				
67FFH	:	Reserved for future use		

8 Object Descriptions

This section describes the commands or object dictionary entries associated with each DIO module. PLEASE NOTE that numbers proceeded by the letter 'H' represent hexadecimal numbers. Also note that the object function tables for each dictionary entry refer to all object elements.

General Notes:

The interupts define, if a change on an input signal cause the transmission of a PDO. If the global interrupt (object 6005H for digital inputs, object 6423H for analogue inputs) is enabled, the module works in an event driven mode, if the interrupt is disabled, the actual value of the input(s) can be only read by a remote access. By default, the global interrupt for digital inputs is enabled, for analogue inputs disabled.

8.1 Digital Input Module

8.1.1 Object 6000H

Reads a group of 8 input lines as a byte of information. A maximum of 255 * 8 bit input blocks are addressable (2040 inputs). In a byte group it is possible to address 2040 inputs per module.

INDEX	6000H
Variable Name	Read State 8 Input Lines
Object Code	8H
Number Of Elements	0H (Mandatory) 1H - FFH (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_8_Inputs_State
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Read_8_Inputs_1H-8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	NO
Mandatory Range	NO

Sub-Index	2H
Description	Read_8_Inputs_9H-10H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Read_8_Inputs_7F1H-7F8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	NO
Mandatory Range	NO

8.1.2 Object 6002H

Defines the polarity of a group of 8 input lines.

INDEX	6002H
Variable Name	Polarity 8 Input Lines
Object Code	8H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_8_Inputs_Polarity
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Polarity_8_Inputs_1H-8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	NO
Error Codes	YES
Value Range	Unsigned8
Default Value	0H
Mandatory Range	NO

to

Sub-Index	FFH
Description	Polarity_8_Inputs_7F1H-7F8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	0H
Mandatory Range	NO

8.1.3 Object 6003H

Filter constant for input modules. This defines that an additional configurable filter constant can be enabled or disabled.

INDEX	6003H
Variable Name	Filter Constant 8 Input Lines
Object Code	8H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_8_Inputs_Filter_Constant
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Filter_Constant_8_Inputs_1H-8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Filter_Constant_8_Inputs_7F1H-7F8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	NO
Mandatory Range	NO

8.1.4 Object 6005H

Globally enable/disable Input interrupts.

INDEX	6005H
Variable Name	Enable Digital Input Interrupts
Object Code	5H
Number Of Elements	1H

Object Description

Sub-Index	0H
Description	Enable_Digital_Input_Interrupts
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	NO
Error Codes	YES
Value Range	Boolean
Default Value	1
Mandatory Range	NO

8.1.5 Object 6006H

Determines which input port lines activate an interrupt. Done for groups of 8 lines and for any change of a digital input line. By default, every input activates an interrupt.

INDEX	6006H
Variable Name	Input Interrupt Mask 8 Input Lines any change
Object Code	8H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_8_Inputs_Interrupt_any
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Interrupt_any_8_Inputs_1H-8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	FFH
Mandatory Range	NO

to

Sub-Index	FFH
Description	Interrupt_any_8_Inputs_7F1H-7F8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	FFH
Mandatory Range	NO

8.1.6 Object 6007H

Determines which input port lines activate an interrupt. Done for groups of 8 lines and for a change from low to high of a digital input line. The values are in an „OR“ connection to the values of object 6006H.

INDEX	6007H
Variable Name	Input Interrupt Mask 8 Input Lines low to high
Object Code	8H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_8_Inputs_Interrupt_tohigh
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Interrupt_tohigh_8_Inputs_1H-8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Interrupt_tohigh_8_Inputs_7F1H-7F8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	NO
Mandatory Range	NO

8.1.7 Object 6008H

Determines which input port lines activate an interrupt. Done for groups of 8 lines and for a change from high to low of a digital input line. The values are in an „OR“ connection to the values of object 6006H.

INDEX	6008H
Variable Name	Input Interrupt Mask 8 Input Lines high to low
Object Code	8H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_8_Inputs_Interrupt_tolow
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Interrupt_tolow_8_Inputs_1H-8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Interrupt_tolow_8_Inputs_7F1H-7F8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	NO
Mandatory Range	NO

8.1.8 Object 6020H

Reads a single input line information. A maximum of 128 bit inputs are addressable at one index.

INDEX	6020H
Variable Name	Read State 1 Input Line 1-128
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Input_State_1_128
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Read_1_Input_1_128_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

Sub-Index	2H
Description	Read_1_Input_1_128_2H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Read_1_Input_1_128_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.1.9 Object 6021H to Object 6027H

Reads a single input line information. A maximum of 128 bit inputs are addressable at one index.

INDEX	6027H
Variable Name	Read State 1 Input Line 896-1024
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Input_State_896_1024
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Read_1_Input_896_1024_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Read_1_Input_896_1024_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.1.10 Object 6030H

Sets the polarity of a single input line. A maximum of 128 bit inputs are addressable at one index.

INDEX	6030H
Variable Name	Polarity 1 Input Line 1-128
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Input_ Polarity _1_128
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Polarity _1_Input_1_128_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

Sub-Index	2H
Description	Polarity _1_Input_1_128_2H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Polarity _1_Input_1_128_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.1.11 Object 6031H to Object 6037H

INDEX	6037H
Variable Name	Polarity 1 Input Line 896 -1024
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Input_ Polarity_896_1024
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Polarity_1_Input_896_1024_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Polarity_1_Input_896_1024_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.1.12 Object 6038H

Filter constant for input modules. This defines that a additional configurable filter constant can be enabled or disabled.

INDEX	6038H
Variable Name	Filter Constant 1 Input Line 1-128
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Input_Filter_Constant_1_128
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Filter_Constant_1_Input_1_128_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

Sub-Index	2H
Description	Filter_Constant_1_Input_1_128_2H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Filter_Constant_1_Input_1_128_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.1.13 Object 6039H to Object 6045H

INDEX	6039H
Variable Name	Filter Constant 1 Input Line 896 -1024
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Input_Filter_Constant_896_1024
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Filter_Constant_1_Input_896_1024_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Filter_Constant_1_Input_896_1024_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.1.14 Object 6050H

Sets interrupt mask for a single input line. A maximum of 128 bit inputs are addressable at one index.

INDEX	6050H
Variable Name	Interrupt Mask 1 Input Line 1-128 (any change)
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Input_ Interrupt_any _1_128
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Interrupt_any_1_Input_1_128_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

Sub-Index	2H
Description	Interrupt_any_1_Input_1_128_2H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Interrupt_any_1_Input_1_128_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.1.15 Object 6051H to Object 6057H

INDEX	6057H
Variable Name	Interrupt Mask 1 Input Line 896 -1024 (any change)
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Input_Interrupt_any_896_1024
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Interrupt_any_1_Input_896_1024_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Interrupt_any_1_Input_896_1024_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.1.16 Object 6060H

Sets interrupt mask for a single input line. A maximum of 128 bit inputs are addressable at one index.

INDEX	6060H
Variable Name	Interrupt Mask 1 Input Line 1-128 (low to high)
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Input_Interrupt_tohigh_1_128
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Interrupt_ tohigh_1_Input_1_128_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

Sub-Index	2H
Description	Interrupt_ tohigh_1_Input_1_128_2H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Interrupt_ tohigh_1_Input_1_128_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.1.17 Object 6061H to Object 6067H

INDEX	6067H
Variable Name	Interrupt Mask 1 Input Line 896 -1024 (low to high)
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Input_Interrupt_tohigh_896_1024
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Interrupt_ tohigh_1_Input_896_1024_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Interrupt_ tohigh_1_Input_896_1024_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.1.18 Object 6070H

Sets interrupt mask for a single input line. A maximum of 128 bit inputs are addressable at one index.

INDEX	6060H
Variable Name	Interrupt Mask 1 Input Line 1-128 (high to low)
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Input_Interrupt_tolow_1_128
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Interrupt_ tolow_1_Input_1_128_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

Sub-Index	2H
Description	Interrupt_ tolow_1_Input_1_128_2H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Interrupt_ tolow_1_Input_1_128_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.1.19 Object 6071H to Object 6077H

INDEX	6077H
Variable Name	Interrupt Mask 1 Input Line 896 -1024 (high to low)
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Input_Interrupt_ tolow_896_1024
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Interrupt_ tolow_1_Input_896_1024_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Interrupt_ tolow _1_Input_896_1024_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.1.20 Object 6100H

Reads a group of 16 input lines as a 2 bytes information. A maximum of 255 * 16 bit input blocks are addressable (4080 inputs).

INDEX	6100H
Variable Name	Read State 16 Input Lines
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - FFH (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_16_Inputs_State
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Read_16_Inputs_1H-10H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Read_16_Inputs_FE0H-FF0H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	NO
Mandatory Range	NO

8.1.21 Object 6102H

Defines the polarity for a group of 16 input lines.

INDEX	6102H
Variable Name	Polarity 16 Input Lines
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_16_Inputs_Polarity
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Polarity_16_Inputs_1H-10H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	NO
Error Codes	YES
Value Range	Unsigned16
Default Value	0
Mandatory Range	NO

to

Sub-Index	FFH
Description	Polarity_16_Inputs_FE0H-FF0H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	0
Mandatory Range	NO

8.1.22 Object 6103H

Filter constant for input modules. This defines that an additional configurable filter constant can be enabled or disabled.

INDEX	6103H
Variable Name	Filter Constant 16 Input Lines
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_16_Inputs_Filter_Constant
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Filter_Constant_16_Inputs_1H-10H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Filter_Constant_16_Inputs_FE0H-FF0H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	NO
Mandatory Range	NO

8.1.23 Object 6106H

Determines which input port lines activate an interrupt. Done for groups of 16 lines and for any change of a digital input line.

INDEX	6106H
Variable Name	Input Interrupt Mask 16 Input Lines any change
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_16_Inputs_Interrupt_any
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Interrupt_any_16_Inputs_1H-10H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	FFFFH
Mandatory Range	NO

to

Sub-Index	FFH
Description	Interrupt_any_16_Inputs_FE0H-FF0H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	FFFFH
Mandatory Range	NO

8.1.24 Object 6107H

Determines which input port lines activate an interrupt. Done for groups of 16 lines and for a change from low to high of a digital input line.

INDEX	6107H
Variable Name	Input Interrupt Mask 16 Input Lines low to high
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_16_Inputs_Interrupt_tohigh
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Interrupt_tohigh_16_Inputs_1H-10H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Interrupt_tohigh_16_Inputs_FE0H-FF0H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	NO
Mandatory Range	NO

8.1.25 Object 6108H

Determines which input port lines activate an interrupt. Done for groups of 16 lines and for a change from high to low of a digital input line.

INDEX	6108H
Variable Name	Input Interrupt Mask 16 Input Lines high to low
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_16_Inputs_Interrupt_tolow
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Interrupt_tolow_16_Inputs_1H-10H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Interrupt_tolow_16_Inputs_FE0H-FF0H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	NO
Mandatory Range	NO

8.1.26 Object 6120H

Reads a group of 32 input lines as a 4 bytes information. A maximum of 255 * 32 bit input blocks are addressable (8160 inputs).

INDEX	6120H
Variable Name	Read State 32 Input Lines
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - FFH (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_32_Inputs_State
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Read_32_Inputs_1H-20H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Read_32_Inputs_1FC0H-1FE0H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	NO
Mandatory Range	NO

8.1.27 Object 6122H

Defines the polarity for a group of 32 input lines.

INDEX	6122H
Variable Name	Polarity 32 Input Lines
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_32_Inputs_Polarity
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Polarity_32_Inputs_1H-20H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	NO
Error Codes	YES
Value Range	Unsigned32
Default Value	0
Mandatory Range	NO

to

Sub-Index	FFH
Description	Polarity_32_Inputs_1FC0H-1FE0H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	0
Mandatory Range	NO

8.1.28 Object 6123H

Filter constant for input modules. This defines that an additional configurable filter constant can be enabled and disabled.

INDEX	6123H
Variable Name	Filter Constant 32 Input Lines
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_32_Inputs_Filter_Constant
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Filter_Constant_32_Inputs_1H-20H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Filter_Constant_32_Inputs_1FC0H-1FE0H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	NO
Mandatory Range	NO

8.1.29 Object 6126H

Determines which input port lines activate an interrupt. Done for groups of 32 lines and for any change of a digital input line.

INDEX	6126H
Variable Name	Input Interrupt Mask 32 Input Lines any change
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_32_Inputs_Interrupt_any
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Interrupt_any_32_Inputs_1H-20H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	FFFFFFFFH
Mandatory Range	NO

to

Sub-Index	FFH
Description	Interrupt_any_32_Inputs_1FC0H-1FE0H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	FFFFFFFFH
Mandatory Range	NO

8.1.30 Object 6127H

Determines which input port lines activate an interrupt. Done for groups of 32 lines and for a change from low to high of a digital input line.

INDEX	6127H
Variable Name	Input Interrupt Mask 32 Input Lines low to high
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_32_Inputs_Interrupt_tohigh
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Interrupt_tohigh_32_Inputs_1H-20H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Interrupt_tohigh_32_Inputs_1FC0H-1FE0H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	NO
Mandatory Range	NO

8.1.31 Object 6128H

Determines which input port lines activate an interrupt. Done for groups of 32 lines and for a change from high to low of a digital input line.

INDEX	6128H
Variable Name	Input Interrupt Mask 32 Input Lines high to low
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_32_Inputs_Interrupt_tolow
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Interrupt_tolow_32_Inputs_1H-20H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Interrupt_tolow_32_Inputs_1FC0H-1FE0H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	NO
Mandatory Range	NO

8.2

8.2 Digital Output Module

8.2.1 Object 6200H

Sets a group of 8 output lines as a byte of information. A maximum of 255 * 8 bit output blocks are addressable . In a byte group it is possible to address 2040 outputs per module.

INDEX	6200H
Variable Name	Write State 8 Output Lines
Object Code	8H
Number Of Elements	0H (Mandatory) 1H - FFH (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_8_Outputs_State
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Write_8_Outputs_1H-8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	FFH
Mandatory Range	NO

Sub-Index	2H
Description	Write_8_Outputs_9H-10H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	FFH
Mandatory Range	NO

to

Sub-Index	FFH
Description	Write_8_Outputs_7F1H-7F8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	FFH
Mandatory Range	NO

8.2.2 Object 6201H

Defines to change the output signal of a group of 8 output lines.

INDEX	6201H
Variable Name	Toggle 8 Output Lines
Object Code	8H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_8_Outputs_Toggle
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Toggle_8_Outputs_1H-8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	NO
Error Codes	YES
Value Range	Unsigned8
Default Value	0
Mandatory Range	NO

to

Sub-Index	FFH
Description	Toggle_8_Outputs_7F1H-7F8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	0
Mandatory Range	NO

8.2.3 Object 6202H

Defines the polarity of a group of 8 output lines.

INDEX	6202H
Variable Name	Polarity 8 Output Lines
Object Code	8H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_8_Outputs_Polarity
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Polarity_8_Outputs_1H-8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	NO
Error Codes	YES
Value Range	Unsigned8
Default Value	0
Mandatory Range	NO

to

Sub-Index	FFH
Description	Polarity_8_Outputs_7F1H-7F8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	0
Mandatory Range	NO

8.2.4 Object 6206H

Output line fault mode. This defines the default output mode on detecting a fault condition. Defined for groups of 8 lines (1 bit per line). This equals 1 if the output must revert to a predefined output state on fault detection.

INDEX	6206H
Variable Name	Fault Mode 8 Output Lines
Object Code	8H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_8_Outputs_Fault_Mode
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Fault_Mode_8_Outputs_1H-8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	FFH
Mandatory Range	NO

to

Sub-Index	FFH
Description	Fault_Mode_8_Outputs_7F1H-7F8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	FFH
Mandatory Range	NO

8.2.5 Object 6207H

Output line fault state. This defines the default output state on detecting a fault condition. Defined for groups of 8 outputs. The corresponding bit must be set in the default output line mode.

INDEX	6207H
Variable Name	Fault State 8 Output Lines
Object Code	8H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_8_Outputs_Fault_State
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Fault_State_8_Outputs_1H-8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	0H
Mandatory Range	NO

to

Sub-Index	FFH
Description	Fault_State_8_Outputs_7F1H-7F8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	0H
Mandatory Range	NO

8.2.6 Object 6208H

Filter constant for output modules. This defines that an additional configurable filter constant can be enabled or disabled.

INDEX	6208H
Variable Name	Filter Constant 8 Output Lines
Object Code	8H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_8_Outputs_Filter_Constant
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Filter_Constant_8_Outputs_1H-8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Filter_Constant_8_Outputs_7F1H-7F8H
Data Type	Unsigned8
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Default Value	NO
Mandatory Range	NO

8.2.7 Object 6220H

Sets a single output line information. A maximum of 128 bit outputs are addressable at one index.

INDEX	6220H
Variable Name	Write State 1 Output Line 1-128
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Output_State_1_128
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Write_1_Output_1_128_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

Sub-Index	2H
Description	Write_1_Output_1_128_2H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Write_1_Output_1_128_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.2.8 Object 6221H to Object 6227H

INDEX	6027H
Variable Name	Write State 1 Output Line 896-1024
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Output_State_896_1024
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Write_1_Output_896_1024_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Write_1_Output_896_1024_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.2.9 Object 6230H

Defines to change the output signal of a single output line.

INDEX	6230H
Variable Name	Toggle 1 Output Line 1-128
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Toggle_Blocks_1_Output_ Polarity _1_128
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Toggle_1_Output_1_128_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

Sub-Index	2H
Description	Toggle_1_Output_1_128_2H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Toggle_1_Output_1_128_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.2.10 Object 6231H to Object 6237H

INDEX	6237H
Variable Name	Toggle 1 Output Line 896 -1024
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Output_ Toggle_896_1024
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Toggle_1_Output_896_1024_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Toggle_1_Output_896_1024_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.2.11 Object 6240H

Sets the polarity of a single output line. A maximum of 128 bit outputs are addressable at one index.

INDEX	6240H
Variable Name	Polarity 1 Output Line 1-128
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Output_ Polarity _1_128
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Polarity _1_Output_1_128_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

Sub-Index	2H
Description	Polarity _1_Output_1_128_2H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Polarity _1_Output_1_128_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.2.12 Object 6241H to Object 6247H

INDEX	6247H
Variable Name	Polarity 1 Output Line 896 -1024
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Output_Polarity_896_1024
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Polarity_1_Output_896_1024_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Polarity_1_Output_896_1024_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.2.13 Object 6250H

Output line fault mode. This defines the default output mode on detecting a fault condition. Defined for 1 bit per line. This equals 1 if the output must revert to a predefined output state on fault detection.

INDEX	6250H
Variable Name	Fault Mode 1 Output Line 1-128
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Output_Fault_Mode_1_128
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Fault_Mode_1_Output_1_128_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

Sub-Index	2H
Description	Fault_Mode_1_Output_1_128_2H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Fault_Mode_1_Output_1_128_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.2.14 Object 6251H to Object 6257H

INDEX	6257H
Variable Name	Fault Mode 1 Output Line 896 -1024
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Output_ Fault_Mode_896_1024
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Fault_Mode_1_Output_896_1024_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Fault_Mode_1_Output_896_1024_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.2.15 Object 6260H

Output line fault state. This defines the default output state on detecting a fault condition. Defined for 1 output. The corresponding bit must be set in the default output line mode.

INDEX	6260H
Variable Name	Fault State 1 Output Line 1-128
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Output_Fault_State_1_128
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Fault_State_1_Output_1_128_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

Sub-Index	2H
Description	Fault_State_1_Output_1_128_2H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Fault_State_1_Output_1_128_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.2.16 Object 6261H to Object 6267H

INDEX	6267H
Variable Name	Fault State 1 Output Line 896 -1024
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Output_ Fault_State_896_1024
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Fault_State_1_Output_896_1024_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Fault_State_1_Output_896_1024_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.2.17 Object 6270H

Filter constant for output modules. This defines that a additional configurable filter constant can be enabled or disabled.

INDEX	6270H
Variable Name	Filter Constant 1 Output Line 1-128
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Output_Filter_Constant_1_128
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Filter_Constant_1_Output_1_128_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

Sub-Index	2H
Description	Filter_Constant_1_Output_1_128_2H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Filter_Constant_1_Output_1_128_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.2.18 Object 6271H to Object 6277H

INDEX	6277H
Variable Name	Filter Constant 1 Output Line 896 -1024
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - 80H (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_1_Output_Filter_Constant_896_1024
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - 80H
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Filter_Constant_1_Output_896_1024_1H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

to

Sub-Index	80H
Description	Filter_Constant_1_Output_896_1024_80H
Data Type	Boolean
Length	1
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Boolean
Default Value	NO
Mandatory Range	NO

8.2.19 Object 6300H

Reads a group of 16 output lines as a 2 bytes information. A maximum of 255 * 16 bit output blocks are addressable (4080 outputs).

INDEX	6300H
Variable Name	Write State 16 Output Lines
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - FFH (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_16_Outputs_State
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Write_16_Outputs_1H-10H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Write_16_Outputs_FE0H-FF0H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	NO
Mandatory Range	NO

8.2.20 Object 6301H

Defines to change the output signal of a single output line.

INDEX	6301H
Variable Name	Toggle 16 Output Lines
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_16_Outputs_Toggle
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Toggle_16_Outputs_1H-10H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	NO
Error Codes	YES
Value Range	Unsigned16
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Toggle_16_Outputs_FE0H-FF0H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	NO
Mandatory Range	NO

8.2.21 Object 6302H

Defines the polarity for a group of 16 output lines.

INDEX	6302H
Variable Name	Polarity 16 Output Lines
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_16_Outputs_Polarity
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Polarity_16_Outputs_1H-10H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	NO
Error Codes	YES
Value Range	Unsigned16
Default Value	0
Mandatory Range	NO

to

Sub-Index	FFH
Description	Polarity_16_Outputs_FE0H-FF0H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	0
Mandatory Range	NO

8.2.22 Object 6306H

Output line fault mode. This defines the default output mode on detecting a fault condition. Defined for 1 bit per line. This equals 1 if the output must revert to a predefined output state on fault detection.

INDEX	6306H
Variable Name	Fault Mode 16 Output Lines
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_16_Outputs_Fault_Mode
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Fault_Mode_16_Outputs_1H-10H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	FFFFH
Mandatory Range	NO

to

Sub-Index	FFH
Description	Fault_Mode _16_Outputs_FE0H-FF0H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	FFFFH
Mandatory Range	NO

8.2.23 Object 6307H

Output line fault state. This defines the default output state on detecting a fault condition. Defined for 1 output. The corresponding bit must be set in the default output line mode.

INDEX	6307H
Variable Name	Fault State 16 Output Lines
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_16_Outputs_Fault_State
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Fault_State_16_Outputs_1H-10H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	0H
Mandatory Range	NO

to

Sub-Index	FFH
Description	Fault_State_16_Outputs_FE0H-FF0H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	0H
Mandatory Range	NO

8.2.24 Object 6308H

Filter constant for output modules. This defines that an additional configurable filter constant can be enabled or disabled.

INDEX	6308H
Variable Name	Filter Constant 16 Output Lines
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_16_Outputs_Filter_Constant
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Filter_Constant_16_Outputs_1H-10H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Filter_Constant_16_Outputs_FE0H-FF0H
Data Type	Unsigned16
Length	2
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Default Value	NO
Mandatory Range	NO

8.2.25 Object 6320H

Sets a group of 32 output lines as a 4 bytes information. A maximum of 255 * 32 bit output blocks are addressable (8160 outputs).

INDEX	6320H
Variable Name	Write State 32 Output Lines
Object Code	9H
Number Of Elements	0H (Mandatory) 1H - FFH (Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_32_Outputs_State
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0 - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Write_32_Outputs_1H-20H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Write_32_Outputs_1FC0H-1FE0H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	NO
Mandatory Range	NO

8.2.26 Object 6321H

Defines to change the output signal of a single output line.

INDEX	6321H
Variable Name	Toggle 32 Output Lines
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_32_Outputs_Toggle
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Toggle_32_Outputs_1H-20H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	NO
Error Codes	YES
Value Range	Unsigned32
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Toggle_32_Outputs_1FC0H-1FE0H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	NO
Mandatory Range	NO

8.2.27 Object 6322H

Defines the polarity for a group of 32 output lines.

INDEX	6322H
Variable Name	Polarity 32 Output Lines
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_32_Outputs_Polarity
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Polarity_32_Outputs_1H-20H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	NO
Error Codes	YES
Value Range	Unsigned32
Default Value	0
Mandatory Range	NO

to

Sub-Index	FFH
Description	Polarity_32_Outputs_1FC0H-1FE0H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	0
Mandatory Range	NO

8.2.28 Object 6326H

Output line fault mode. This defines the default output mode on detecting a fault condition. Defined for 1 bit per line. This equals 1 if the output must revert to a predefined output state on fault detection.

INDEX	6326H
Variable Name	Fault Mode 32 Output Lines
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_32_Outputs_Fault_Mode
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Fault_Mode_32_Outputs_1H-20H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	FFFFFFFFH
Mandatory Range	NO

to

Sub-Index	FFH
Description	Fault_Mode_32_Outputs_1FC0H-1FE0H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	FFFFFFFFH
Mandatory Range	NO

8.2.29 Object 6327H

Output line fault state. This defines the default output state on detecting a fault condition. Defined for 1 output. The corresponding bit must be set in the default output line mode.

INDEX	6327H
Variable Name	Fault State 32 Output Lines
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_32_Outputs_Fault_State
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Fault_State_32_Outputs_1H-20H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	0H
Mandatory Range	NO

to

Sub-Index	FFH
Description	Fault_State_32_Outputs_1FC0H-1FE0H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	0H
Mandatory Range	NO

8.2.30 Object 6328H

Filter constant for output modules. This defines that an additional configurable filter constant can be enabled and disabled.

INDEX	6328H
Variable Name	Filter Constant 32 Output Lines
Object Code	9H
Number Of Elements	0H(Mandatory) 1H - FFH(Optional)

Value Description

Sub-Index	0H
Description	Number_Blocks_32_Outputs_Filter_Constant
Data Type	Unsigned8
Length	1
Object Class	Mandatory
Operational Channel Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Default Value	NO
Mandatory Range	NO

Sub-Index	1H
Description	Filter_Constant_32_Outputs_1H-20H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	NO
Mandatory Range	NO

to

Sub-Index	FFH
Description	Filter_Constant_32_Outputs_1FC0H-1FE0H
Data Type	Unsigned32
Length	4
Object Class	Optional
Operational Channel Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Default Value	NO
Mandatory Range	NO

8.3 Analogue Input Module

Unconverted value is the result of the a/d convertion, the convert value is calculated by the formula:

converted value = (unconverted value * input scale) + offset

8.3.1 Object 6400H

Reads the value of the input channel 'n' (unconverted). Value is 8 bits or less in size. The value is always left adjusted. The remaining bits at the right side of the LSB must be set to zero.

E.g.: 4-bit conversion.

Bit	7							0
Sub-Index > 0	X	X	X	X	X	0	0	0
	Sign	MSB			LSB			

MSB: Most Significant Bit from the conversion
LSB: Least Significant Bit from the conversion
X: Depending on the converted value

INDEX	6400H
Variable Name	Read_Analogue_Input_8
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs_8
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H-FFH
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Signed8 (left adjusted)
Length	1
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Signed8 (left adjusted)
Length	1
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES

Value Range	Unsigned8
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Signed8 (left adjusted)
Length	1
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Mandatory Range	NO

8.3.2 Object 6401H

Reads the value of the input channel 'n' (unconverted). Value is 16 bits wide or less. The value is always left adjusted.

E.g.: 12 Bit converter.

Bit	15							8
Sub-Index > 0	X	X	X	X	X	X	X	X
	Sign	MSB						
Bit	7							0
	X	X	X	X	X	0	0	0
					LSB			

MSB: Most Significant Bit from conversion
LSB: Least Significant Bit from conversion
X: Depending on the converted value

INDEX	6401H
Variable Name	Read_Analogue_Input_16
Object Code	9H
Number Of Elements	0H - FFH*

*) If an Input is available, then Number Of Elements 1 - FFH.

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs_16
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Unsigned16 (left adjusted)
Length	2
Object Class	Optional

PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Unsigned16 (left adjusted)
Length	2
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Unsigned16 (left adjusted)
Length	2
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Mandatory Range	NO

8.3.3 Object 6402H

Reads the value of the input channel 'n' (unconverted). Value is 32 bits wide or less. The value is always left adjusted.

E.g.: 24 Bit converter.

Bit	31							24
Sub-Index > 0	X	X	X	X	X	X	X	X
	Sign	MSB						
Bit	23							16
	X	X	X	X	X	X	X	X
Bit	15							8
	X	X	X	X	X	X	X	X
Bit	7							0
	X	0	0	0	0	0	0	0
	LSB							

MSB: Most Significant Bit from conversion
LSB: Least Significant Bit from conversion
X: Depending on the converted value

INDEX	6402H
Variable Name	Read_Analogue_Input_32
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs_32
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Unsigned32 (left adjusted)
Length	2
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Unsigned32 (left adjusted)
Length	2
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Unsigned32 (left adjusted)
Length	2
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

8.3.4 Object 6403H

Reads the value of the input channel 'n' (converted).

INDEX	6403H
Variable Name	Read_Analogue_Input_Converted
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

8.3.5 Object 6404H

Reads the value of the input channel 'n' (in unconverted, converted or manufacturer specific format). E.g. 12-bit conversion value and some statusflags represented in 2 bytes.

INDEX	6404H
Variable Name	Read_Analogue_Input_Manufacturer_Specific
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Manufacturer Specific
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Manufacturer Specific
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Manufacturer Specific
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

8.4 Analogue Output Module

converted value = (unconverted vaule / output scale) - output offset

8.4.1 Object 6410H

Writes the value to the output channel 'n' (unconverted). Value is 8 bits wide or less. The value is always left adjusted.

E.g.: For a 5 Bit converter.

Bit	7							0
Sub-Index > 0	X	X	X	X	X	X	0	0
	Sign	MSB				LSB		

MSB: Most Significant Bit for the conversion
LSB: Least Significant Bit for the conversion
X: Depending on the value to be converted

INDEX	6410H
Variable Name	Write_Analogue_Output_8
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Outputs_8
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Output_1H
Data Type	Signed8 (left adjusted)
Length	1
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Mandatory Range	NO

Sub-Index	2H
Description	Output_2H
Data Type	Signed8 (left adjusted)
Length	1
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Mandatory Range	NO

to

Sub-Index	FFH
Description	Output_FFH
Data Type	Signed8 (left adjusted)
Length	1
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Mandatory Range	NO

8.4.2 Object 6411H

Writes the value to the output channel 'n' (unconverted). Value is 16 bits wide or less. The value is always left adjusted.

E.g.: For a 10 Bit converter.

Bit	15							8
Sub-Index > 0	X	X	X	X	X	X	X	X
	Sign	MSB						
Bit	7							0
	X	X	X	0	0	0	0	0
			LSB					

MSB: Most Significant Bit for the conversion
LSB: Least Significant Bit for the conversion
X: Depending on the value to be converted

INDEX	6411H
Variable Name	Write_Analogue_Output_16
Object Code	9H
Number Of Elements	0H - FFH

*) If an Output is available, then Number Of Elements 1 - FFH.

Value Description

Sub-Index	0H
Description	Number_Analogue_Outputs_16
Data Type	Unsigned8
Length	1
Object Class	Mandatory
PDO Mapping	NO
Error Codes	YES
Value Range	0H -FFH
Mandatory Range	NO

Sub-Index	1H
Description	Output_1H
Data Type	Unsigned16 (left adjusted)
Length	2
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Mandatory Range	NO

Sub-Index	2H
Description	Output_2H
Data Type	Unsigned16 (left adjusted)
Length	2
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Mandatory Range	NO

to

Sub-Index	FFH
Description	Output_FFH
Data Type	Unsigned16 (left adjusted)
Length	2
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned16
Mandatory Range	NO

8.4.3 Object 6412H

Writes the value to the output channel 'n' (unconverted). Value is 32 bits wide or less.

E.g.: For a 20 Bit converter.

Bit	31							24
Sub-Index > 0	X	X	X	X	X	X	X	X
	Sign	MSB						
Bit	23							16
	X	X	X	X	X	X	X	X
Bit	15							8
	X	X	X	X	X	0	0	0
					LSB			
Bit	7							0
	0	0	0	0	0	0	0	0

MSB: Most Significant Bit for the conversion
LSB: Least Significant Bit for the conversion
X: Depending on the value to be converted

INDEX	6412H
Variable Name	Write_Analogue_Output_32
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Outputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H -FFH
Mandatory Range	NO

Sub-Index	1H
Description	Output_1H
Data Type	Unsigned32
Length	2
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

Sub-Index	2H
Description	Output_2H
Data Type	Unsigned32
Length	2
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

to

Sub-Index	FFH
Description	Output_FFH
Data Type	Unsigned32
Length	2
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

8.4.4 Object 6413H

Writes the value to the output channel 'n' (converted).

INDEX	6413H
Variable Name	Write_Analogue_Output_Converted
Object Code	8H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Outputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Output_1H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

Sub-Index	2H
Description	Output_2H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

to

Sub-Index	FFH
Description	Output_FFH
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

8.4.5 Object 6414H

Writes the value to the output channel 'n' (in unconverted, converted or manufacturer specific format). E.g. 12-bit convertion value and some commandflags represented in 2 bytes.

INDEX	6414H
Variable Name	Write_Analogue_Input_Manufacturer_Specific
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Manufacturer Specific
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Manufacturer Specific
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Manufacturer Specific
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

8.5 Analogue Input Set-ups

8.5.1 Object 6420H

Sets the input range/capability for channel 'n', when a hardware configuration is provided.

Bit	Range	Coding
(LSB) 0	0 ... 10 [V]	0000H 7FFFH
1	-10 ... +10 [V]	8000H 7FFFH
2	0 ... 500 [mV] (PT100)	0000H 7FFFH
3	-10 ... 50 [mV] (thermocoupler)	E667H 7FFFH
4	-10 ... 100 [mV] (thermocoupler)	F334H 7FFFH
5	0 ... 20 [mA]	0000H 7FFFH
6	4 ... 20 [mA]	0000H 7FFFH
7	Temperature [°C/10] (-273 ... 3276,7 °C)	F556H 4E20H
8	Resistance [Ohm/10] (0 ... 3276,7 Ohm))	0000H 7FFFH
9 ... F	Reserved for future use	

INDEX	6420H
Variable Name	Set_Analogue_Input_Range
Object Code	8H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs
Data Type	Unsigned8
Length	1
Object Class	Mandatory
PDO Mapping	NO
Error Codes	YES
Value Range	0H -20H
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Unsigned16
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	Unsigned16
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Unsigned16
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	Unsigned16
Mandatory Range	NO

to

Sub-Index	20H
Description	Input_20H
Data Type	Unsigned16
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	Unsigned8
Mandatory Range	NO

8.5.2 Object 6421H

Determines which events cause an interrupt for a specific channel. Bits set in the list below 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 - 7	reserved for future use.

INDEX	6421H
Variable Name	Interrupt_Trigger_Selection
Object Code	8H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs
Data Type	Unsigned8
Length	1
Object Class	Mandatory
PDO Mapping	NO
Error Codes	YES
Value Range	0H - 20H
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	See below
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	See below
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	See below
Mandatory Range	NO

8.5.3 Object 6422H

Determines which channel has produced interrupt. Bits set relate to the number of any channels that have produced interrupts.

INDEX	6422H
Variable Name	Interrupt_Source
Object Code	9H
Number Of Elements	0H ... 8H

Object Description

Sub-Index	0H
Description	Number_of_Interrupt_Source_Banks
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	Unsigned8
Mandatory Range	1 ... 4

Sub-Index	1H
Description	Interrupt_Source_Bank_1
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	YES
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

Sub-Index	2H
Description	Interrupt_Source_Bank_2
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	YES
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

to

Sub-Index	8H
Description	Interrupt_Source_Bank_8
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	YES
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

8.5.4 Object 6423H

Globally enable/disable analogue input interrupts. By default, no analogue input activates an interrupt.

INDEX	6423H
Variable Name	Global_Interrupt_Enable
Object Code	5H
Number Of Elements	1H

Object Description

Sub-Index	0H
Description	Global_Enable_Interrupts
Data Type	Boolean
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	Boolean
Default Value	FALSE
Mandatory Range	NO

8.5.5 Object 6424H

When enabled, interrupt triggered when analogue input rises above this value

INDEX	6424H
Variable Name	Input_Interrupt_Upper_Limit
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

8.5.6 Object 6425H

When enabled, interrupt triggered when analogue input falls below this value

INDEX	6425H
Variable Name	Input_Interrupt_Lower_Limit
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

8.5.7 Object 6426H

When enabled, interrupt triggered when analogue input changes by more than this value from previous reading (rising or falling).

INDEX	6426H
Variable Name	Input_Interrupt_Delta
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

8.5.8 Object 6427H

When enabled, interrupt triggered when analogue input falls by more than this value below the last reading taken.

INDEX	6427H
Variable Name	Input_Interrupt_Negative_Delta
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

8.5.9 Object 6428H

When enabled, interrupt triggered when analogue input rises by more than this value above the last reading.

INDEX	6428H
Variable Name	Input_Interrupt_Positive_Delta
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

8.5.10 Object 6429H

When enabled, interrupt triggered when analogue input rises above this value. (Converted)

INDEX	6429H
Variable Name	Input_Interrupt_Upper_Limit_Converted
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Float
Length	1
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Float
Length	1
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Float
Length	1
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

8.5.11 Object 642AH

When enabled, interrupt triggered when analogue input falls below this value. (Converted)

INDEX	642AH
Variable Name	Input_Interrupt_Lower_Limit_Converted
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

8.5.12 Object 642BH

When enabled, interrupt triggered when analogue input changes by more than this value from previous reading. (Converted)

INDEX	642BH
Variable Name	Input_Interrupt_Delta_Converted
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

8.5.13 Object 642CH

When enabled, interrupt triggered when analogue input falls by more than this value below the last reading taken. (Converted)

INDEX	642CH
Variable Name	Input_Interrupt_Negative_Delta_Converted
Object Code	9H
Number Of Elements	0H to FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Unsigned32
Length	1
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

8.5.14 Object 642DH

When enabled, interrupt triggered when analogue input rises by more than this value above the last reading. (Converted)

INDEX	642DH
Variable Name	Input_Interrupt_Positive_Delta_Converted
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

8.5.15 Object 642EH

Sets the offsets for converting input data to real values for channel 'n'.

INDEX	642EH
Variable Name	Input_Conversion_Offsets
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Outputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Output_1H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

Sub-Index	2H
Description	Output_2H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

to

Sub-Index	FFH
Description	Output_FFH
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

8.5.16 Object 642FH

Sets the scaling for converting input data to real values.

INDEX	642FH
Variable Name	Input_Conversion_Scaling
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Inputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Input_1H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

Sub-Index	2H
Description	Input_2H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

to

Sub-Index	FFH
Description	Input_FFH
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

8.6 Analogue Output Set-ups

8.6.1 Object 6440H

Sets the output driver range/capability for channel 'n', when a hardware configuration is provided.

Bit	Range	Coding
(LSB) 0	0 ... 10 [V]	0000H 7FFFH
1	-10 ... +10 [V]	8000H 7FFFH
2	0 ... 5 [V]	0000H 7FFFH
3	-5 ... +5 [V]	8000H 7FFFH
4	0 ... 20 [mA]	0000H 7FFFH
5	4 ... 20 [mA]	1999H 7FFFH
6	Reserved	-
7	Temperature [°C/10] (-273 ... 3276,7 °C)	F556H 7FFFH
	Resistance [Ohm/10] (0 ... 3276,7 Ohm)	0000H 7FFFH
9 ... F	Reserved for future use	

INDEX	6440H
Variable Name	Set_Analogue_Output_Configuration
Object Code	8H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Outputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - 20H
Mandatory Range	NO

Sub-Index	1H
Description	Output_1H
Data Type	Unsigned16
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	Unsigned16
Mandatory Range	NO

Sub-Index	2H
Description	Output_2H
Data Type	Unsigned16
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	Unsigned16
Mandatory Range	NO

to

Sub-Index	FFH
Description	Output_FFH
Data Type	Unsigned16
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	Unsigned16
Mandatory Range	NO

8.6.2 Object 6441H

Sets the offsets for converting real values to output data for channel 'n'.

INDEX	6441H
Variable Name	Output_Conversion_Offsets
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Outputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Output_1H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

Sub-Index	2H
Description	Output_2H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

to

Sub-Index	FFH
Description	Output_FFH
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

8.6.3 Object 6442H

Sets the scaling for converting real values to output data.

INDEX	6442H
Variable Name	Output_Conversion_Scaling
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Outputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Output_1H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

Sub-Index	2H
Description	Output_2H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

to

Sub-Index	FFH
Description	Output_FFH
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

8.6.4 Object 6443H

Output fault mode. Defines whether an output reverts to a default output value on event of a fault.
0 => actual value rest.
1 => reverts to default value unconverted.
2 => reverts to default value converted.
Rest => reserved

INDEX	6443H
Variable Name	Output_Fault_Mode
Object Code	8H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Outputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Output_1H
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Mandatory Range	NO

Sub-Index	2H
Description	Output_2H
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Mandatory Range	NO

to

Sub-Index	FFH
Description	Output_FFH
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned8
Mandatory Range	NO

8.6.5 Object 6444H

Default output fault value (unconverted). If the fault mode flag is set, the output will revert to the value defined here on detection of a fault.

INDEX	6444H
Variable Name	Default_Output_Fault_Value_Unconverted
Object Code	9H
Number Of Elements	0h - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Outputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Output_1H
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

Sub-Index	2H
Description	Output_2H
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

to

Sub-Index	FFH
Description	Output_FFH
Data Type	Unsigned32
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Unsigned32
Mandatory Range	NO

8.6.6 Object 6445H

Default output fault value (converted). If the fault mode flag is set, the output will revert to the value defined here on detection of a fault.

INDEX	6445H
Variable Name	Default_Output_Fault_Value_Converted
Object Code	9H
Number Of Elements	0H - FFH

Value Description

Sub-Index	0H
Description	Number_Analogue_Outputs
Data Type	Unsigned8
Length	1
Object Class	Optional
PDO Mapping	NO
Error Codes	YES
Value Range	0H - FFH
Mandatory Range	NO

Sub-Index	1H
Description	Output_1H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

Sub-Index	2H
Description	Output_2H
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

to

Sub-Index	FFH
Description	Output_FFH
Data Type	Float
Length	4
Object Class	Optional
PDO Mapping	Possible
Error Codes	YES
Value Range	Float
Mandatory Range	NO

8.6.7 Other Objects

Objects 6446H to 67FFH reserved for future use.