ELOTECH

CANopen Device Profile

for

Measuring Devices and

Closed-Loop Controllers

For R1140, R2000, R2100, R2200, R2400, R2500

Object Dictionary

CiA DS-404

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Contents

Scope

This document represents the device profile for measuring devices and for universal controller devices for measuring or controlling physical quantities like temperature or pressure. These devices use communication techniques which conform to those described in the CiA CANopen Communication Profile DS-301 Version 3.0. This document should be consulted in parallel to this profile.

References

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

/2/: ISO/DIS 11898, 1992, Road Vehicles, Interchange of Digital Information - Controller Area Network (CAN) for high-speed Communication

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

/4/: CiA/DS 102, CAN Physical Layer for Industrial Applications

/5/: CiA/DS 201, CAN Reference Model, April 1994

/6/: CiA/DS 202-1, CMS Service Specification, April 1994

/7/: CiA/DS 202-2, CMS Protocol Specification, April 1994

/8/: CiA/DS 202-3, CMS Encoding Rules, April 1994

/9/: CiA/DS 203-1, NMT Service Specification, April 1994

/10/: CiA/DS 203-2, NMT Protocol Specification, April 1994

/11/: CiA/DS 204-1, DBT Service Specification, April 1994

/12/: CiA/DS 204-2, DBT Protocol Specification, April 1994

/13/: CiA/DS 207, Application Layer Naming Specification, April 1994

/14/: CiA/DS 205-1, LMT Service Specification, April 1994

/15/: CiA/DS 205-2, LMT Protocol Specification, April 1994

/16/: CiA/DS 206, Application Specific Data Types, April 1995

/17/: CiA/DS 301, CAL-based Communication Profile, October 1996

/18/: CIA/DS 401, Device Profile for I/O Modules, December 1996

Definitions, Acronyms and Abbreviations

CiA

CAN in Automation e. V. CAN-Bus international manufacturer and user organisation.

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.

Operating Principle

Introduction

The purpose of this device profile is to describe units for measuring or closed loop control of different physical quantities. As such devices may include quite different functionality, the profile specifies different functional blocks which could be combined in a real device. Which functional blocks are included is coded within the Device type object (1000H)
The purpose of an universal closed loop controller is to control a physical quantity in a process environment. Often these types of controllers are implemented as multi channel controllers.
Once configured via SDO, the controller is able to run its control tasks without necessarily needing further real time communication with host systems. Every controller has a large amount of data for configuration purposes. The control loop itself is realised in the controller device. All data of the controller have to be accessed via SDO. In order to reduce busload the controller communicates based on events. In general there are three types of events - informations, warnings and errors.

- Information - this event is used for indicating that a setpoint has been reached or that an output has been set. Information events may also be used to transfer data (e.g. measuring values) on a cyclical basis For this purpose it is suggested to use the SYNC-message specification of DS-301.
- Warning - this event indicates that a warning limit has been reached,
- Error - this event indicates that an error has occurred on the controller.

The event based communication can be established in the following manner.

1. The controller indicates the host device in the network that an event has occurred.
1. The host device reads the data from the controller via SDO.

General Object Dictionary Layout

All parameters of the controller are accessible via the object dictionary. In order to implement multi channel devices, parameters are arranged in arrays. Each array has up to number_of_channels + 3 entries. The maximum number of available channels is 249.

Index	Sub-Index	Parameter
6000H	0	number_of_channels
	1	parameter x for channel 1
	:	:
	n	parameter x for channel n
	254	simultaneous write access to all channels
	255	data type and object type specifier according to DS-301 (optional)

In order to access a particular parameter via SDO, the parameter must be addressed with the index and the channel has to be addressed with the sub-index. Controllers with only one channel use the sub-indices 0 and 1 only.
Write access to sub-index 254 will set the parameter value for all channels within this index to the value specified.
To improve the readability of the object dictionary, all objects are allied to a function block model. This model collects all objects belonging to a specific function to a function block. These are the

1. Digital input function block
1. Analogue input function block
1. Digital output function block
1. Analogue output function block
1. Controller function block
1. Alarm function block

The function block Controller is divided into functions such as

- process values
- admissible value ranges
- basic controller parameters
- parameter set

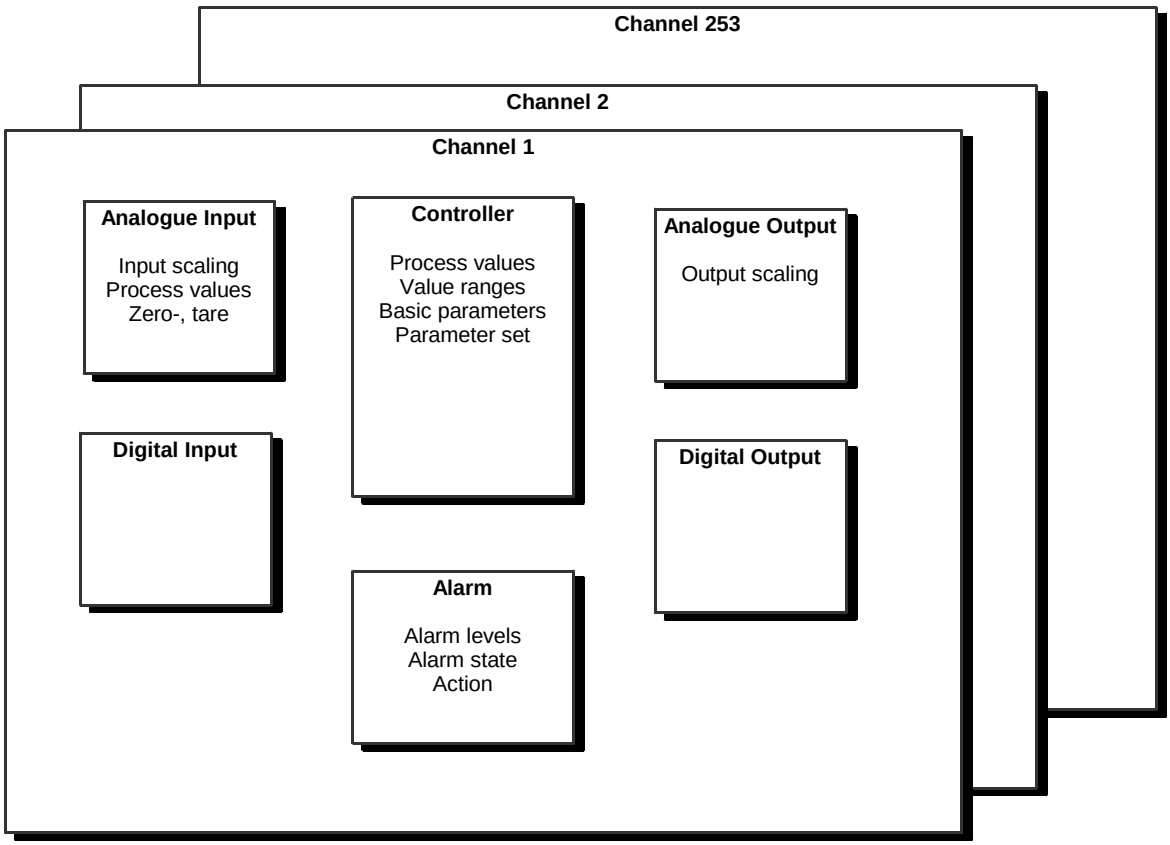


Table 0-1 Function Block Model

Digital Input Function Block

If Module incorporates digital input lines they are addressed according to a subset of the CANopen device profile DS-401. Only 1 and 8 Bit access are defined.

Analogue Input Function Block

This functional block may describe the measuring input of a closed loop controller, but may also be used for a sensor with CANopen interface.

The analogue input function block describes how field values are converted to process values.

Examples for **field values** could be:

- unscaled readings from analogue digital converter
- calibrated electrical value at input terminal of measuring transformer (mA, V, mV/V)

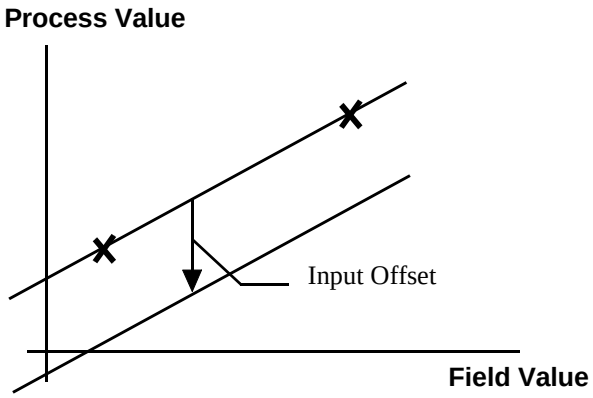
These field values are converted to the real physical dimension of the measured quantity, and the result is called "process value".

Examples for **process values** could be:

- Value in Centigrade for temperature measurement

Non-linear transformation (e.g. for thermocouples, PT100 sensors) is possible and is defined within the parameter "Sensor Type".

The calibration characteristic can be shifted by an additional "**input offset**" value.



The parameters "**Span Start**" and "**Span End**" define the validity range for the process value. If process value exceeds this limits it will be marked as "overflowed".

Digital Output Function Block

If Module incorporates digital output lines they are addressed by a subset of the CANopen device profile according to DS-401. Only 1 and 8 Bit access are defined.

Controller Function Block

The controller function block describes the PID algorithm for controlling all kinds of process values. The process value might be temperature, pressure, mass flow or any other physical value. The PID controller allows two set points, a manual override and a self optimisation.

The controller can be configured as a two-point controller or three-point controller. In the two-point controller mode, the PID algorithm uses the parameters Proportional Band Xp1, Integral Action Time Tn1, Derivative Action Time Tv1 and the Cycle Time T1. In the three-point controller mode the parameters Xp2, Tn2, Tv2 and T2 will be used, too.

The output of the controller can be limited, e.g. to insure a minimum and a maximum pressure. The output of the controller is a read-only variable. Via the self-optimisation algorithm it is possible to calculate the necessary PID parameters automatically. Because of different implementations by the manufacturer the starting conditions have to be noticed.

The two possible set points (W and W2) can only be set within the limits of the objects „Lower Set Point Limit„ (W0) and „Upper Set Point Limit„ (W100). The switching between these set points is performed via the set point switch.

Alarm Function Block

The alarm function block is able to generate alarm messages according to predefined alarm conditions like sensor fault, signal value exceeding specified signal levels, difference between two signals exceeding specified level etc. The output of the alarm function block can be mapped to a PDO. Entering alarm state can also trigger the transmission of emergency messages.
The alarm function block defines objects for up to 2 alarm trigger definitions per channel.
The **Input Value** is compared to **Level** and **Action** is performed when comparison meets the condition specified in **Type**.

Emergency Messages

Principle

Emergency Messages are triggered by internal errors in the device and they are assigned to high priority to minimise bus access latency. By default, the emergency messages contain the error field with pre-defined error numbers and additional information.

Error Code Meanings

Error Code (hex)	Meaning	Defined By
0000	No Error	DS-301
1000	Generic Error	DS-301
2000	Current	DS-301
2100	Current, device input side	DS-301
2110	Short circuit	DS-404
2200	Current inside the device	DS-301
2300	Current, device output side	DS-301
2310	Current at outputs too high (Overload)	DS-404
2320	Short circuit at outputs	DS-404
2330	Load dump at outputs	DS-404
3000	Voltage	DS-301
3100	Mains Voltage	DS-301
3200	Voltage inside the device	DS-301
3300	Output Voltage	DS-301
4000	Temperature	DS-301
4100	Ambient Temperature	DS-301
4200	Device Temperature	DS-301
5000	Device Hardware	DS-301
5010	Self Test	DS-404
5020	Autocalibration	DS-404
6000	Device Software	DS-301
6100	Internal Software	DS-301
6200	User Software	DS-301
6300	Data Set	DS-301
6310	Calibration	DS-404
6311	Input Calibration	DS-404
6312	Output Calibration	DS-404
6320	Controller parameters	DS-404
7000	Additional Modules	DS-301
8000	Monitoring	DS-301
8100	Communication	DS-301
9000	External Error	DS-301
F000	Additional Functions	DS-301
F001	Input Overload	DS-404
F002	Output Overload	DS-404
F011	Limit Exceeded	DS-404
F020	Tara Overflow	DS-404
F030	Self-Optimisation failed	DS-404
FF00	Device specific	DS-301
FF11	Device specific: Alarm 1 of the Controller	
FF12	Device specific: Alarm 2 of the Controller	
FF19	Device specific: Alarm "Er.Cu" (min. Heatcurrent) of the Controller	

Additional Error Codes

The additional error code uses the following format

Byte MSB	Byte LSB
Manufacturer specific error detail	Channel number

The least significant byte of the add. error code xx contains the channel number where error occurred (for multi-channel devices). The most significant byte of the add. error code can be used manufacturer specific to give more detailed explanation of error reason.

Predefinitions

Principle

To enable asynchronous cyclic transmission of PDOs without a sync master running there can be defined a transmission rate for each transmit PDO as a parameter within the device function block.

To enable transmission of values from multi-channel-devices with single PDOs two new data types called information record and control record have been defined which act as a multiplexor on multiple channels within a single device. To use this feature elements of the information or control record are mapped to PDOs instead of elements of the object dictionary, together with the element "channel number" which is needed to demultiplex the PDO data. Within the device function block a couple of parameters enable the link of transmit and receive PDOs between devices with different number of channels.

As a device may include a set of different functional blocks there are more than the 2 standard PDOs predefined. If PDOs number 3 to 5 are to be used the corresponding COB-IDs need to be configured.

Naming conventions

The first three characters of CMS name is a device profile identification (see /17/) and is defined for this device profile as: <404>. (According to the number of this standard).

PDO Mapping

The default mapping defines default values for communication objects 1000_h to $1FFF_h$ which are not defined by the communication profile (see /17/).

Object 1000_h: Device type

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

Byte: MSB LSB

Additional Information	Device Profile Number

Figure: Structure of the Device Type Parameter

Device profile number: 404
Additional information

Bit	Meaning
0	digital input block included in device
1	analogue input block included in device
2	digital output block included in device
3	analogue output block included in device
4	controller block included in device
5	alarm block included in device
6	reserved
7	reserved
8..15	reserved

Object 1001_h: Error Register

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

2nd transmit PDO mapping (Controller)

Index	Subindex	Comment	Default Value
1801_h	0	number of entries	4
	1	COB-ID used by PDO	280H+NodeID
	2	transmission type	255
	3	inhibit time	300
	4	CMS priority group	3

Index	Subindex	Comment	Default Value
$1A01_h$	0	number of mapped objects	5
	1	Channel_No	0000 00 08H
	2	CO_Effective Controller Output Y	6410 FD 10H
	3	CO_Effective Current Value Xeff	7400 FD 10H
	4	CO_control byte	6425 FD 08H
	5	AL_ 1..8 State	6600 FD 08H

Object Dictionary

In many applications it is not suitable to stick to a specific data type. In a pure temperature controller application it may be sufficient to transmit the current value as Integer16, whereas in a pressure controller application it is necessary to use floating point numbers. For this reason the device profile supports four different data types: floating point numbers (Float) as well as 16 bit, 24 bit and 32 bit integers (Integer16, Integer24 and Integer32). To have a better access to the objects in the dictionary, it is divided into four sections:

Note: The data type Integer24 is at the moment not supported by the Communication Profile DS-301. However it is planned to support this data type in a future version of DS-301.

Index	Data Type
6000 ... 6FFF	Floating point numbers (Float)
7000 ... 7FFF	Integer16
8000 ... 8FFF	Integer24
9000 ... 9FFF	Integer32

As mentioned in section 4, the universal controller is divided in several function blocks. To give the user an easy access to the dictionary, the following structure is used:

Index	Data Type
$X000_h$ ... $X0FF_h$	Digital Input Block
$X100_h$ ... $X1FF_h$	Analogue Input Block
$X200_h$ ... $X2FF_h$	Digital Output Block
$X300_h$ ... $X3FF_h$	Analogue Output Block
$X400_h$ ... $X4FF_h$	Controller Block
$X500_h$ ... $X5FF_h$	Alarm Function Block
$X600_h$ ... $XEFF_h$	reserved
$XF00_h$ ... $XFFF_h$	Device Function Block

The letter „X“ has to be replaced by the number 6, 7, 8, or 9 for the data type.

Dictionary Components

Additionally there are new data types for the device profile defined, these are

- Information record
- Control record

These data types act as a multiplexor for multi-channel-devices if parts of the record are mapped to a PDO.

Information Record:

The information record is used to transmit the actual value and status via PDO.

Index	Subindex	Field	Data Type
42_h	0	number of supported entries in the record	Unsigned8
	1	Channel_Number	Unsigned8
	2	DI_Read_state_8_Input_Lines	Unsigned8
	3	AI_Input_Field_Value_F	Float
	4	AI_Input_Field_Value_16	Integer16
	5	AI_Input_Field_Value_24	Integer24
	6	AI_Input_Field_Value_32	Integer32
	7	AI_Input_Process_Value_F	Float
	8	AI_Input_Process_Value_16	Integer16
	9	AI_Input_Process_Value_24	Integer24
	10	AI_Input_Process_Value_32	Integer32
	11	AI_Net_Process_Value_F	Float
	12	AI_Net_Process_Value_16	Integer16
	13	AI_Net_Process_Value_24	Integer24
	14	AI_Net_Process_Value_32	Integer32
	15	AI_Status_Information	Unsigned8
	16	CO_Effective_Current_Value_F	Float
	17	CO_Effective_Current_Value_16	Integer16
	18	CO_Effective_Current_Value_24	Integer24
	19	CO_Effective_Current_Value_32	Integer32
	20	CO_Effective_Controller_Output	Integer16
	21	CO_Status_Information	Unsigned16
	22	AL_1..8 State	Unsigned8
	23	AL_9..16 State	Unsigned8
	24	AL_Group_1..8_State	Unsigned8
	25	Value_Conversion _Count	Unsigned8
	26	CRC of PDO data	Unsigned8

Control Record:

The control record is used to receive the actual value and control byte via PDO.

Index	Subindex	Field	Data Type
43	0	number of supported entries in the record	Unsigned8
	1	channel_number	Unsigned8
	2	AI_input_control_byte	Unsigned8
	3	DO_Write_State_8_Output_Lines	Unsigned8
	4	CO_1st_set_point_F	Float
	5	CO_1st_set_point _16	Integer16
	6	CO_1st_set_point_24	Integer24
	7	CO_1st_set_point_32	Integer32
	8	CO_2nd_set_point_F	Float
	9	CO_2nd_set_point _16	Integer16
	10	CO_2nd_set_point_24	Integer24
	11	CO_2nd_set_point_32	Integer32
	12	CO_manual_controller_output	Integer16
	13	CO_control_byte	Unsigned8
	14	CO_controller_on_off	Unsigned8
	15	Input_process_value_F	Float
	16	Input_process_value_16	Integer16
	17	Input_process_value_24	Integer24
	18	Input_process_value_32	Integer32
	19	Alternate_input_process_value_F	Float
	20	Alternate_Input_process_value_16	Integer16
	21	Alternate_Input_process_value_24	Integer24
	22	Alternate_Input_process_value_32	Integer32
	23	Input_Value_Status	Unsigned8
	24	Alternate_Input_Value_Status	Unsigned8

Survey Object Dictionary

Digital Input Function Block

Index (hex)	Object (Symbolic Name)	Name	Type	Attr.	M/O
6000	ARRAY	Read State 8 Input Lines	Unsigned8	ro	O

Digital Output Function Block

Index (hex)	Object (Symbolic Name)	Name	Type	Attr.	M/O
6200	ARRAY	Write State 8 Output Lines	Unsigned8	rw	O

Analogue Input Function Block-

Index (hex)	Object (Symbolic Name)	Name	Type	Attr.	M/O
		Sensor:			
6110	ARRAY	AI_Sensor_Type	Unsigned16	ro	O
		Process Value Reading:			
7124	ARRAY	AI_Input_Offset "OFSt"	spec. by index	rw	O
7130	ARRAY	AI_Input_Process_Value	spec. by index	ro	M
6131	ARRAY	AI_Physical_Unit_Process_Value	Unsigned16	ro	M
6132	ARRAY	AI_Decimal_Digits_Process_Value	Unsigned8	ro	M
		Overflow Limits for Process Values			
7148	ARRAY	AI_Span_Start "Messbereichsanfang"	spec. by index	ro	O
7149	ARRAY	AI_Span_End "Messbereichsende"	spec. by index	ro	O

Controller Function Block

Index (hex)	Object (Symbolic Name)	Name	Type	Attr.	M/O
7400	ARRAY	CO_Effective Current Value Xeff "akt Istwert"	spec. by index	ro	M
7401	ARRAY	CO_Effective Set Point Weff "akt. Sollwert"	spec. by index	ro	M
7402	ARRAY	CO_1st Set Point W "SP1"	spec. by index	rw	M
7403	ARRAY	CO_2nd Set Point W2 "SP2"	spec. by index	rw	M
7404	ARRAY	CO_Lower Set Point Limit W0 "SP.Lo"	spec. by index	rw	O
7405	ARRAY	CO_Upper Set Point Limit W100 "SP.Hi"	spec. by index	rw	O
6406	ARRAY	CO_Physical Unit Current Value / Set Point	Unsigned16	ro	M
6407	ARRAY	CO_Decimal Digits Current Value / Set Point	Unsigned8	ro	M
6410	ARRAY	CO_Effective Controller Output Y " Y"	Integer16	ro	M
6412	ARRAY	CO_Manual Controller Output "Y. HA"	Integer16	rw	O
6413	ARRAY	CO_Lower Controller Output Limit Ymin (C) "2Y.Hi"	Integer16	rw	O
6414	ARRAY	CO_Upper Controller Output Limit Ymax (H)"1Y.Hi"	Integer16	rw	O
6420	ARRAY	CO_Set Point Switch W/W2	Unsigned8	rw	M
6422	ARRAY	CO_Controller on / off "ZonE"	Unsigned8	rw	M
6424	ARRAY	CO_Self Optimization on / off " Opt"	Unsigned8	rw	O
6425	ARRAY	CO_control byte	Unsigned8	rw	M
7440	ARRAY	CO_Neutral Zone XSH " Sh"			
7450	ARRAY	CO_Proportional Band Xp1 (H) "1 P"	spec. by index	rw	O
7451	ARRAY	CO_Proportional Band Xp2 (C) "2 P"	spec. by index	rw	O
7452	ARRAY	CO_Integral Action Time Tn1 (H) "1 I"	spec. by index	rw	O
7453	ARRAY	CO_Integral Action Time Tn2 (C) "2 I"	spec. by index	rw	O
7454	ARRAY	CO_Derivative Action Time Tv1 (H) "1 d"	spec. by index	rw	O
7455	ARRAY	CO_Derivative Action Time Tv2 (C) "2 d"	spec. by index	rw	O
7456	ARRAY	CO_Cycle Time T1 (H) "1 C"	spec. by index	rw	O
7457	ARRAY	CO_Cycle Time T2 (C) "2 C"	spec. by index	rw	O
6458	ARRAY	CO_Physical Unit PID Timing	Unsigned16	ro	O
6459	ARRAY	CO_Decimal Digits PID Timing	Unsigned8	ro	O

Alarm Function Block

Index	Object	Name	Type	R/W	MO
6509	ARRAY	AL_1 Action	Unsigned8	rw	M
750A	ARRAY	AL_1 Level “ AL1”	spec. by index	rw	M
650D	ARRAY	AL_1 State	Boolean	ro	M
6519	ARRAY	AL_2 Action	Unsigned8	rw	M
751A	ARRAY	AL_2 Level “ AL2”	spec. by index	rw	M
651D	ARRAY	AL_2 State	Boolean	ro	M
6579	ARRAY	AL_current Action	Unsigned8	rw	M
6600	ARRAY	AL_1...8 State	Unsigned8	ro	M

Device Function Block

Index	Object	Name	Type	R/W	M O
6F00	ARRAY	Transmission_Rate (x0.1ms) transmit PDOs	Unsigned32	rw	M
6F01	ARRAY	Channel enable transmit PDO	Unsigned8	rw	M

ELOTECH Extensions

Index	Object	Name	Type	R/W	MO
2000	ARRAY	Ident-Object	Integer16	ro	O
2010	ARRAY	User EAROM (16-Byte)	UNSIGNED32	rw	O
2110	ARRAY	Sensor (Measuring range) " SEN"	Integer16	rw	O
2115	ARRAY	Sensor configuration (PT100/ TC) "P tc"	Integer16	rw	O
2400	ARRAY	Heater current actual value " Cur"	Integer16	ro	O
2401	ARRAY	Actual leakage current value "c. "	Integer16	ro	O
2402	ARRAY	Min. allowed leakage current value "c. "	Integer16	rw	O
2403	ARRAY	Current detection interval "Cu.Cy"	Integer16	rw	O
2408	ARRAY	Setpoint ramp, rising " SP/"	Integer16	rw	O
2409	ARRAY	Setpoint ramp, falling " SP\"	Integer16	rw	O
2421	ARRAY	Manual mode configuration "Hand"	Integer16	rw	O
2423	ARRAY	CO_Controller mode "ConF"	Unsigned8	rw	O
2424	ARRAY	Temperature-limit for average	Integer16	rw	O
2508	ARRAY	Alarm 1 Configuration "Co.A1"	Integer16	rw	O
2509	ARRAY	Switching behaviour Alarm1 (direct/invers) "rE.A1"	Integer16	rw	O
250A	ARRAY	Alarm 1 Delay "dL.A1"	Integer16	rw	O
2600	ARRAY	Control sensity "1 Sd"	Integer16	rw	O
2601	ARRAY	Control sensity "2 Sd"	Integer16	rw	O
2518	ARRAY	Alarm 2 Configuration "Co.A2"	Integer16	rw	O
2519	ARRAY	Switching behavior Alarm 2 (direkt/invers) "rE.A2"	Integer16	rw	O
251A	ARRAY	Alarm 2 Delay "dL.A2"	Integer16	rw	O
2700	ARRAY	Softstart off/on "So.St"	Unsigned8	rw	O
2701	ARRAY	Softstart output ratio "So.Y"	Integer16	rw	O
2702	ARRAY	Softstart setpoint "So.SP"	Integer16	rw	O
2703	ARRAY	Softstart duration time "So.ti"	Integer16	rw	O
2F10	ARRAY	Configuration of the function of key "F1" "Co.F1"	Integer16	rw	O
2F11	ARRAY	LOC Configuration " LOC"	Integer16	rw	O
2F20	ARRAY	Start zone Configuration "Zo.St"	Integer16	rw	O
2F21	ARRAY	Zone offset Configuration "Zo.OF"	Integer16	rw	O
2F22	ARRAY	Sample time for recorder function (R2500)	Integer16	rw	O

Detailed Object Dictionary

Object 6000H: Read_8_Inputs_Lines

Reads a group of 8 input lines as a Byte of information. Only Bit0 and Bit 1 are used. Bit2..7 are alway zero.

Index	6000H
Variable Name	Read State 8 Inputs_State
Object Code	8H
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_Blocks_8_Inputs_State
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	Read_8_Inputs_Lines
Data Type	Unsigned8
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	0H - 3H (only Bit0 and Bit 1)
Mandatory Range	NO

Object 6200H: Write_8_Output_Lines

Sets a group of 8 output lines as byte of information. Only Bit0 and Bit 1 are used. Bit2..7 are alway zero.

Index	6200H
Variable Name	Write State 8 Outputs_State
Object Code	8H
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_Blocks_8_Outputs_State
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	Write_8_Outputs_1H
Data Type	Unsigned8
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	0H - 3H (only Bit0 and Bit 1)
Mandatory Range	NO

Object 6110H: AI_sensor_Type

Specifies the type of sensor which is connected to the analogue input.

Value	Meaning
1	Thermocouple type J
2	Thermocouple type K
3	Thermocouple type L
4	Thermocouple type S
30	PT100
43	0...10V

Index	6110H
Variable Name	AI_Sensor_Type
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	AI_Sensor_Type_1H
Data Type	Unsigned16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	Unsigned16
Mandatory Range	NO

to

Sub-Index	FDH
Description	AI_Sensor_Type_FDH
Data Type	Unsigned16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	Unsigned16
Mandatory Range	NO

Object 7124H: AI_Input_Offset

The object describes the parameter “OFSt” of the Controller.

This object defines the additional offset value for the analogue input channel. It is scaled in physical unit of process value.

Index	7124H
Variable Name	AI_Input_Offset
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	AI_Input_Offset_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	AI_Input_Offset _FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 7130H: AI_Input_Process_Value

This read only object represents the result of the input scaling block and gives the measured quantity scaled in the physical unit of process values (e.g. degrees centigrade, kg, kN, mm etc.).

Index	7130H
Variable Name	AI_Input_Process_Value
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	AI_Input_Process_Value _1H
Data Type	Integer16
Access	ro
Object Class	Optional
PDO Mapping	possible
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	AI_Input_Process_Value _FDH
Data Type	Integer16
Access	ro
Object Class	Optional
PDO Mapping	Possible
Value Range	data type specific
Mandatory Range	NO

Object 6131H: AI_Physical_Unit_Process_Value

This object describes the physical unit for the process values within the analogue input function block.
Coding see object 6101.

Index	6131H
Variable Name	AI_Physical_Unit_Process_Value
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	AI_Physical_Unit_Process_Value _1H
Data Type	Unsigned16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	Unsigned16
Mandatory Range	NO

to

Sub-Index	FDH
Description	AI_Physical_Unit_Process_Value _FDH
Data Type	Unsigned16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	Unsigned16
Mandatory Range	NO

Object 6132H: AI_Decimal_Digits_Process_Value

This object describes the number of decimal digits following the decimal point for interpretation of data types signed8, signed16 and signed32.
Example: A field value of 1.230 (float) will be coded as 123 in signed16 format if number of decimal digits is set to 2.

Index	6132H
Variable Name	AI_Decimal_Digits_Process_Value
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	AI_Decimal_Digits_Process_Value _1H
Data Type	Unsigned8
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	0 - 9H
Mandatory Range	NO

to

Sub-Index	FDH
Description	AI_Decimal_Digits_Process_Value _FDH
Data Type	Unsigned8
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	0-9H
Mandatory Range	NO

Object 7148H: AI_Span_Start

This value specifies the lower limit where process values are expected. Process values which are lower than this limit are marked as overflowed.

Index	7148H
Variable Name	AI_Span_Start
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	AI_Span_Start _1H
Data Type	Integer16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	AI_Span_Start _FDH
Data Type	Integer16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 7149H: AI_Span_End

This value specifies the upper limit where process values are expected. Process values exceeding this limit are marked as overflowed.

Index	7149H
Variable Name	AI_Span_End
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	AI_Span_End _1H
Data Type	Integer16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	AI_Span_End _FDH
Data Type	Integer16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 7400H: CO_Effective Current Value

This object defines the effective current value used by the control algorithm. The physical unit and the number of decimal digits of this object are defined by objects 6406 and 6407.

Index	7400H
Variable Name	CO_Effective_Current_Value
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Effective_Current_Value_Channel_1H
Data Type	Integer16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Effective_Current_Value_Channel_FDH
Data Type	Integer16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 7401H: CO_Effective Set Point

This object holds the set point currently used by the controller algorithm. In most cases it will be copy of the objects X402 or X403 (it may be generated by set point ramp also). The physical unit and the number of decimal digits of this object are defined by objects 6406 and 6407.

Index	7401H
Variable Name	CO_Effective_Set_Point
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Effective_Set_Point_Channel_1H
Data Type	Integer16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	Effective_Set_Point_Weff_Channel_FDH
Data Type	Integer16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 7402H: CO_Set point

The object describes the parameter " SP1" of the Controller.

The first set point is variable within the limits of W0 and W100 (W0 ≤ W ≤ W100). The physical unit and the number of decimal digits of this object are defined by objects 6406 and 6407.

Index	7402
Variable Name	CO_Set_point_W
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Set_point_W_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Set_point_W_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 7403H: CO_2nd Set point

The object describes the parameter " SP2" of the Controller.

The first set point is variable within the limits of W0 and W100 (W0 ≤ W ≤ W100). The physical unit and the number of decimal digits of this object are defined by objects 6406 and 6407.

Index	7403H
Variable Name	CO_2nd_Set_point
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_2nd_Set_point_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_2nd_Set_point_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 7404H: CO_Lower Set Point Limit

The object describes the parameter “SP.Lo” of the Controller.

The object describes the lower limit of the set point. The physical unit and the number of decimal digits of this object are defined by objects 6406 and 6407.

Index	7404H
Variable Name	CO_Lower_Set_Point_Limit
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Lower_Set_Point_Limit_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Lower_Set_Point_Limit_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 7405H: CO_Upper Set Point Limit

The object describes the parameter “SP.Hi” of the Controller.

The object describes the upper limit of the set point. The physical unit and the number of decimal digits of this object are defined by objects 6406 and 6407.

Index	7405H
Variable Name	CO_Upper_Set_Point_Limit
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Upper_Set_Point_Limit_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Upper_Set_Point_Limit_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 6406H: CO_Physical Unit Current Value / Set Point

The object describes the physical unit of the objects beginning from 7400 to 7405 .

Index	6406H
Variable Name	CO_Physical_Unit_XW
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Physical_Unit_XW_Channel_1H
Data Type	Unsigned16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	0000 - FFFF
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Physical_Unit_XW_Channel_FDH
Data Type	Unsigned16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	0000 - FFFF
Mandatory Range	NO

Object 6407H: CO_Decimal Digits Current Value / Set Point

The object describes the number of decimal digits of the objects beginning from 7400 to 7405 .

Index	6407H
Variable Name	CO_Decimal_Digits_XW
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Decimal_Digits_XW_Channel_1H
Data Type	Unsigned8
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	0 - 15
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Decimal_Digits_XW_Channel_FDH
Data Type	Unsigned8
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	0 - 15
Mandatory Range	NO

Object 6410H: CO_Effective Controller Output Y

The object describes the parameter “ Y” of the Controller.

This object holds effective controller output calculated by the PID algorithm. The object is read only. The value is given in percent with one decimal digit after the comma. The value will always be within the range of Ymin and Ymax (Ymin ≤ Y ≤ Ymax).

Index	6410H
Variable Name	CO_Effective_Controller_Output
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Effective_Controller_Output_Channel_1H
Data Type	Integer16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	0 – FFFF
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Effective_Controller_Output_Channel_FDH
Data Type	Integer16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	0 - FFFF
Mandatory Range	NO

Object 6412H: CO_Manual Controller Output

The value is used as output in the manual controller mode. The value is given in percent with one decimal digit after the comma.

Index	6412H
Variable Name	Manual_Controller_Output
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	Manual_Controller_Output_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	0 – FFFF
Mandatory Range	NO

to

Sub-Index	FDH
Description	Manual_Controller_Output_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	0 – FFFF
Mandatory Range	NO

Object 6413H: CO_Lower Controller Output Limit Ymin

The object describes the parameter “2Y.Hi” of the Controller.

The value describes the lower limit for the controller output. The value is given in percent with one decimal digit after the comma.

Index	6413H
Variable Name	Lower_Controller_Output_Limit
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Lower_Controller_Output_Limit_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	0000 - FFFF
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Lower_Controller_Output_Limit_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	0000 - FFFF
Mandatory Range	NO

Object 6414H: CO_Upper Controller Output Limit Ymax

The object describes the parameter “1Y.Hi” of the Controller.

The value describes the lower limit for the controller output. The value is given in percent with one decimal digit after the comma.

Index	6414H
Variable Name	Upper_Controller_Output_Limit
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Upper_Controller_Output_Limit_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	0000 - FFFF
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Upper_Controller_Output_Limit_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	0000 - FFFF
Mandatory Range	NO

Object 6420H: CO_Set Point switch

Set Point Switch W/W2 for switching between first and second set point. The value TRUE selects the second set point.

Index	6420H
Variable Name	Set_Point_Switch
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	Set_Point_Switch_Channel_1H
Data Type	BOOL
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	TRUE, FALSE
Mandatory Range	NO

to

Sub-Index	FDH
Description	Set_Point_Switch_Channel_FDH
Data Type	BOOL
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	TRUE, FALSE
Mandatory Range	NO

Object 6422H: CO_Controller On/Off

The object describes the parameter “ZonE” of the Controller.

Switches the controller on or off. The value FALSE switches the controller on.

Index	6422H
Variable Name	Controller_On_Off
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	Controller_On_Off_Channel_1H
Data Type	BOOL
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	TRUE, FALSE
Mandatory Range	NO

to

Sub-Index	FDH
Description	Controller_On_Off_Channel_FDH
Data Type	BOOL
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	TRUE, FALSE
Mandatory Range	NO

Object 6424H: CO_Self Optimization on/off

The object describes the parameter " OPt" of the Controller.

The value TRUE switches the self optimisation on.

Index	6424H
Variable Name	Self_Optimisation
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	Self_Optimization_Channel_1H
Data Type	BOOL
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	TRUE, FALSE
Mandatory Range	NO

to

Sub-Index	FDH
Description	Self_Optimisation_Channel_FDH
Data Type	BOOL
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	TRUE, FALSE
Mandatory Range	NO

Object 6425H: CO_Control Byte

The control byte maps the BOOL objects for set-point switch, controller on/off etc. in one single object. The main purpose for this mapping is to have an single object for the PDO mapping.

Index	6425H
Variable Name	CO_Control_Byte
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Control_Byte_Channel_1H
Data Type	Unsigned8
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	0 - FFH
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Control_Byte_Channel_FDH
Data Type	Unsigned8
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	0 - FFH
Mandatory Range	NO

The single bits of the control byte have the following meaning:

Bit	***Meaning***
0	Controller On/Off 0=on, 1=off
1	Self-Optimization 0=off, 1=on
2	Manual Mode 0=control action 1=manual action
3	Set Point 1/2 0=SP1, 1=SP2
4	Error: Self tuning mode (Er.OP)
5	Setpoint ramp function active
6	Sensor Error (Er.Lo, Er.Hi)
7	System Error (Err0, Err8)

Object 7440H: CO_Neutral Zone XSH

The object describes the parameter “ Sh” of the Controller.

The value is given in degrees with one digit after the comma.

Index	7440H
Variable Name	CO_Neutral Zone XSH
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Neutral Zone XSH _1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Neutral Zone XSH _Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 7450H: CO_Proportional Band Xp1

The object describes the parameter “1 P” of the Controller.

The object describes the parameter Xp of the PID-algorithm. The value is given in percent with one digit after the comma.

Index	7450H
Variable Name	CO_Proportional_Band_Xp1
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Proportional Band_Xp1_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Proportional_Band_Xp1_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 7451H: CO_Proportional Band Xp2

The object describes the parameter “2 P” of the Controller.

The object describes the parameter Xp of the PID-algorithm. The value is given in percent with one digit after the comma.

Index	7451H
Variable Name	CO_Proportional_Band_Xp2
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Proportional_Band_Xp2_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Proportional_Band_Xp2_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 7452H: CO_Integral Action Time Tn1

The object describes the parameter “1 I” of the Controller.

The object describes the parameter Tn of the PID-algorithm. The physical unit and the number of decimal digits is given by objects 6458 and 6459.

Index	7452H
Variable Name	CO_Integral_Action_Time_Tn1
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Integral_Action_Time_Tn1_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Integral_Action_Time_Tn1_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 7453H: CO_Integral Action Time Tn2

The object describes the parameter “2 I” of the Controller.

The object describes the parameter Tn of the PID-algorithm. The physical unit and the number of decimal digits is given by objects 6458 and 6459.

Index	7453H
Variable Name	CO_Integral_Action_Time_Tn2
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Integral_Action_Time_Tn2_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Integral_Action_Time_Tn2_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 7454H: CO_Derivate Action Time Tv1

The object describes the parameter “1 d” of the Controller.

The object describes the parameter Tv of the PID-algorithm. The physical unit and the number of decimal digits is given by objects 6458 and 6459.

Index	7454H
Variable Name	CO_Derivate_Action_Time_Tv1
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Derivate_Action_Time_Tv1_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Derivate_Action_Time_Tv1_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 7455H: CO_Derivate Action Time Tv2

The object describes the parameter “2 d” of the Controller.

The object describes the parameter Tv of the PID-algorithm. The physical unit and the number of decimal digits is given by objects 6458 and 6459.

Index	7455H
Variable Name	CO_Derivate_Action_Time_Tv2
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Derivate_Action_Time_Tv2_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Derivate_Action_Time_Tv2_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 7456H: CO_Cycle Time T1

The object describes the parameter “1 C” of the Controller.

The object describes the cycle time of the PID-algorithm. The physical unit and the number of decimal digits is given by objects 6458 and 6459.

Index	7456H
Variable Name	CO_Cycle_Time_T1
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Cycle_Time_T1_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Cycle_Time_T1_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 7457H: CO_Cycle Time T2

The object describes the parameter “2 C” of the Controller.

The object describes the cycle time of the PID-algorithm. The physical unit and the number of decimal digits is given by objects 6458 and 6459.

Index	7457H
Variable Name	CO_Cycle_Time_T2
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Cycle_Time_T2_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Cycle_Time_T2_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 6458H: CO_Physical Unit PID Timing

The object describes the physical unit of the objects beginning from 7450 to 7457 .

Index	6458H
Variable Name	CO_Physical_Unit_PID
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Physical_Unit_PID_Channel_1H
Data Type	Unsigned16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	0000 - FFFF
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Physical_Unit_PID_Channel_FDH
Data Type	Unsigned16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	0000 - FFFF
Mandatory Range	NO

Object 6459H: CO_Decimal Digits PID Timing

The object describes the number of decimal digits of the objects beginning from 7450 to 7457 .

Index	6459H
Variable Name	CO_Decimal_Digits_PID
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	CO_Decimal_Digits_PID_Channel_1H
Data Type	Unsigned8
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	0 - 15
Mandatory Range	NO

to

Sub-Index	FDH
Description	CO_Decimal_Digits_PID_Channel_FDH
Data Type	Unsigned8
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	0 - 15
Mandatory Range	NO

Object 6509H – 65F9H: AL_1_Action

This object defines which actions are performed if alarm state is changing.

Objects 6519, 6529 ... 65F9 are defined similar.

Bit	Meaning
0	Send Emergency Message
1	Internal Alarm

Index	6509H
Variable Name	AL_1 Action
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	AL_1 Action_1H
Data Type	Unsigned16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	Unsigned16
Mandatory Range	NO

to

Sub-Index	FDH
Description	AL_1 Action_FDH
Data Type	Unsigned16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	Unsigned16
Mandatory Range	NO

Object 750AH - 75FAH: AL_1 Level

The object describes the parameter “ A1” of the Controller.

This object represents the level which the AL_Input_Value is compared with. It is scaled in the physical unit of process values (e.g. degrees centigrade, kg, kN, mm etc.).

Objects 751A, 752A ... 75FA are defined similar.

Index	750AH
Variable Name	AL_1 Level
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	AL_1 Level _1H
Data Type	Float, Integer16, Integer24, Integer32
Access	rw
Object Class	Optional
PDO Mapping	possible
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	AL_1 Level _FDH
Data Type	Float, Integer16, Integer24, Integer32
Access	rw
Object Class	Optional
PDO Mapping	Possible
Value Range	data type specific
Mandatory Range	NO

Object 650DH – 65FDH: AL_1 State

Alarm state represents the result of the alarm comparison.

Objects 651D, 652D ... 65FD are defined similar.

Index	650DH
Variable Name	AL_1 State
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	AL_1 State _1H
Data Type	Boolean
Access	ro
Object Class	Optional
PDO Mapping	possible
Value Range	0, 1
Mandatory Range	NO

to

Sub-Index	FDH
Description	AL_1 State _FDH
Data Type	Boolean
Access	ro
Object Class	Optional
PDO Mapping	Possible
Value Range	0, 1
Mandatory Range	NO

Object 6600H: AL_1..8 State

Alarm state represents the result of the alarm comparison of alarm number 1 to 8.
Only Bit 0 and Bit 1 are used.

Data format:

Bit	7	6	5	4	3	2	1	0
Alarm	8	7	6	5	4	3	2	1

Index	6600H
Variable Name	AL_1..8 State
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	AL_1..8 State _1H
Data Type	Unsigned8
Access	ro
Object Class	Optional
PDO Mapping	possible
Value Range	Unsigned8
Mandatory Range	NO

to

Sub-Index	FDH
Description	AL_1..8 State _FDH
Data Type	Unsigned8
Access	ro
Object Class	Optional
PDO Mapping	Possible
Value Range	Unsigned8
Mandatory Range	NO

Object 6F00H: Transmission_Rate

Transmission rate for transmit PDO 1 to n in resolution of 0.1 ms.
If value is different from zero, PDO will be send asynchronously after time interval specified elapsed after last transmission (Clock generator for PDO transmission).

Only multiples of 80ms will be operated.
E.g.: 0... 799 -> = 0ms,
800...1599 -> = 80ms,
1600...2399 -> = 160ms, and so forth.

Index	6F00H
Variable Name	Transmission_Rate
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_valid_entries
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	Transmission_Rate _1H
Data Type	Unsigned32
Access	rw
Object Class	Optional
PDO Mapping	No
Value Range	0H – 1D4C0H (0D – 120000D)
Mandatory Range	NO

to

Sub-Index	FDH
Description	Transmission_Rate _FDH
Data Type	Unsigned32
Access	rw
Object Class	Optional
PDO Mapping	No
Value Range	0H – 1D4C0H (0D – 120000D)
Mandatory Range	NO

Object 6F01H: Channel enable transmit PDOs

This object defines which channels will take part in the multiplexing process when transmission PDOs are mapped to the information record. This object is needed to disable transmission from specified channels within one module, e.g. when only part of the module channels are used at all.

Index	6F01H
Variable Name	Channel enable transmit PDOs
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	Channel enable transmit PDOs _1H
Data Type	Boolean
Access	rw
Object Class	Optional
PDO Mapping	No
Value Range	0, 1
Mandatory Range	NO

to

Sub-Index	FDH
Description	Channel enable transmit PDOs _FDH
Data Type	Boolean
Access	rw
Object Class	Optional
PDO Mapping	No
Value Range	0, 1
Mandatory Range	NO

Object 2000H: Ident-Objekt

Index	2000H
Variable Name	Ident-Objekt
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..4H (Optional)

Sub-Index	0
Description	Number_of_valid_entries
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-4H
Mandatory Range	NO

Sub-Index	1H
Description	Ident-Objekt _1
Data Type	Integer16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Device	Identobject (4digits)	Identobject (5digits)	Number of Channels;	Controller type (supported by devices with 5digits Identobject)
R20xx	20xx	y20xx	x = 04, 06, 08, 10, 16	y = 2 : 2Point- y = 3 : 3Point-controller
R21xx	21xx	y21xx	x = 04, 06, 08, 10, 16	y = 2 : 2Point- y = 3 : 3Point-controller
R22xx	22xx	y22xx	x = 04, 06, 08, 10, 16	y = 2 : 2Point- y = 3 : 3Point-controller
R24xx	-	y24xx	x = 04, 06, 08, 10, 16	y = 2 : 2Point- y = 3 : 3Point-controller
R25xx	-	y25xx	x = 04, 06, 08, 10, 16	y = 2 : 2Point- y = 3 : 3Point-controller

Object 2010H: USR_EaromSpace

The object describes 16-Byte userearom space.

Index	2010H
Variable Name	USR_EaromSpace
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..4H (Optional)

Sub-Index	0
Description	Number_of_valid_entries
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-4H
Mandatory Range	NO

Sub-Index	1H
Description	USR_EaromSpace_1
Data Type	UNSIGNED32
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	4H
Description	USR_EaromSpace_4
Data Type	UNSIGNED32
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 2110H: USR_Sensor_Type

The object describes the parameter " SEn" of the Controller.

Index	2110H
Variable Name	USR_Sensor_Type
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Sensor_Type_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	USR_Sensor_Type_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

For details refer to the specific operational manual of the controller.

Object 2115H: USR_Sensor_Konfiguration

The object describes the parameter “p tc” of the Controller.

Index	2110H
Variable Name	USR_Sensor_Konfiguration
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Sensor_Konfiguration_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Sensor Configuration:

Number of Channels: 4
- 00H: Z1...4: Thermocouple
- 01H: Z1...2: Pt100, Z3...Z4: Thermocouple
- 02H: Z1...4: Pt100

Number of Channels: 6
- 00H: Z1...6: Thermoelement
- 01H: Z1...2: Pt100, Z3...Z6: Thermocouple
- 02H: Z1...4: Pt100, Z5...Z6: Thermocouple
- 03H: Z1...6: Pt100

Number of Channels: 8
- 00H: Z1...8: Thermoelement
- 01H: Z1...2: Pt100, Z3...Z8: Thermocouple
- 02H: Z1...4: Pt100, Z5...Z8: Thermocouple
- 03H: Z1...6: Pt100, Z7...Z8: Thermocouple
- 04H: Z1...8: Pt100

Number of Channels: 10
- 00H: Z1...10: Thermoelement
- 01H: Z1.....2: Pt100, Z3...Z10: Thermocouple
- 02H: Z1.....4: Pt100, Z5...Z10: Thermocouple
- 03H: Z1.....6: Pt100, Z7...Z10: Thermocouple
- 04H: Z1.....8: Pt100, Z9...Z10: Thermocouple
- 05H: Z1...10: Pt100

Number of Channels: 16
- 00H: Z1...16: Thermoelement
- 01H: Z1.....2: Pt100, Z3.....Z16: Thermocouple
- 02H: Z1.....4: Pt100, Z5.....Z16: Thermocouple
- 03H: Z1.....6: Pt100, Z7.....Z16: Thermocouple
- 04H: Z1.....8: Pt100, Z9.....Z16: Thermocouple
- 05H: Z1...10: Pt100, Z11...Z16: Thermocouple
- 06H: Z1...12: Pt100, Z13...Z16: Thermocouple

07H: Z1...14: Pt100, Z15...Z16: Thermocouple
08H: Z1...16: Pt100

Object 2400H: USR_Stromistwert

The object describes the parameter " cur" of the Controller.

Index	2400H
Variable Name	USR_Stromistwert
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Stromistwert_Channel_1H
Data Type	Integer16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	8H
Description	USR_Stromistwert_Channel_8H
Data Type	Integer16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 2401H: USR_Reststromistwert

The object describes the parameter “c ” of the Controller.

Index	2401H
Variable Name	USR_Reststromistwert
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Reststromistwert_Channel_1H
Data Type	Integer16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	8H
Description	USR_Reststromistwert_Channel_8H
Data Type	Integer16
Access	ro
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 2402H: USR_Reststromalarmwert

The object describes the parameter “c ” of the Controller.

Index	2401H
Variable Name	USR_Reststromalarmwert
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Reststromalarmwert_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	USR_Reststromalarmwert_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 2403H: USR_Stromerfassungsintervall

The object describes the parameter “Cu.Cy” of the Controller.

Index	2401H
Variable Name	USR_Stromerfassungsintervall
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Stromerfassungsintervall_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	USR_Stromerfassungsintervall_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 2408H: USR_Sollwertrampe_Steigend

The object describes the parameter " SP/" of the Controller.

Index	2408H
Variable Name	USR_Sollwertrampe_Steigend
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Sollwertrampe_Steigend _Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	USR_Sollwertrampe_Steigend _Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 2409H: USR_Sollwertrampe_Fallend

The object describes the parameter “ SP\” of the Controller

Index	2409H
Variable Name	USR_Sollwertrampe_Fallend
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Sollwertrampe_Fallend_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	USR_Sollwertrampe_Fallend_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 2421H: USR_Handstellgrad_Mode

The object describes the parameter “HAnd” of the Controller.

Index	2421H
Variable Name	USR_Handstellgrad_Mode
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Handstellgrad_Mode _Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	USR_Handstellgrad_Mode _Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 2423H: USR_Controller mode

Selects the mode of the controller.

Index	6423H
Variable Name	USR_Controller_Mode
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Controller_Mode_Channel_1H
Data Type	Unsigned8
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	0 - 03H
Mandatory Range	NO

to

Sub-Index	FDH
Description	USR_Controller_Mode_Channel_FDH
Data Type	Unsigned8
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	0 - 03H
Mandatory Range	NO

The controller mode can be selected like shown below:

3-Point controller (refer to Identobject 2000H):

- 00H: 2-Point heating
- 01H: 2-Point cooling
- 02H: 2-Point cooling not linear
- 03H: 3-Point heating / cooling
- 04H: 3-Point heating / cooling not linear
- 05H: Display only

2-Point controller (refer to Identobject 2000H):

- 00H: 2-Point heating
- 01H: 2-Point cooling
- 02H: 2-Point cooling not linear
- 03H: Display only

Object 2508H: USR_Alarm1_Mode

The object describes the parameter “Co.A1” of the Controller.

Index	2508H
Variable Name	USR_Alarm1_Mode
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Alarm1_Mode _Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	USR_Alarm1_Mode _Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

This object specifies the alarm type.

Value	**Meaning**
0	No Alarm Function
1	Signal Contact, setpoint dependent: off-on
2	Limit Contact, process value dependent: off-on
3	Limit Comperator, setpoint dependent: off-on-off
4	Signal Contact, setpoint dependent: on-off
5	Limit Contact, process value dependent: on-off
6	Limit Comperator, setpoint dependent: on-off-on
7	Limit Comperator, setpoint dependent: off-on-off With start-up supression
8	Heater Current Alarm: off-on
9	Heater Current Alarm: on-off

Object 2509H: USR_Alarm1_Output_Mode

The object describes the parameter “rE.A1” of the Controller.

Index	2509H
Variable Name	USR_Alarm1_Output_Mode
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Alarm1_Output_Mode _Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	USR_Alarm1_Output_Mode _Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 250AH: USR_Alarm1_Delay

The object describes the parameter “dL.A1” of the Controller.

Index	250AH
Variable Name	USR_Alarm1_Delay
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Alarm1_Delay_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	USR_Alarm1_Delay_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 2518H: USR_Alarm2_Mode

The object describes the parameter “Co.A2” of the Controller.

Index	2518H
Variable Name	USR_Alarm2_Mode
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Alarm2_Mode _Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	USR_Alarm2_Mode _Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

This object specifies the alarm type.

Value	**Meaning**
0	No Alarm Function
1	Signal Contact, setpoint dependent: off-on
2	Limit Contact, process value dependent: off-on
3	Limit Comperator, setpoint dependent: off-on-off
4	Signal Contact, setpoint dependent: on-off
5	Limit Contact, process value dependent: on-off
6	Limit Comperator, setpoint dependent: on-off-on
7	Limit Comperator, setpoint dependent: off-on-off With start-up supression
8	Heater Current Alarm: off-on
9	Heater Current Alarm: on-off

Object 2519H: USR_Alarm2_Output_Mode

The object describes the parameter “rE.A2” of the Controller.

Index	2519H
Variable Name	USR_Alarm2_Output_Mode
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Alarm2_Output_Mode _Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	USR_Alarm2_Output_Mode _Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 251AH: USR_Alarm2_Delay

The object describes the parameter “dL.A2” of the Controller.

Index	251AH
Variable Name	USR_Alarm2_Delay
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Alarm2_Delay_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	USR_Alarm2_Delay_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 2700H: USR_Anfahrschaltung on/off

The object describes the parameter “So.SP” of the Controller The value TRUE switches the “Anfahrschaltung” on.

Index	2700H
Variable Name	USR_Anfahrschaltung
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Anfahrschaltung _1H
Data Type	BOOL
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	TRUE, FALSE
Mandatory Range	NO

to

Sub-Index	FDH
Description	USR_Anfahrschaltung _FDH
Data Type	BOOL
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	TRUE, FALSE
Mandatory Range	NO

Object 2701H: USR_Anfahr_Controller Output Limit Ymax

The object describes the parameter “So. Y” of the Controller. The value is given in percent with one decimal digit after the comma.

Index	2701H
Variable Name	USR_Anfahr _Controller_Output_Limit
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Anfahr _Controller_Output_Limit_Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	USR_Anfahr _Controller_Output_Limit_Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 2702H: USR_Anfahrsollwert

The object describes the parameter “So.SP” of the Controller. The physical unit and the number of decimal digits of this object are defined by objects 6406 and 6407.

Index	2702
Variable Name	USR_Anfahrsollwert
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Anfahrsollwert _Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	USR_Anfahrsollwert _Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

Object 2703H: USR_Anfahr_Haltezeit

The object describes the parameter “So.ti” of the Controller.

Index	2703H
Variable Name	USR_Anfahr_Haltezeit
Object Code	8H (ARRAY)
Number Of Elements	0H (Mandatory) 1H..FDH (Optional)

Sub-Index	0
Description	Number_of_Controller_Channels
Data Type	Unsigned8
Access	ro
Object Class	Mandatory
PDO Mapping	NO
Value Range	0H-FDH
Mandatory Range	NO

Sub-Index	1H
Description	USR_Anfahr_Haltezeit _Channel_1H
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

to

Sub-Index	FDH
Description	USR_Anfahr_Haltezeit _Channel_FDH
Data Type	Integer16
Access	rw
Object Class	Optional
PDO Mapping	NO
Value Range	data type specific
Mandatory Range	NO

CANopen Features

CANopen Master:	No
CANopen Slave:	Yes
Extended Boot-up:	No
Minimum Boot-up:	Yes
COP ID Distribution:	Default, via SDO
Node ID Distribution:	via devicekeyboard
No of PDOs:	0 RX, 1 TX
PDO Modes:	async
Variable PDO Mapping:	No
Emergency Message:	Yes
Live Guarding:	Yes
No. of SDOs:	1 RX, 1 TX
Device Profile:	DSP 404,