PMA

Industrial Controller KS 90-1/DP
KS 92-1/DP
KS 90-1programmer/DP,
KS 92-1programmer/DP

KS 90-1
KS 92-1
PROFIBUS-DP

PROFI
PROCESS FIELD BUS
BUS ®

Interface Description
PROFIBUS - DP
Parameter transmission
9499 040 65311

valid from: 8422

Explanation of symbols

General information
General warning
Attention: ESD sensitive devices

Contents

1   General

Thank you very much for deciding for the industrial controller KS 90-1/DP / KS 92-1/DP respectively for the programmer KS 90-1*programmer*/DP / KS 92-1*programmer*/DP.The KS 90-1 format is 48x96 mm, the KS 92-1 format is 96x96 mm. The products are signified as "device" or "instrument" in the following text.

The instruments are equipped with a PROFIBUS-DP interface for transmission of process, parameter and configuration data. Connection is on the controller rear. The serial communication interface permits connection to supervisory systems, PC's, visualization tools, etc.

The possibilities of acyclical transmission of parameters, process data, etc. in the cyclical process data channel are described in this documentation. This feature is called parameter channel.
Possibilities for instrument connection, process data channel structure and special KS 90-1 / KS 92-1 instrument functions are described in documentation "Interface description PROFIBUS-DP Process data" (9499-040-66611)".

1.1   GSD file

The actual version of the GSD-file you can find on the homepage www.pma-online.de keyword software.. The GSD-file is valid for both KS 90-1 and KS 92-1 as well as the programmer version of both.

ⓘ **The GSD file is available as a standard file with English texts (PMA29402.gsd) and with German texts (PMA29402.gsg). For working with German texts with your PROFIBUS master configuration, please, install file PMA29402.gsg.**

ⓘ **Instruments from series date 8406 require GSD file PMA̲29402.gs* for using the DPV1 functionality.**

1.2   Engineering Set

For easy comissioning there is an engineering set KS 90-1/DP (order-no.. 9407-999-10501). It can be used with KS 90-1 as well as with KS 92-1.

The Engineering set comprises:

- Interface description for PROFIBUS-DP – Process Data
  Document "Interface description PROFIBUS-DP Process Data" (9499-040-66611) provides basic explanations for connection of KS 90-1/DP to PROFIBUS-DP networks. It contains hints for cyclical process data exchange.
- Interface description for PROFIBUS-DP Parameter Data
  Document "Interface description PROFIBUS-DP Parameter Data" (9499-040-65311) describes additional functions for transfer of process values, parameters and configuration data via the parameter channel
- Floppy with GSD-data, example projects for Siemens STEP7-environment and Hilscher CIF/Sycon applications, functionblocks for parameterchannel transmission with S7-environment.

Pma29402.gsd	GSD-file (English texts)
Pma29402.gsg	GSD-file (German texts)
Pma_sup.arj	Function module for STEP˙ 7 as library
KS90demo.zip	Project example in STEP˙ 7 for S7-300
DevKS901.bct	Configuration example for BlueControl˙
KS90cifV0.pb	Configuration example for CIF®-interf.
KS90cifV1.pb	Configuration example for CIF®-interf.

2 Parameter transmission for DPV0

For transmission of parameters, the 'parameter channel' via which data can be exchanged transparently via the function block protocol independent of controller is available. Thereby, all protocol access types are supported (single or block access, data formats integer (FixPoint or floating point). Communication to the controller is transparent, i.e. the user himself is responsible for monitoring adjustment ranges, operating modes (remote/local) etc.

The parameter channel is designed for large data quantities with low requirements on the transmission speed.

This message is handled during cyclical process data exchange (also called DPV0 (=standard) operation).

Fig.: 1   Parameter channel schematic drawing
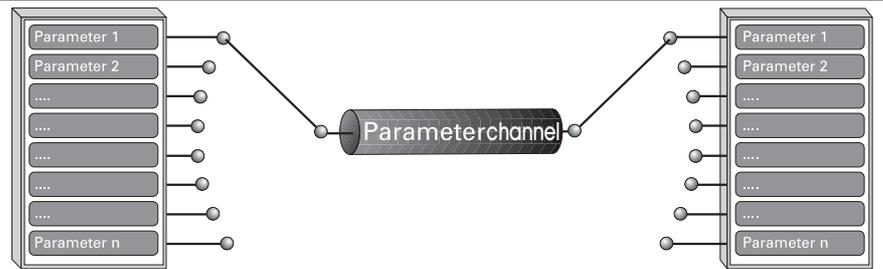
Parameter channel

Access to process, parameter and configuration data is possible via the parameter channel. These data are transmitted on request over several cycles.

The user can set up parameter channel transmission by selecting plug & GO module A.4 in its PROFIBUS configuration (see also documentation 9499-040-66611). Configuration is via the bus master bus configuration tool.

Module A.4:

General- Parameter channel:[1]			
Parameter channel	module-ID: $F3_{hex}$/ 243_{dez}		
Reading	Bytes	Writing	Bytes
Reply data	8	Requested data	8

Fig.: 2   Hardware configuration example for SIMATIC S7

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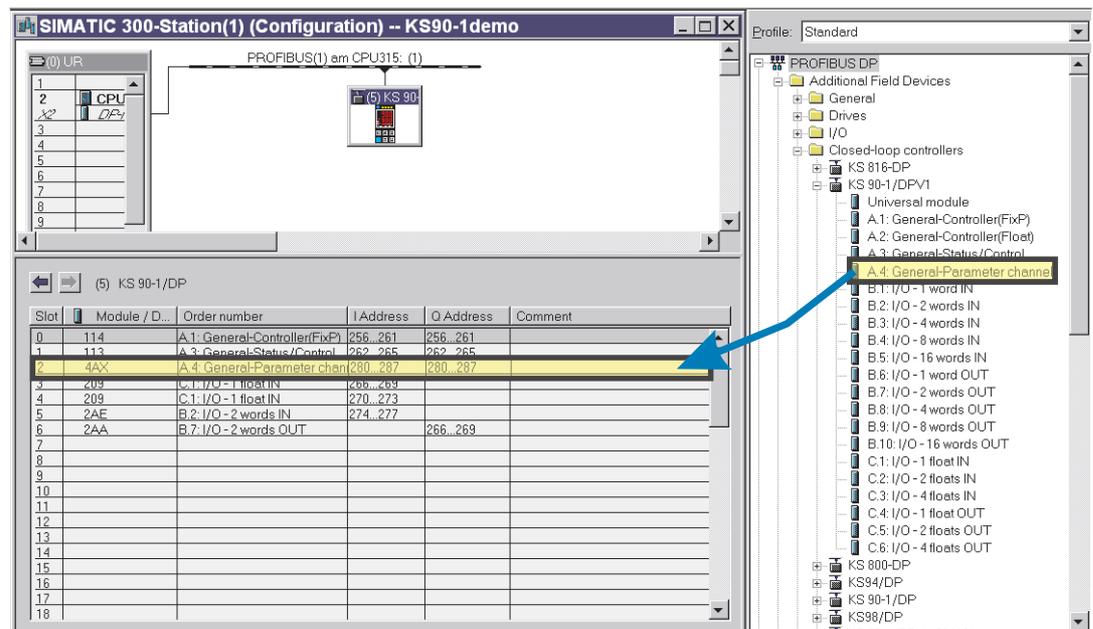
1) Please note the necessary consistency data transmission!

| | 2.1 | **Message elements** |

Some terms which are explained below are used in the following paragraphs:

Element	Description
ID	Telegram type identification
ID1	Data format of the transmitted or received data
Rd.Cnt	Number of data which can be read
Adr.High	Start address High-Byte
Adr.Low	Start address Low-Byte
Cnt. Real	Number of float data which can be written
Cnt. Int	Number of integer data which can be written

ID

The element ID identifies the telegram type:

ID = 0x10 (16_{dez})	≙	Start telegram
ID = 0x68 (104_{dez})	≙	Data telegram
ID = 0x16 (22_{dez})	≙	End telegram

ID1

The element ID1 identifies the data format:

ID1 = 0	≙	Integer
ID1 = 1, 3	≙	Float
ID1 = 2	≙	single character(char)
ID1 = 4	≙	character in compact format

Integer format(0)   Data are transmitted as 2 integer bytes in the data telegram. The start address determines, if these data are integer, FixPoint1, FixPoint2 or FixPoint3 values. With a start address defined in the float address range, it will be converted into the corresponding integer range.

Float format(1,3)   Data are transmitted as 4 bytes with floating decimal point in the data telegram. Unless a start address in the float address range is defined, the start address is converted into the corresponding float range.

Character format(2)   Data are transmitted as 1 character byte in the data telegram. Unless a start address in the integer address range is defined, the start address is converted into the corresponding integer range.

Compact character format(4)   Data are transmitted as 4 character bytesin the data telegram. Unless a start address in the integer address range is defined, the start address is converted into the corresponding integer range. Unused digits in the data telegram are filled with value 0x00.

Rd.Cnt   Rd.Cnt defines the number of data to be read in the selected format (ID1).

🛈 **For this, data Cnt.Real and Cnt.Int must be zero.**

Adr.High/Adr.Low   Fields Adr.High and Adr.Low define the start address of data to be defined. The address is divided into a high byte and a low byte.

🛈 **Example: The integer value of the address for set-point 5P is 3180dec , as float value, its address is 39128dec.**

Name				Value in decimal format		Value in hex format	
	Format	Adr. dez.	Adr. hex	Adr.High	Adr.Low	Adr.High	Adr.Low
SP	Integer	3180	0C6C	12	108	0C	6C
SP	Float	39128	98D8	152	216	98	D8

Cnt.Real	Value defined for the number of real values to be written (ID1 = 1, 3). The value for Cnt.Int must be 0.
Cnt.Int	Value defined for the number of integer values to be written (ID1 = 0, 2, 4). The value for Cnt.Real must be 0.

2.2	**General communication structure**

For transmission of the required parameters via an 8-byte data window, the access comprises start, data and end telegram. The messages to be sent by the master are shown below.

i Please, note that consistent data transmission of 8 bytes for the parameter channel is required.

Start telegram ❑ Start telegram with specification of data format, start address and number to be transmitted.

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
ID	ID1	Rd.Cnt	Adr.High	Adr.Low	0	Cnt. Real	Cnt. Int

Data telegram ❑ n Data blocks with data to be transmitted
Structure of data telegram:
a) Transmission of floating point values (ID1 = 1,3)

format float

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
ID	Count			Float			

b) Transmission of integer values (ID1 = 0)

format integer

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
ID	Count					Integer	

c) Transmission of Char values (ID1 = 2)

format character

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
ID	Count						Char

d) Transmission of four characters (ID1 = 4)

format string

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
ID	Count			Char	Char+1	Char+2	Char+3

i The byte sequence for float and integer formats is as Motorola (default) or Intel format according to the user parameter setting. See also document "SB PROFIBUS-DP process data" (9499-040-66611).

End telegram ❑ an end block, provides the result of the operation
End telegram structure:

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
ID		Result					

Signification of Result	
0	OK
2	erroneous address
3	invalid value
4	buffer overflow

A read or write operation is always started by the master. If the values of Cnt.Real or Cnt.Int ≠ 0, a write, otherwise a read service is started; a value Rd.Cnt ≠ 0 is a prerequisite of the latter.

2.3 Data write procedure

❑ Start telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Master sends:	0x10	ID1	0	Adr.High.	Adr.Low	0	Cnt.Real[1]	Cnt.Int[1]

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Controller replies:	0x10							

❑ Data telegrams:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Master sends:	0x68	Count			Value

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Controller replies:	0x68	Count			

Thereby, the first value is sent with Count = 1, for flow checking, Count is mirrored by KS 90-1/DP (1 ≤ Count ≤ Cnt.Real rsp. Cnt.Int).

❑ End telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Master sends:	0x16				

	Byte 0	Byte 1	Byte 2-3	Byte 4 - 7
Controller replies:	0x16		Result	

2.4 Data read procedure

❑ Start telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Master sends:	0x10	ID1	Rd.Cnt	Adr.High	Adr.Low	0	0	0

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Controller replies:	0x10						Cnt.Real[1]	Cnt.Int[1]

❑ Data telegrams:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Master sends:	0x68	Count			

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Controller replies:	0x68	Count			Value

With Count = 1, the first value is requested, for flow control, Count is mirrored by the controller and the value is also sent (1 ≤ Count ≤ Cnt.Real resp. Cnt.Int).

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1)   Selection: only one of values Cnt.Real and Cnt.Int may be ≠ 0.

❏ End telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Master sends:	0x16				

	Byte 0	Byte 1	Byte 2-3		Byte 4 - 7
Controller replies:	0x16		Result		

2.5 Examples

2.5.1 Example 1: single access, read, integer value

The controller proportional band 1 ($Pb1$) is to be read out in FixPoint1format (address = 13192_{dec}).

Start telegramm:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Master sends:	0x10	0x0	0x1	0x33	0x88	0	0	0

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Controller replies:	0x10						0	1

Data telegram 1:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Master sends:	0x68	1			

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Controller replies:	0x68	1			Value

End telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Master sends:	0x16				

	Byte 0	Byte 1	Byte 2-3		Byte 4 - 7
Regler replies:	0x16		0		

2.5.2 Example 2: Block access, read, float value

The set-point adjustment parameters ($SP.Lo$, $SP.Hi$, $SP.2$, $r.SP$) are to be read in float format (address = 38968_{dec} , 4 values).

Start telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Master sends:	0x10	0x1	0x4	0x98	0x38	0	0	0

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Controller replies:	0x10						4	0

Data telegram 1:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Master sends:	0x68	1			

Controller	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
replies:	0x68	1			Value

…

Data telegram 4:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Master sends:	0x68	4			

Controller	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
replies:	0x68	4			Value

End telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Master sends:	0x16				

Controller	Byte 0	Byte 1	Byte 2-3	Byte 4 - 7
replies:	0x16		0	

2.5.3 Example 3: Single access, write, integer value

Derivative action time 1 (Ᵽ d 1) of the controller shall be written in integer format (address = 5004_{dec}).

Start telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Master sends:	0x10	0x0	0x0	0x13	0x8C	0	0	1

Controller	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
replies:	0x10							

Data telegram 1:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Master sends:	0x68	1			Value

Controller	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
replies:	0x68	1			

End telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Master sends:	0x16				

Controller	Byte 0	Byte 1	Byte 2-3	Byte 4 - 7
replies:	0x16		0	

2.5.4 **Example 4: Block access, write, float value**

The parameters of limit value 1 (L.1, H.1, HYS.1) shall be written in float format (address = 36968_{dec}, 3 values).

Start telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Master sends:	0x10	0x1	0x0	0x90	0x68	0	3	0

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Controller replies:	0x10							

Data telegram 1:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Master sends:	0x68	1			Value

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Controller replies:	0x68	1			

…

Data telegram 3:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Master sends:	0x68	3			Value

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Controller replies:	0x68	3			

End telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Master sends:	0x16				

	Byte 0	Byte 1	Byte 2-3	Byte 4 - 7
Controller replies:	0x16		0	

| **3** | # Getting started with SIMATIC® S7 |

The disk enclosed in the engineering set contains the GSD file and project examples for a SIMATIC® S7. Communication with a process controller can be built up easily by means of configuration and project.

Test environment

The following components are required for the exemplary test set-up:
- Programming unit (PG) or PC with PC adaptor
- Programming tool STEP®7 $\geq$ V5.0
- PLC

e.g. CPU S7 315-2 DP, latest revision

Components
- KS 90-1/DP, (e.g. order no. KS90-100-2000D-000)
- Sub-D adaptor (e.g. order no. 9407-998-07001)
- Engineering set (e.g. order no. 9407 999 10511)
- Cable
    - PROFIBUS cable PLC $\leftrightarrow$ KS90-1/DP with PROFIBUS connector and integrated termination resistors
    - PG $\leftrightarrow$ PLC

Test environment example:

Task
- A KS 90-1/DP with address 5 shall be connected to CPU315-2 DP via PROFIBUS-DP.
- The parameter channel shall be set up. For this, process data module A.4 must be included.

(i) Before take the test environment into operation, you should ensure that the PLC do not contain any user software ("clear/reset").

Procedure:
- Make the connections (PROFIBUS)
- Configure the instruments
    - Load the example engineering from the floppy into KS 90-1/DP
    - Adjust address 5 to KS 90-1/DP (via front keys or BlueControl˙)
    - connect instruments to PROFIBUS network
    - Activate the bus termination resistors.

Procedure
- PROFIBUS-network configuration
    - Insert disk (Engineering Set) into PG.
    - Retrieve the example project (A:\KS901DP\S7_FB\EXAMPLE\KS90demo.zip)
    - Open project KS90-1demo.
    - if necessary adapt addresses and CPU hardware configuration and download it to the DP master (CPU315-2 DP).
    - Switch PLC to run mode.

After taking the test set-up into operation, testing the parameter channel by means of the variable tables (VAT 2, VAT3) enclosed in the project is possible.

3.1 Simple access

Access to the parameter channel is possible using a simplified input function via variable table VAT2. In the program example, the relevant conversions in FC104 are carried out, i.e. only the following values must be defined for manual data transmission:

- Read / write selection
- Data type selection
- Start address definition
- Number of data to be transmitted
- Execution start

Procedure

For data transmission testing, proceed as follows:

- Select, if you want to read or to write data (0 or 1)
- Select the transmission data type (integer, float, character; 0,1,2)
- Specify a start address; if you have adjusted a float transmission, you should define the address in hex format.
- Select the number of data to be transmitted with Count.
- Define Wrrite values within DB37.Dxxx; as a word or double word dependent of selected data type.
- Start message handling with value Start = 1.
- The message is finished, if the result is 0x0002 (positive) or 0x0004 (negative). Read values are within DB37.Dxxx.

Result

Display word shows the current status of transmission for the selected data range. The structure of the display word is:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Timeout (FB)	Faulty service				000 : ok 010 : faulty address 011 : invalid value 100: buffer overflow			wait for end telegram	Service (0=Read; 1=Write)	Reset order	wait for acknowledgement	Order finished with fault	Order finished without fault	Order busy	

Fig. 3 : VAT 2: Example for simple parameter operation, here: read 4 real values

3.2 Direct access

Alternatively, direct access to function blocks FB106, FB107 (see below) via variable table VAT3 is possible.

Fig. 4 :   Example for direct access to the FBs of the parameter channel

For parameter description, see chapter 4.1.

4 Function blocks for SIMATIC® S7

S7 function blocks FB106 (PMA-FIX) and FB107 (PMA float) are used for easy access to parameter and configuration data of KS 90-1.
Calling up the FB is indispensable when starting an order and as long as the order is active.
Dependent of S7-CPU and DP master, there are differences in the I/O handling. When using the on-board DP interface of a CPU315-2 DP, SFC modules 14 and 15 must be used for transmitting data consistently. SFC modules 14 and 15 copy the I/O areas into the marker or data module area. When using an external CP' (CP 342-5 DP), the relevant SEND and RECEIVE FB's at the cycle start and end must be used. The FB has an instance DB which must be specified with function block call.
Every FB has an instance DB, which must also be specified when calling up the FB.

4.1 FB106, FB107 structure

Function blocks FB106, FB107 have the call parameters given below. In FB106, the data are stored in word width in the associated data block, in double word width with FB107.

Name	Typ	Description / function
A-Anfang	Pointer	Start address range of output words (e.g. address of data range 'RECORD' of SFC 15, Ax, y when using an external CP). When specifying a data word, the DB no. must also be transmitted (e.g. DB4.DBX0.0).
E-Anfang	Pointer	Start address range of input words (e.g. adress data range 'RECORD' of SFC 15, Ex, y when using an external CP). When specifying a data word, the DB no. must also be transmitted (e.g. DB4.DBX0.0).
DB-Para	Pointer	Specification of data block with the parameter data. Entry comprises the data block no. and the data word no. where the parameter data start. Thereby, <u>no</u> offset needs to be taken into account. The data are interpreted as parameter data by the specified address. Specification of the DB must be in the following form, e.g. DB6.DBX10.0
Service	WORD	Service (Read/Write)
Code_nr	WORD	Read access: number of values to be read
FB_nr	WORD	Address, high byte
FKT_nr	WORD	Address, low byte
Typ	WORD	d.c. (always '0')
Timeout	DWORD	Timeout value, is decremented at each call. With a value = 1, the order is cancelled with error message 'timeout'.
DWLR	WORD	Length of real values; definition when writing
DWLI	WORD	Length of integer values; definition when writing
DWLC	WORD	Length of Char values; definition when writing
ANZW	W	The display word shows the current status of transmission for the selected data range. The display word structure is:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Timeout (FB)	Faulty service				000 : ok 010 : faulty address 011 : invalid value 100: buffer overflow				wait for end telegram	Service (0=Read; 1=Write)	Reset order	wait for acknowledgement	Order finished with fault	Order finished without fault	Order busy

The function module reads or writes KS 90-1/DP parameter/configuration data.
- A-Anfang, E-Anfang
  Enter the input addresses or output addresses of the parameter channel in these parameters. The addresses are determined when configuring the PROFIBUS unit.
  (STEP 7 - hardware configuration)
- DB-Para
  DB-Para is a pointer to the data module into which read data are written or from which data are removed when writing..

- Service
  This parameter determines the access mode (write / read).

Write access:	F0	$\triangleq$	Integer	**Read access**:	0	$\triangleq$	Integer
	F1	$\triangleq$	Real		1	$\triangleq$	Real
	F2	$\triangleq$	Char		2	$\triangleq$	Char

- Code_nr
  With read accesses, Code_nr defines the the number of data to be read. In this case, the data DWLR, DWLI, DWLC must be zero. When writing, Code_nr = 0 must be set.

- FB_nr
  Specify the high byte of the parameter to be addressed.
  Example: parameter L. l , address $2100_{dec} \triangleq 0834_{hex}$

  FB_nr contains: $08_{hex} \triangleq 8_{dec}$
  FKT_nr contains: $34_{hex} \triangleq 52_{dec}$

- FKT_nr
  Specify the low byte of the parameter to be addressed.

-

- DWLR (Real), DWLI (Integer), DWLC (Char)
  These parameters contain the relevant number of received data after a read access. With a write access, the relevant number of data to be transmitted is specified. Only one of these parameters may contain a value $\neq 0$.

- ANZW
  This display word provides the mapping for the current transmission status. Bit 4 can be used as an input for resetting the B 206 / FB 207.

5 Parameter transmission in DPV1

In a first extension (DPV1), the standard PROFIBUS functions were completed by standard functions for acyclical parameter reading and writing. Thus e.g. slave parameter changing during operation is possible. This acyclical data communication is in parallel to the cyclical data exchange, but with lower priority, in the remaining time of the programmed communication cycle.

The instrument supports DPV1 functions. Additionally, loading a complete engineering into the instrument or reading it from the instrument into the PC are possible using PROFIBUS-DPV1 via BlueControl®. In this way, central engineering stations can be built up, e.g. without transferring the data e.g. via a PLC.

Fig.: 5   DPV1 Connecting possibilities
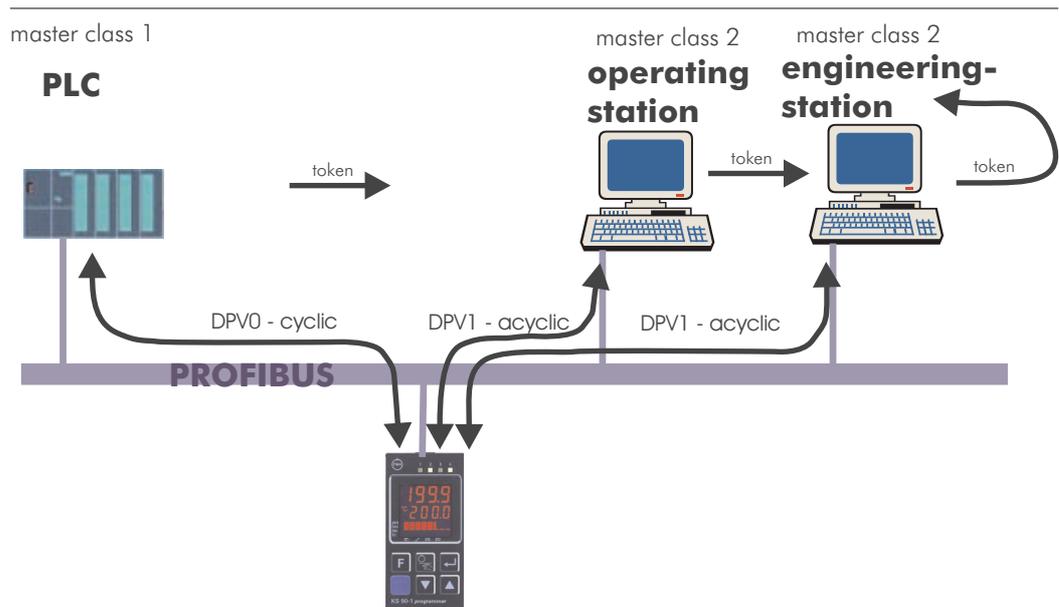
From DP firmware version ≥ V2.0, the imstrument supports:

- ☐ an acyclical connection class 1 master
- ☐ two acyclical connections to class 2 masters
- ☐ up to a data length of 240 bytes per communication
- ☐ the acyclical services to class 1 master
    - Read   reading a data block
    - Write   writing a data block
    - Alarm   explicitly acknowledged alarm which is transmitted from instrument to the master
    - Alarm_Ack   The master acksnowledges reception of an alarm
- ☐ the acyclical services to class 2 master
    - Read   reading a data block
    - Write   writing a data block
    - Initiate   build-up of a data connection to instrument
    - Abort   build-up of data connection to instrument

5.1	## Connection to DPV1 master

The two classes of PROFIBUS-DP masters are:

Class 1 master
- Class 1 master (DPM1):
  With a class 1 master, fast changing process data are exchanged cyclically with the associated slaves, e.g. KS 90-1/DP. Typical class 1 masters are PLCs, Soft PLCs (PC) or supervisory systems.

Class 2 master
- Class 2 master (DPM2):
  Acyclical access to slaves in the PROFIBUS network is possible by class 2 masters. These slaves can be allocated to another class 1 master. Examples are operating systems and engineering stations which exchange data with slaves only on request.

Multi-master, Mono-master
- Systems with more than one master integrated in a PROFIBUS network are called multi-master systems. A typical case is a PLC as a class 1 master for processing of the decentral data and a PC as an operating/engineering station (class 2 master).
  Systems with only one master are called mono-master systems.

5.1.1	### *Hints for setting up the DP master*

For smooth operation, we recommend using the following DP master settings:
- The active master supports DPV1 - services
- Enable the DPV1 functionality at the master and for the selected instrument
- If applicable, specify the max. channel size (240 bytes)
- Check or adjust the Token target rotation time.

Fig.: 6   Token access
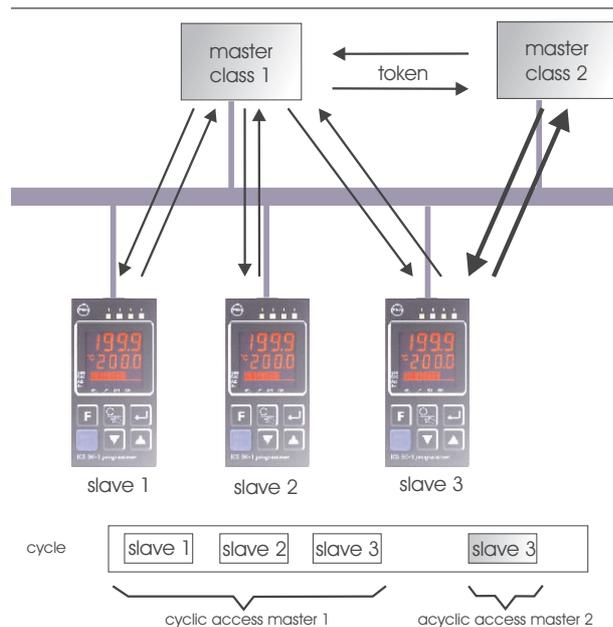
Token target rotation time

ⓘ **The Token time (Ttr) must not be too low, otherwise, the acyclic message cannot be handled. This time defines the maximum available time for one Token rotation, within which all active DP masters get the permission for bus access once**

ⓘ **When using one or several class 1 masters and one or several class 2 masters in a multi-master system, the token target rotation time must be set to the same value on all masters, e.g. the sum of all individual times.**

ⓘ At low Profibus transfer-rates (9.6 bzw. 19.2 kBit/s) the preset target rotation time is to be enlarged at least by factor 5.

⚠ **An incorrectly adjusted token target rotation time can cause communication troubles.**

transmission
time

The DPV1 transmission times are determined from Baudrate, overall number of data to be transmitted and size of data to be transmitted in the addressed instrument. Example: typical values for transmission of an instrument engineering are within 15 sec. and 3 min.

ⓘ For access to an instrument via a class 2 master for acyclical services, the instrument can be allocated to and exchange cyclical data with another class 1 master (e.g. PLC). Thereby, it is unimportant whether the class 1 master has defined the instrument as DPV0 or DPV1 slave. However, the allocation of the instrument to another class 1 master is not a prerequisite for acyclical data exchange.

5.1.2   *Available acyclical connections*

In total, the instrument supports three acyclical connections which can be active simultaneously:

☐ a class 1 master connection
☐ max. two class 2 master connections
These connection must be built up and cancelled explicitly using services Initiate and Abort.

5.2   Acyclical services Read, Write

Acyclical services Read and Write can be described only generally in this paragraph.
With PROFIBUS DPV1, acyclical data addressing is done using a slot number and an index, which can be used for addressing all data enabled for transmission. The maximum number of transmitted data of 240 bytes can be limited by specifying a length.

Before Read and Write service handling, communication must be built up using an initiate command at first with a class 2 master. After finishing the transfer, the communication can be stopped by means of the abort command.

ⓘ Further information is given in the PROFIBUS master manual, or from the PROFIBUS user organization under www.profibus.com .

The instrument uses parameters slot number and index for instrument parameter addressing via DPV1. For definitions, see chapter "Address structure", page 23.

5.2.1   *Read service*

Service Read (read dataset) comprises a request telegram sent by the master and a reply telegram returned by the slave after data transfer. In the meantime, the master polls the slave until reception of a reply.

Read request

Parameters for the request telegram:

Parameter	Range	Signification
Slot number	0 … 254	Forms the higher byte of the start address
Index	0 … 254	Forms the lower byte of the start address
Length	1 … 240	Indicates the number of requested bytes

Reply

Reply telegram with positive result:

Parameter	Range	Signification
Length	1 … 240	Actual number of read bytes
Data		Read data bytes

5.2.2	***Write service***

The Write service (write dataset) comprises a request telegram sent by the master and a response telegram returned by the slave after data transfer. In the meantime, the master polls the slave until reception of a reply.

Write request

Parameters for the request telegram:

Parameter	Range	Signification
Slot number	0 … 254	Forms the higher byte of the start address
Index	0 … 254	Forms the lower byte of the start address
Length	1 … 240	Indicates the number of requested bytes
Data		Data bytes to be written

Reply

Response telegram with positive result:

Parameter	Range	Signification
Länge	1 … 240	Actual number of written bytes

5.2.3	***Data type and data format***

Data type

The type of data to be written is determined by the predefined address range (see chapter 7.1).
Example:
If you specify address (slot number + index) $2100_{dec} = 0834_{hex}$ for
low limit value 1 (**L. 1**)
this value and all following ones of this message are transmitted as integer value without digits behind the decimal point. When specifying $10292_{dec} = 2834_{hex}$
for lower limit value 1 (**L. 1**)
this value and all following values of this message are transmitted as integer value with one digit behind the decimal point. When specifying $36968_{dec} = 9068_{hex}$
for lower limit value 1 (**L. 1**)
this and all following values of this message are transmitted als float value.

Data format

The transmitted integer and float values can be different as to the order of bytes. This is Motorola (also IEEE 754 - def. for float values) or Intel format. The PROFIBUS standard (IEC 61158) is based on the Motorola format.
The applicable rules are:
- for class 1 master communication:
  - according to the selected definition in the user parameter setting (Motorola or Intel)
- for class 2 master communication:
  - always Motorola format.

5.2.4 *Negative response telegram*

Unless a service can be handled without error, a negative response telegram is returned from the master to the slave.

Error reply

Response telegram with negative result, supported error messages:

Parameter	Values	Meaning
Error identification (Error_Decode)	128_{dec}	Describes the protocol system; in this case 128 = DPV1
Error code 1 (Error_Code 1)	Error_Class 0xAy (10_{dez})	Application error class Error y: 0x9 "feature not supported" functionality not supported
	Error_Class 0xBy (11_{dez})	Access error class Error y; 0x0 "invalid index" - faulty address calculation 0x2 "invalid slot" - faulty address calculation 0xA "MODADR invalid" - faulty address calculation (faulty index, slot number) 0xB "Value_invalid" - values not accepted (e.g. no write access permitted, out-of-limits)
Error code 2 (Error_Code 2)	0x00	Reserved

5.2.5	***Address structure***

For addressing individual data, service parameters Slot number and Index are used in common as an address. The slot number is formed by the higher address byte, whilst the index is formed by the lower byte.

Index ≠ FFhex

Example:

Parameter $Pb\ 1$ (proportional band 1) as integer value (without digits behind the decimal point)

Address:	5000_{dez}	= 1388 hex
Slot number:	19_{dez}	= 13hex
Index:	136_{dez}	= 88

> ⓘ **Since value 255 (FF$_{hex}$) for Slot and Index according to the PROFIBUS standard is not available, the following conversions are necessary.**
>
> - Slot number:
>   No actions are necessary, because no addresses higher than or equal to 65280 (FF00) are defined.
> - Index:
>   The following conversion are necessary:
>   ① address = xxFF ⟹ slot number xx & index FF
>   ② set index to 1: 01
>   ③ add to slot number 80 (128), the result is the substitute address

Index =FFhex

Example:

Parameter $dEL.3$ (alarm delay with limit value 2) as integer value (without digits behind the decimal point)

Address:	2303_{dez}	= 08FF$_{hex}$
Slot number:	8_{dez}	= 08$_{hex}$
Index:	255_{dez}	= FF$_{hex}$
add to slot number 80$_{hex}$ (128$_{dez}$):		
Slot number:	136_{dez}	= 88$_{hex}$
Set index to 1:		
Index:	1_{dez}	= 01$_{hex}$
new address:	34817_{dez}	= 8801$_{hex}$

The conversion concerns e.g. the following addresses (selection):

Adr (dez)	Parameter	Function
2303	dEL	Lim3
4351	Y_1	Out2
6143	SegTyp05	ProG; 1st program
6655	SegTyp11	ProG; 6th program
6911	Pt05	ProG; 9th program
7167	Pt11	ProG; 11th program

> ⓘ **This address conversion is necessary only, if the start address starts at the addresses listed in the table. If an access to this adress is made in a block request, conversion is not necessary.**

6   BlueControl® via PROFIBUS-DPV1

The instrument offers the possibility to load a complete engineering into the instrument by means of BlueControl® via PROFIBUS-DPV1, or to read it from the instrument into the PC. Thus central engineerings can be built up, without e.g. transmitting the data via a PLC. A complete engineering, operating functions and trend recording are possible and can be transmitted.

ⓘ   From version 1.5, the BlueControl® engineering tool presently supports the PROFIBUS PC cards make Hilscher, e.g. CIF50-PB, CIF60-PB, firmware version ≥ 1.0.71.

ⓘ   From version 2.4, the BlueControl® engineering tool additionally supports the PROFIBUS PC cards made by Siemens, e.g. CF5613.

For transmission, settings in the engineering tool and for the PROFIBUS card (Tool SyCon®) are required.

Following, the necessary settings in the engineering-tool and for the PROFIBUS-card are shown by example of a pc-card by Fa. Hilscher.

6.1   CIF card setting

Case 1:   The instrument is not integrated into a PROFIBUS network.
The CIF card must be initialized with the master address and the baudrate.(for example, see fig. 9.).

Case 2:   The instrument is intgrated into a network with other DP masters, e.g. S7.

A free master address must be allocated to the CIF card. The Baudrate already used at the bus must be adjusted. The target rotation time must be adapted and adjusted on all masters connected to the PROFIBUS (s. below). Only the CIF card needs to be defined as C2 master (no instrument required as slave).

Case 3:   The instrument is integrated into an engineering with the selected CIF card as a slave.

Access to the instrument is in the form of C1 communication.

Subsequently, the instrument must be connected with the CIF card.

Fig.: 7   DPV1 - Parameter settings CIF

6.2	**BlueControl® settings**

- Select the transfer channel to BlueControl® by selecting field "Settings" with PROFIBUS 1 to 4 (max. 4 PROFIBUS cards can be fitted in the PC).
- Define the KS 90-1/DP to be selected by specification of the address (PROFIBUS address).

ⓘ For transmission from BlueControl®, we recommend using the basic settings for the Hilscher interface card:
  - Instrument: user parameters
  - Set Motorola/Intel format to "Motorola = 0" .
  - Set DP master storage format to "little Endian" (LSB/MSB).

ⓘ An engineering download via DPV1 functions is available from DP firmware version 2.0.
If building up of a transmission channel by means of the Hilscher interface cards is not possible, the cause may be e.g.:
  - The instrument contains an earlier software version (error message -7).
  - The instrument is defined as a DPV0 slave and access to the instrument by the engineering tool is via a class 1 master access (error message 1132).
  - The maximum channel data length in the DPV1 settings of the instrument is too low (error message 1132). The instrument is designed for 240 bytes.
  - There is no communication with the instrument (error message 1129).
  - The target rotation time is too low (error message 1129).

⚠ **Only one engineering tool per instrument at a time may be busy exchanging data.**

Fig.: 8   Selecting the transfer channel

7	**Address formats**

7.1	**Area definitions**

The address is coded in 2 bytes (= 1 word). The 3 most significant bits are used for definition of the format in which the data are written or read.
For BluePort® devices the following formats are available:
Für Geräte stehen folgende Formate zur Verfügung
- **Integer**
- **Integer with 1, 2, 3 digit(s)**
- **Floating point format (Float to IEEE)**

Address range	Data format	Transmissible min. value	Transmissible max. value	Resolution
0x0000 to 0x1FFF	Integer without digits behind the decimal point	-30000	+32000	+/- 1
0x2000 to 0x3FFF	Integer with 1 digit behind the decimal point	-3000.0	+3200.0	+/- 0.1
0x4000 to 0x5FFF	Integer with 2 digits behind the decimal point	-300.00	+ 320.00	+/- 0.01
0x6000 to 0x7FFF	Integer with 3 3 digits behind the decimal point	-30.000	+ 32.000	+/- 0.001
0x8000 to 0xBFFF	Float (IEEE format)	-1.0 E+037	+1.0 E+37	+/- 1.4E-45

(i) **With the integer numbers without and with digits behind the decimal point, value range -30000 to 32000 is transmitted via the interface. Scaling with factors 1, 10, 100 or 1000 must be done by both the sender and the receiver.**

To make polling and presetting of processdata, parameter- and configurationdata as easy as possible, the relevant ranges are grouped.

(i) **Processdata can be defined multiple in different groupings.**

7.2	**Special values**

With transmission in integer format, the following special values are defined:
- -31000   This datum or a dependent value has a sensor failure.
- -32500   This datum is not defined. This value is returned by the controller, if a datum in the block is not defined with a block request..
- -32000   The function is switched off.
- -32768   Corresponds to 0x8000 hex; the value to be transmitted is out of the transmissible integer range.

The following special values are defined with transmission in float format:
- -1.5E37   This datum is not defined. This value is returned by the controller, if a datum within the block is not defined with a block request.

(i) **Data with a switch-off value (-32000) are marked "off" in column "Value" of the following tables.**

7.2.1   *Composition of the address tables*

In the address tables shown in Section 5, the addresses for every parameter of the corresponding data format are specified in decimal values.
The tables are structured as follows:

Name	R/W	Address	Integer	Real	Type	Value/off	Description
		base 1dP					

- Name   Description of the datum
- R/W   permitted type of access: R = read, W = write
- Address integer   Address for integer values
- base   Integer without decimals
- 1 dP   Integer with 1 decimal
- 2 dP   Integer with 2 decimals
- 3 dP   Integer with 3 decimals
- Real   Floating point number / Float (IEEE format)
- Type   internal data type
- Value/off   permissible value range, switch-off value available
- Description   Explanations

7.2.2   *Internal data types*

The following data types are assigned to data used in the device:

- Float
  Floating point number
  Value range: -1999 ... -0.001, 0, 0.001 ... 9999
- INT
  Positive whole integer number
  Value range: 0 ... 65535
  Exception: Switch-off value '-32000'
- Text
  Text string consisting of n characters, currently defined n = 5
  Permissible characters: 20H...7FH
- Long
  Positive whole Long number
  Value range: 0 … 99999
- Enum
  Selection value

8　Terms

BlueControl®	Engineering tool software for BluePort® controller
BluePort®- interface	interface at the front of the controller to connect an engineering tool
DPV0	zyklischer Datenaustausch, Grundfunktionen
DPV1	azyklische Dienste zusätzlich zu DPV0
ET	Abbreviation of engineering tool
Fail-safe	behaviour of a device in case of PROFIBUS or bus master fault.
FB	Abbreviation of function block
Float	Abbreviation of floating point number
FixPoint	data format with one fixed decimal point
Fkt	Abbreviation for function
Forcing	Presetting of input and output values via bus interface
Function	a partial function of the function block which is self-contained seen from the interface
Function block	closed sequence unit
GSD file	file of instrument data, standardarized description of communication capabilities
HW	Abbreviation of hardware
Master Klasse 1	Master, der den zyklischen Nutzdatenaustausch durchführt
Master Klasse 2	Master für Inbetriebnahme und Engineering - Aufgaben
MS0	zyklische Kommunikation zwischen Master Klasse 1 und Slave
MS1	azyklische Kommunikation zwischen Master Klasse 1 und Slave
MS2	azyklische Kommunikation zwischen Master Klasse 2 und Slave
Parameter channel	Possibility to transfer data acyclically and sequentially within the cyclic process data exchange
PG	Abbreviation of programming unit
PNO	PROFIBUS Nutzerorganisation
PROFIBUS-DP	Standard communication protocol to IEC 61158 (DP: decentral peripheral units)
Real	another term for floating point number
RS485	Standard 2-wire connection, half duplex, (EIA RS 485)
S5 / S7	PLC families of the Siemens AG
Serial interface	rear bussable controller interface
SW	Abbreviation of software
TTL	Signal level at chip level
VAT	Variable table: monitoring of values in STEP®7

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10	**Address tables**

The following sections describe the address tables for:
- **Process controller KS 90-1 / KS 92-1**
- **Programmer KS 90-1** *programmer* **/ KS 92-1** *programmer*

10.1	**Explanations for program addresses**

For addressing the programs of the KS 90-1 *programmer* / KS 92-1 *programmer* the following rules should be observed:
- The program currently active can be reached by address 6100 f..
- The starting addresses of the stored programs start at 6200 f. for program 1, 6300 f. for program 2 ....and so on (see table).
- The program structure is the same for every program

	program start addresses				
	base	1 dP	2 dP	3dP	real
currently running program	6100	14292	22484	30676	44968
Program 1	6200	14392	22584	30776	45168
Program 2	6300	14492	22684	30876	45368
Program 3	6400	14592	22784	30976	45768
Program 4	6500	14692	22884	31076	45968
Program 5	6600	14792	22984	31176	46168
Program 6	6700	14892	23084	31276	46368
Program 7	6800	14992	23184	31376	46568
Program 8	6900	15092	23284	31476	46768
Program 9	7000	15192	23384	31576	46968
Program 10	7100	15292	23484	31676	47168
Program 11	7200	15392	23584	31776	47368
Program 12	7300	15492	23684	31876	47568
Program 13	7400	15592	23784	31976	47768
Program 14	7500	15692	23884	32076	47968
Program 15	7600	15792	23984	32176	48168
Program 16	7700	15892	24084	32276	48368

Making changes in the actual working program is only temporary (address 6100 f.) If changes shall be permanent the value must be written to the programs address (e.g. 7100 for program 10 or 6300 for program 2).

Notes:

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Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP.Fn	r/w	base	3150	39068	Enum	Enum_SPFN	Basic configuration for setpoint processing, e.g. 'setpoint controller switchable to external setpoint'. Configuration of special, controller-dependent setpoint functions.
		1dP	11342				
		2dP	19534				
		3dP	27726				

						0	set-point controller can be switched over to external set-point (->LOGI/SP.E)
						8	Setpoint controller switchable to setpoint controller with external setpoint shift (switchable -> LOGI/SP.E).

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
C.tYP	r/w	base	5062	42892	Enum	Enum_CtYP	The process value can be assigned directly to an input value, but it can also be computed from the comparison of two input values. For this, various formulas are provided for the user, e.g. the difference or the ratio of the two input values.
		1dP	13254				
		2dP	21446				
		3dP	29638				

						0	Standard controller (process value = x1)
						1	Ratio controller (x1+oFFS)/x2. An offset is added to the input value x1, and then the ratio is calculated from the result and the input value x2. This ratio is used as process value.
						2	The process value is calculated as the difference of the two values (x1 - x2).
						3	Maximum value of x1 and x2. The higher value is used for control. In case of a sensor fault, control is continued with the remaining process value.
						4	Minimum value of x1 and x2. The lower value is used for control. In case of a sensor fault, control is continued with the remaining process value.
						5	Mean value (x1 + x2) / 2. In case of a sensor fault, control is continued with the remaining process value.
						6	Switchover between the input values: process value = x1 or process value = x2.
						7	O2 function with constant sensor temperature. The engineering unit for the O2 setting should be checked under: Other -> parameter unit (ppm / %). The sensor temperature must be defined under: Parameters -> Controller -> Sensor temperature.
						8	O2 function with measured sensor temperature. The sensor temperature is required as the second process value x2. The engineering unit for the O2 setting should be checked under: Other -> Parameter unit (ppm / %).

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
C.Fnc	r/w	base	5050	42868	Enum	Enum_CFnc	Control behaviour (algorithm) referred to output value: e.g. 2- or 3-point controller, signaller, 3-point stepping control.
		1dP	13242				
		2dP	21434				
		3dP	29626				

						0	on/off controller or signaller with one output. The on/off controller or signaller switches if the process value drifts from the setpoint more than the hysteresis.
						1	PID control, e.g. heating, with one output: Switched as a digital output (2-point) or used as an analog output (continuous). PID controllers respond quickly to changes of the control deviation, and typically do not exhibit any permanent control offset.
						2	D / Y / Off, or 2-point controller with partial/full load switch-over. 2 digital outputs: Y1 is the switching output and Y2 is the changeover contact for D/Y.
						3	2 x PID control, e.g. heating/cooling. Two outputs: Switched as a digital output (3-point) or used as an analog output (continuous). PID controllers respond quickly to changes of the control deviation, and typically do not exhibit any permanent control offset.
						4	3-point stepping controller, e.g. for motor actuators. Two digital outputs. No actuating pulses are generated when the process is lined out.
						5	3-point stepping controller with position feedback signal Yp, e.g. for motorized valves. Two digital outputs. No output signals are generated when the process is lined out. The position feedback signal Yp serves for displaying the actuator position, but also for monitoring the actuator if the DAC function (Digital Actuator Control) is provided.
						6	continuous controller with integrated positioner. This is basically a cascade. A tracking controller with three-point stepping behaviour which operates with Yp as process value is used with the continuous controller.

1 Cntr

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
mAn	r/w	base 1dP 2dP 3dP	5051 13243 21435 29627	42870	Enum	Enum_mAn		Enables the output value to be adjusted in manual operation. If adjustment is not enabled, the output value cannot be changed in manual operation, neither with the front keys nor via the interface.Note: This setting does not affect the auto/manual switchover function.
						0		The output value cannot be changed in manual operation, neither with the front keys nor via the interface.
						1		The output value is to be adjusted in manual operation (see also LOGI/mAn).
C.Act	r/w	base 1dP 2dP 3dP	5052 13244 21436 29628	42872	Enum	Enum_CAct		Operating sense of the controller. Inverse operation (e.g. heating) means increased heat input when the process value falls. Direct operation (e.g. cooling) means increased heat input when the process value increases.
						0		Inverse or opposed-sense response, e.g. heating. The controller output is increased with a falling process value, and decreased with a rising process value.
						1		Direct or same-sense response, e.g. cooling. The controller output is increased with a rising process value, and decreased with a falling process value.
FAIL	r/w	base 1dP 2dP 3dP	5053 13245 21437 29629	42874	Enum	Enum_FAIL		With the sensor break response, the operator determines the instrument's reaction to a sensor break, thus ensuring a safe process condition.
						0		controller outputs switched off
						1		y = parameter Y2 (Caution: fixed parameter Y2, not controller output Y2!). Note for three-point stepping controller: With Y2 < 0.01 CLOSED is set (DY= -100%), with 0.01 =< Y2 =< 99.9 no output is set (DY=0%), with Y2 > 99.9 OPEN is set (DY= +100%). Note for signallers: With Y2 < 0.01 OFF is set, with 0.01 =< Y2 =< 99.9 status keeps unchanged, with Y2 > 99.9 ON is set.
						2		y = mean output. The maximum permissible output can be adjusted with parameter Ym.H. To prevent determination of inadmissible values, mean value formation is only if the control deviation is lower than parameter L.Ym.
rnG.L	r/w	base 1dP 2dP 3dP	5059 13251 21443 29635	42886	Float	-1999...9999 ☐		Lower limit for the controller's operating range. The control range is independent of the measurement range. Reducing the control range will increase the sensitivity of the self-tuning process.
rnG.H	r/w	base 1dP 2dP 3dP	5060 13252 21444 29636	42888	Float	-1999...9999 ☐		Upper limit for the controller's operating range. The control range is independent of the measurement range. Reducing the control range will increase the sensitivity of the self-tuning process.

1 Cntr

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
CYCL	r/w	base 1dP 2dP 3dP	5055 13247 21439 29631	42878	Enum	Enum_CYCL	Duty cycle for 2-point and 3-point controllers. Internally, the controller calculates a continuous output value, which is converted into switching pulses for digital outputs. The user can adapt the setting to calculate various duty cycles (on/off ratio).

						0	Standard. 'Bathtub curve'. The adjusted duty cycles t1 and t2 are valid for ± 50% control output. With very small and very large control outputs, the effective duty cycle is increased sufficiently to prevent nonsensically short operating pulses. The shortest pulses are limited to ¼ of t1 and ¼ of t2.
						1	Linear water cooling (standard switching behaviour for heating). Cooling only starts above an adjustable temperature value (E.H20). Cooling 'On' with fixed pulse duration (t.on). Cooling 'Off' with minimum pulse duration (t.oFF), which varies according to controller output.
						2	Non-linear water cooling (standard switching behaviour for heating). The cooling characteristic ensures that controller action is relatively weak between 0 and approx. 70% of controller output. Above that, controller action increases rapidly up to the maximum cooling rate. The parameter 'F.H2O' can be used to alter the curve of the cooling characteristic.
						3	With constant pulses for heating and cooling. The adjusted duty cycles t1 and t2 are maintained over the entire output range. The parameter tp is used to adjust the minimum pulse duration. Shorter pulses are added internally until a pulse of length tp can be generated.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
tunE	r/w	base 1dP 2dP 3dP	5056 13248 21440 29632	42880	Enum	Enum_tune	Self-tuning procedure / sequence. Choice between:step response tuning during start-up and pulse response tuning at setpoint; or pulse response tuning during start-up and at setpoint; or only step response tuning during start-up, and no tuning at setpoint (no pulse).

						0	At start-up with step function, impulse function at setpoint. The step function at start up requires a control deviation of more than 10% of the control range. At setpoint, with control deviation less than 10% of the control range, tuning is done with the impulse function.
						1	At start-up with impulse function. Setting for fast controlled systems (e.g. hot runner control). Always tuning with impulse function. At start up, with a control deviation of more than 10% of the control range, the control loop is optimized for a wide control range. At set-point the control deviation during self-tuning is small.
						2	At start up and at set-point always tune step function at start up. Tuning is done with step function at start up, regardless of the control deviation.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Strt	r/w	base 1dP 2dP 3dP	5057 13249 21441 29633	42882	Enum	Enum_Strt	Start of self-tuning. Self-tuning can always be started manually at the request of the operator. Here, it is possible to determine that self-tuning is started automatically under the following conditions: On power-up or when an oscillation of the process value is detected.

| | | | | | | 0 | no automatic start (manual start via front interface) |
| | | | | | | 1 | Manual or automatic start of auto-tuning at power on or when oscillating is detected (oscillating of process value by more than ± 0.5% of the control range, and simultaneously the output value by more than 20%.) Note: Though the process is unchanged, at power on always the (time-consuming) auto-tuning is started. |

1 Cntr

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Adt0	r/w	base 1dP 2dP 3dP	5061 13253 21445 29637	42890	Enum	Enum_Adt0	Optimization of the switching cycles t1 and t2 for the DED conversion can be disabled here. In order to fine-tune the positioning action, the switching periods are changed by the self-tuning function, if automatic tuning is configured.

0	The cycle duration is determinated by auto-tuning. Thereby the best controlling results are obtained.
1	The cycle duration is not determinated by auto-tuning. An oversized cycle duration causes bad control behavior. An undersized cycle duration causes a more frequent switching, which can raise the wearout of mechanical actuators (relay, contactor).

• PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Pb1	r/w	base 1dP 2dP 3dP	5000 13192 21384 29576	42768	Float	1...9999	☐	Proportional band 1 (heating) in engineering unit, e.g. °C. Pb defines the relationship between controller output and control deviation. The smaller Pb is, the stronger is the control action for a given control deviation. If Pb is too large or too small, the control loop will oscillate (hunting).
Pb2	r/w	base 1dP 2dP 3dP	5001 13193 21385 29577	42770	Float	1...9999	☐	Proportional band 2 (cooling) in engineering units, e.g. °C. Pb defines the relationship between controller output and control deviation. The smaller Pb is, the stronger is the control action for a given control deviation. If Pb is too large or too small, the control loop will oscillate (hunting).
ti1	r/w	base 1dP 2dP 3dP	5002 13194 21386 29578	42772	Float	1...9999	☑	Integral action time 1 (heating) [s]. Ti is the time constant of the integral portion. The smaller Ti is, the faster is the response of the integral action. Ti too small: Control tends to oscillate. Ti too large: Control is sluggish and needs a long time to line out.
ti2	r/w	base 1dP 2dP 3dP	5003 13195 21387 29579	42774	Float	1...9999	☑	Integral action time 2 (cooling) [s]. Ti is the time constant of the integral portion. The smaller Ti is, the faster is the response of the integral action. Ti too small: Control tends to oscillate. Ti too large: Control is sluggish and needs a long time to line out.
td1	r/w	base 1dP 2dP 3dP	5004 13196 21388 29580	42776	Float	1...9999	☑	Derivative action time 1 (heating) [s], second parameter set. Td is the time constant of the derivative portion. The faster the process value changes, and the larger the value of Td is, the stronger will be the derivative action. Td too small: Very little derivative action. Td too large: Control tends to oscillate.
td2	r/w	base 1dP 2dP 3dP	5005 13197 21389 29581	42778	Float	1...9999	☑	Derivative action time 2 (cooling) [s], second parameter set. Td is the time constant of the derivative portion. The faster the process value changes, and the larger the value of Td is, the stronger will be the derivative action. Td too small: Very little derivative action. Td too large: Control tends to oscillate.
t1	r/w	base 1dP 2dP 3dP	5006 13198 21390 29582	42780	Float	0,4...9999	☐	Minimum duty cycle 1 (heating) [s]. With the standard duty cycle converter, the shortest pulse duration is 1/4 x t1. If the duty cycle is not to be optimized, this must be entered in the configuration. (Default: Optimization of the duty cycle during self-tuning, but also if the output value is less than 5%).

1 Cntr

● PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
t2	r/w	base 1dP 2dP 3dP	5007 13199 21391 29583	42782	Float	0,4...9999	☐	Minimum duty cycle 2 (cooling) [s]. With the standard duty cycle converter, the shortest pulse duration is 1/4 x t1. If the duty cycle is not to be optimized, this must be entered in the configuration. (Default: Optimization of the duty cycle during self-tuning, but also if the output value is less than 5%).
SH	r/w	base 1dP 2dP 3dP	5014 13206 21398 29590	42796	Float	0...9999	☐	Neutral zone, or switching difference of the signaller [engineering unit].Too small: unnecessarily high switching frequency.Too large: reduced controller sensitivity.With 3-point controllers this slows down the direct transition from heating to cooling. With 3-point stepping controllers, it reduces the switching operations of the actuator around setpoint.
d.SP	r/w	base 1dP 2dP 3dP	5016 13208 21400 29592	42800	Float	-1999...9999	☐	Separation of the D / Y switch-over point from the setpoint [engineering unit]. With a significant control deviation heating start is in delta connection. When the control deviation increases, the instrument switches over to reduced power (Y connection) for line-out to the set-point.
tP	r/w	base 1dP 2dP 3dP	5009 13201 21393 29585	42786	Float	0,1...9999	☑	Minimum pulse duration [s]. Used for switching with constant periods. For positioning values that require a shorter pulse than adjusted for 'tp', the output is suppressed, but 'remembered'. The controller continues adding the internal short pulses until a value equal to 'tp' can be output.
tt	r/w	base 1dP 2dP 3dP	5015 13207 21399 29591	42798	Float	3...9999	☐	Travel time of the actuator motor [s]. If no feedback signal is available, the controller calculates the actuator position by means of an integrator and the adjusted motor travel time. For this reason, a precise definition of the motor travel time between min and max (0% and 100%) is important.
Y.Lo	r/w	base 1dP 2dP 3dP	5018 13210 21402 29594	42804	Float	-105...105	☐	Lower output limit [%] The range is depedant of the type of controller: 2 point controller: 0...ymax+1 3 point controller: -105 ymax-1
Y.Hi	r/w	base 1dP 2dP 3dP	5019 13211 21403 29595	42806	Float	-105...105	☐	Upper output limit [%] The range is ymin+1 105
Y2	r/w	base 1dP 2dP 3dP	5017 13209 21401 29593	42802	Float	-100...100	☐	Second positioning value [%]. Activated Y2 = positioner control. Caution: The parameter 'positioning output Y2' must not be confused with the controller output Y2!
Y.0	r/w	base 1dP 2dP 3dP	5020 13212 21404 29596	42808	Float	-105...105	☐	Offset for die positioning value [%]. This is added to the controller output, and has the most effect with P and PD controllers. (With PID controllers, the effect is compensated by the integral action.) With a control deviation = 0, the P controller generates a control output Y0.
Ym.H	r/w	base 1dP 2dP 3dP	5021 13213 21405 29597	42810	Float	-105...105	☐	Limit for the mean control output value Ym in case of sensor break [%]. The mean control output value is configurable as the response to sensor break. The maximum mean output value = YmH.

1 Cntr

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
L.Ym	r/w	base 1dP 2dP 3dP	5022 13214 21406 29598	42812	Float	1...9999	☐	Max. control deviation (xw), at the start of mean value calculation [engineering unit]. When calculating the mean value, data are only taken into account if the control deviation is small enough. 'Lym' is a preset value that determines how precisely the calculated output value is matched to the setpoint.
E.H2O	r/w	base 1dP 2dP 3dP	5013 13205 21397 29589	42794	Float	-1999...9999	☐	Min. temperature for water cooling. Below the set temperature no water cooling happens
t.on	r/w	base 1dP 2dP 3dP	5010 13202 21394 29586	42788	Float	0,1...9999	☐	Impulse length for water cooling. Fixed for all values of controller output.The pause time is varied.
t.oFF	r/w	base 1dP 2dP 3dP	5011 13203 21395 29587	42790	Float	1...9999	☐	Min. pause time for water cooling. The max. effective controller output results from t.on/(t.on+t.off)·100%
F.H2O	r/w	base 1dP 2dP 3dP	5012 13204 21396 29588	42792	Float	0,1...9999	☐	Adaptation of the (non-linear) water-cooling characteristic.If the cooling action is very strong, and causes an unfavourable transition between heating and cooling, a non-linear characteristic can reduce the cooling action considerably.Adjust FH20 = 1 for output values up to -70%; FH20 = 2 for values up to approx. -80%, and FH20 = 0.5 for up to approx. -60%.
oFFS	r/w	base 1dP 2dP 3dP	5024 13216 21408 29600	42816	Float	-120...120	☐	Zero point for ratio control. For a given value of X2 (e.g. airflow quantity) the ratio controller changes the corresponding value of X1 (e.g. gas flow quantity), until the required ratio is reached.
HYS.L	r/w	base 1dP 2dP 3dP	5028 13220 21412 29604	42824	Float	0...9999	☐	Switching hysteresis below the setpoint of the signaller [engineering unit].
HYS.H	r/w	base 1dP 2dP 3dP	5029 13221 21413 29605	42826	Float	0...9999	☐	Switching hysteresis above the setpoint of the signaller [engineering unit].
tEmP	r/w	base 1dP 2dP 3dP	5036 13228 21420 29612	42840	Float	0...9999	☐	Constant sensor temperature. With O2 measurement, the actual oxygen content is derived from the constant sensor temperature and the EMF (electromotive force in volts) generated by the sensor.Note: A constant sensor temperature is only ensured with heated lambda sensors.

1 Cntr

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
C.InP	r	base 1dP 2dP 3dP	5102 13294 21486 29678	42972	Float	-1999...9999	☐	process value
Tu2	r	base 1dP 2dP 3dP	5145 13337 21529 29721	43058	Float	0...9999	☐	'Cooling' delay time of the loop. Tu is calculated by the self-tuning function: It is the time delay before the process reacts significantly. In effect, Tu is a dead time that is determined by the reaction of the process to a change of the control output. It is used for defining controller action.
Vmax2	r	base 1dP 2dP 3dP	5146 13338 21530 29722	43060	Float	0...9999	☐	Max. rate of change for 'cooling', i.e. the fastest process value increase during self-tuning. Vmax is calculated by the self-tuning function, and is determined by the reaction of the process to a change of the control output. It is used for defining controller action.
Kp2	r	base 1dP 2dP 3dP	5147 13339 21531 29723	43062	Float	0...9999	☐	Process gain for 'cooling'. For control loops with self-regulation, process gain is the ratio determined by the change of the control output and the resulting permanent change of the process value. Kp is calculated by the self-tuning function, and is used for defining controller action.

1 Cntr

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
St.Cntr	r	base 1dP 2dP 3dP	5100 13292 21484 29676	42968	Int	0...65535	☐	Status informations of the controller.f.e. switching signals, controller off or informations about selftuning. The controller sratus shows the actual adjustments of the controller.

Bit 0: Switching signal heating: 0: off 1: on
Bit 1: Switching signal cooling: 0: off 1: on
Bit 2: Sensor error 0: ok 1: error
Bit 3: Controlsignal: Manual/automatic
    0: automatic 1: manual
Bit 4: Controlsignal: Y2
    0: Y2 not activ 1: Y2 activ
Bit 5: Controlsignal: Ext. setting of outputsignal
    0: not activ 1: activ
Bit 6: Controlsignal: Controller off
    0: contr. on 1: contr. off
Bit 7: Controlsignal:The activ parameter set
    0: parameterset 1
    1: parameterset 2
Bit 8: Loopalarm
    0: no alarm
    1: alarm
Bit 9: Soft start function
    0: not activ
    1: activ
Bit 10: Rate to setpoint
     0: not activ
     1: activ
Bit 11: Not used
Bit 12-15: Internal functional statuses (operating state)
0 0 0 0 Automatic
0 0 0 1 Selftuning is running
0 0 1 0 Selftuning faulty
     (Waiting for operator signal)
0 0 1 1 Sensor error
0 1 0 0 Not used
0 1 0 1 Manual
0 1 1 1 Not used
1 0 0 0 Manual, with external presetting of the outputsignal
1 0 0 1 Outputs switched off (neutral)
1 0 1 0 Abortion of the selftuning (by control- or error-signal)

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
diFF	r	base 1dP 2dP 3dP	5104 13296 21488 29680	42976	Float	-1999...9999	☐	Control deviation, is defined as process value minus setpoint. Positive Xw means that the process value is above the setpoint. A small control deviation indicates precise control.
POS	r	base 1dP 2dP 3dP	5105 13297 21489 29681	42978	Float	0...100	☐	The position feedback Yp shows the actuator position with 3-point stepping controllers. If Yp is outside the limits Ymin and Ymax, the output of positioning pulses is suppressed.
Tu1	r	base 1dP 2dP 3dP	5141 13333 21525 29717	43050	Float	0...9999	☐	'Heating' delay time of the loop. Tu is calculated by the self-tuning function: It is the time delay before the process reacts significantly. In effect, Tu is a dead time that is determined by the reaction of the process to a change of the control output. It is used for defining controller action.

1 Cntr

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Ypid	r	base 1dP 2dP 3dP	5103 13295 21487 29679	42974	Float	-120...120 ☐	Output value Ypid is the output signal determined by the controller, and from which the switching pulses for the digital and analog control outputs are calculated. Ypid is also available as an analog signal. e.g. for visualization.
Ada.St	r/w	base 1dP 2dP 3dP	5150 13342 21534 29726	43068	Enum	Enum_AdaStart	Starting / stopping the self-tuning function.After the start signal, the controller waits until the process reaches a stable condition (PIR) before it starts the self-tuning process. Self-tuning can be aborted manually at any time. After a successful self-tuning attempt, the controller automatically resumes normal operation.
						0	'Stop' will abort the self-tuning process, and the controller returns to normal operation with the previous parameter settings.
						1	Start of the self-tuning process is possible during manual or automatic controller operation.
Yman	r/w	base 1dP 2dP 3dP	5151 13343 21535 29727	43070	Float	-110...110 ☐	Absolute preset output value, which is used as output value during manual operation. Caution: With 3-point stepping controllers, Yman (evaluated the same as Dyman) is added to the actual output value as a relative shift.
dYman	r/w	base 1dP 2dP 3dP	5152 13344 21536 29728	43072	Float	-220...220 ☐	Differential preset output value, which is added to the actual output value during manual operation. Negative values reduce the output.
Yinc	r/w	base 1dP 2dP 3dP	5153 13345 21537 29729	43074	Enum	Enum_YInc	Increasing the output value. There are two speeds: 40 s or 10 s for the change from 0 % to 100 %. Note: The 3-point stepping controller translates the increments as UP.
						0	Not active
						1	increment output
Ydec	r/w	base 1dP 2dP 3dP	5154 13346 21538 29730	43076	Enum	Enum_YDec	Decreasing the output value. There are two speeds: 40 s or 10 s for the change from 0 % to 100 %. Note: The 3-point stepping controller translates the increments as DOWN.
						0	Not active
						1	decrement output
SP.EF	r	base 1dP 2dP 3dP	5101 13293 21485 29677	42970	Float	-1999...9999 ☐	Effective setpoint. The value reached at the end of setpoint processing, after taking W2, external setpoint, gradient, boost function, programmer settings, start-up function, and limit functions into account. Comparison with the effective process value leads to the control deviation, from which the necessary controller response is derived.

1 Cntr

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
St.Tune	r	base 1dP 2dP 3dP	5140 13332 21524 29716	43048	Int	0...65535	☐	Status information during self-tuning, e.g. the actual condition, and possible results, warnings, and error messages.
						Bit 0 Process lined out; 0 = No; 1 = Yes Bit 1 Operating mode 'Self-tuning controller; 0 = Off; 1 = On Bit 2 Result of controller self-tuning; 0 = OK; 1 = Fault Bit 3 - 7 Not used Bit 8 - 11 Result of the 'heating' attempt 0 0 0 0 No message / Attempt still running 0 0 0 1 Successful 0 0 1 0 Successful, with risk of exceeded setpoint 0 0 1 1 Error: Wrong operating sense 0 1 0 0 Error: No response from process 0 1 0 1 Error: Turning point too low 0 1 1 0 Error: Risk of exceeded setpoint 0 1 1 1 Error: Step output too small 1 0 0 0 Error: Setpoint reserve too small Bit 12 - 15 Result of 'cooling' attempt (same as heating attempt)		
Vmax1	r	base 1dP 2dP 3dP	5142 13334 21526 29718	43052	Float	0...9999	☐	Max. rate of change for 'heating', i.e. the fastest process value increase during self-tuning. Vmax is calculated by the self-tuning function, and is determined by the reaction of the process to a change of the control output. It is used for defining controller action.
Kp1	r	base 1dP 2dP 3dP	5143 13335 21527 29719	43054	Float	0...9999	☐	Process gain for 'heating'. For control loops with self-regulation, process gain is the ratio determined by the change of the control output and the resulting permanent change of the process value. Kp is calculated by the self-tuning function, and is used for defining controller action.

1 Cntr

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Msg2	r	base 1dP 2dP 3dP	5148 13340 21532 29724	43064	Enum	Enum_Msg	The result of self-tuning for 'cooling' indicates whether self-tuning was successful, and with what result.

0	No message / Tuning attempt still running
1	Self-tuning has been completed successfully. The new parameters are valid.
2	Self-tuning was successful, but with a warning. The new parameters are valid. Note: Self-tuning was aborted due to the risk of an exceeded setpoint, but useful parameters were determined. Possibly repeat the attempt with an increased setpoint reserve.
3	The process reacts in the wrong direction. Possible remedy: Reconfigure the controller (inverse <-> direct). Check the controller output sense (inverse <-> direct).
4	No response from the process. Perhaps the control loop is open. Possible remedy: Check sensor, connections, and process.
5	The process value turning point of the step response is too low. Possible remedy: Increase the permitted step output range, i.e. increase the parameter Y.Hi ('heating') or reduce the parameter Y.Lo ('cooling').
6	Self-tuning was aborted due to the risk of an exceeded setpoint. No useful parameters were determined. Possible remedy: Repeat the attempt with an increased setpoint reserve.
7	The step output change is not large enough (minimum change > 5 %). Possible remedy: Increase the permitted step output range, i.e. increase the parameter Y.Hi ('heating') or reduce the parameter Y.Lo ('cooling').
8	The controller is waiting. Setpoint reserve must be given before generating the step output change. Acknowledgment of this error message leads to switch-over to automatic mode. If self-tuning shall be continued, change set-point, change process value, or decrease set-point range.
9	Impulse tuning failed. No useful parameters were determined. The control loop is perhaps not closed: check sensor, connections and process.

1 Cntr

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Msg1	r	base	5144	43056	Enum	Enum_Msg	The result of self-tuning for 'heating' indicates whether self-tuning was successful, and with what result.
		1dP	13336				
		2dP	21528				
		3dP	29720				

0	No message / Tuning attempt still running
1	Self-tuning has been completed successfully. The new parameters are valid.
2	Self-tuning was successful, but with a warning. The new parameters are valid. Note: Self-tuning was aborted due to the risk of an exceeded setpoint, but useful parameters were determined. Possibly repeat the attempt with an increased setpoint reserve.
3	The process reacts in the wrong direction. Possible remedy: Reconfigure the controller (inverse <-> direct). Check the controller output sense (inverse <-> direct).
4	No response from the process. Perhaps the control loop is open. Possible remedy: Check sensor, connections, and process.
5	The process value turning point of the step response is too low. Possible remedy: Increase the permitted step output range, i.e. increase the parameter Y.Hi ('heating') or reduce the parameter Y.Lo ('cooling').
6	Self-tuning was aborted due to the risk of an exceeded setpoint. No useful parameters were determined. Possible remedy: Repeat the attempt with an increased setpoint reserve.
7	The step output change is not large enough (minimum change > 5 %). Possible remedy: Increase the permitted step output range, i.e. increase the parameter Y.Hi ('heating') or reduce the parameter Y.Lo ('cooling').
8	The controller is waiting. Setpoint reserve must be given before generating the step output change. Acknowledgment of this error message leads to switch-over to automatic mode. If self-tuning shall be continued, change set-point, change process value, or decrease set-point range.
9	Impulse tuning failed. No useful parameters were determined. The control loop is perhaps not closed: check sensor, connections and process.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
YGrw	r/w	base	5155	43078	Enum	Enum_YGrwLs	Gradient of Y-variation 'slow' or 'fast'. Changes the positioning output speed. There are two speeds for output variation: from 0% to 100% in 40s or in 10s.
		1dP	13347				
		2dP	21539				
		3dP	29731				

0	Slow change of Y, from 0% to 100% in 40 seconds.
1	Fast change of Y, from 0% to 100% in 10 seconds.

2 InP.1

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
I.Fnc	r/w	base	167	33102	Enum	Enum_IFnc	Selection of the function assigned to the value at INP1, e.g. value at INP1 is the external setpoint.
		1dP	8359				
		2dP	16551				
		3dP	24743				

0	no function (subsequent input data are skipped)
1	Heating current input.
2	External setpoint SP.E or (depending on version) external setpoint shift SP.E. (Switchover is done via -> LOGI/SP.E).
3	Position feedback signal Yp.
4	Second process value X2. For process value functions such as ratio, min, max, mean. Adjustment via Cntr/C.tYP.
5	Preset for external positioning value Y.E (switchover via -> LOGI/Y.E)
6	No controller input (replaced e.g. by limit value signalling).
7	Process value X1.

2 InP.1

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
S.tYP	r/w	base 1dP 2dP 3dP	1150 9342 17534 25726	35068	Enum	Enum_StYP	Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted
						0	thermocouple type L (-100...900°C), Fe-CuNi DIN Fahrenheit: -148...1652°F
						1	thermocouple type J (-100...1200°C), Fe-CuNi Fahrenheit: -148...2192°F
						2	thermocouple type K (-100...1350°C), NiCr-Ni Fahrenheit: -148...2462°F
						3	thermocouple type N (-100...1300°C), Nicrosil-Nisil Fahrenheit: -148...2372°F
						4	thermocouple type S (0...1760°C), PtRh-Pt10% Fahrenheit: 32...3200°F
						5	thermocouple type R (0...1760°C), PtRh-Pt13% Fahrenheit: 32...3200°F
						6	thermocouple type T (-200...400°C), Cu-CuNi Fahrenheit: -328...752°F
						7	thermocouple type C (0...2315°C), W5%Re-W26%Re Fahrenheit: 32...4199°F
						8	thermocouple type D (0...2315°C), W3%Re-W25%Re Fahrenheit: 32...4199°F
						9	thermocouple type E (-100...1000°C), NiCr-CuNi Fahrenheit: -148...1832°F
						10	thermocouple type B (0/400...1820°C), PtRh-Pt6% Fahrenheit: 32/752...3308°F
						18	Special thermocouple with a linearization characteristic selectable by the user. This enables non-linear signals to be simulated or linearized.
						20	Pt100 (-200.0 ... 100.0(150.0)°C) Measuring range up to 150°C at reduced lead resistance. Fahrenheit: -328...212(302) °F
						21	Pt100 (-200.0 ... 850,0 °C) Fahrenheit: -328...1562 °F
						22	Pt 1000 (-200.0...850.0 °C) Fahrenheit: -328...1562 °F
						23	Special : 0...4500 Ohms. For KTY 11-6 with preset special linearization (-50...150 °C or -58...302 °F).
						24	Special 0...450 Ohm
						30	Current : 0...20 mA / 4...20 mA
						40	0...10V / 2...10V
						41	Special -2.5...115 mV
						42	Special : -25...1150 mV
						50	potentiometer 0...160 Ohm
						51	potentiometer 0...450 Ohm
						52	potentiometer 0...1600 Ohm
						53	potentiometer 0...4500 Ohm

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
S.Lin	r/w	base 1dP 2dP 3dP	1151 9343 17535 25727	35070	Enum	Enum_SLin	Linearization (not adjustable for all sensor types S.tYP). Special linearization. The linearization table can be created with the Engineering Tool. The default characteristic is for KTY 11-6 temperature sensors.
						0	No special linearization.
						1	Special linearization. Definition of the linearization table is possible with the Engineering Tool. The default setting is the characteristic of the KTY 11-6 temperature sensor.

2 InP.1

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Corr	r/w	base	160	33088	Enum	Enum_Corr3		Measured value correction / scaling
		1dP	8352					
		2dP	16544					
		3dP	24736					

0		Without scaling
1		The offset correction (in the CAL Level) can be done on-line in the process. If InL shows the lower input value of the scaling point, then OuL must be adjusted to the corresponding display value. Adjustments are made via the front panel keys of the device only.
2		Two-point correction (in CAL-Level) ist possible offline via process value transmitter or on-line in the process. Set process value for the upper and lower scaling point and confirm as input value InL or InH, then set the belonging displayed value OuL and OuH. The settings are done via the front of the device.
3		Scaling (at PArA-level). The input values for the upper (InL, OuL) and lower scaling point (InH. OuH) are visible at the parameter level. Adjustment is made via front operation or the engineering tool.
4		Automatic calibration of the position feedback potentiometer. For 3-point stepping controllers with position feedback Yp from a potentiometer, and for continuous controllers operating a positioner with position feedback Yp from a potentiometer.

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.F	r/w	base	1152	35072	Float	-1999...9999	☑	Substitute value in case of a fault. This value is used for calculations, if there is a fault at the input (e.g. FAIL).
		1dP	9344					
		2dP	17536					
		3dP	25728					

● PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
InL.1	r/w	base	1100	34968	Float	-1999...9999	☐	Input value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the lower scaling point (e.g. 4 mA) is done using the corresponding electrical value.
		1dP	9292					
		2dP	17484					
		3dP	25676					
OuL.1	r/w	base	1101	34970	Float	-1999...9999	☐	Display value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the lower scaling point, e.g. 4 mA is displayed as 2 [pH].
		1dP	9293					
		2dP	17485					
		3dP	25677					
InH.1	r/w	base	1102	34972	Float	-1999...9999	☐	Input value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the upper scaling point (e.g. 20 mA) is done using the corresponding electrical value.
		1dP	9294					
		2dP	17486					
		3dP	25678					
OuH.1	r/w	base	1103	34974	Float	-1999...9999	☐	Display value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the upper scaling point, e.g. 20 mA is displayed as 12 [pH].
		1dP	9295					
		2dP	17487					
		3dP	25679					
t.F1	r/w	base	1104	34976	Float	0...100	☐	Filter time constant [s]. Every input is fitted with a digital (software) low-pass filter for suppressing process-related disturbances on the input leads. Higher filter settings improve the suppression, but increase the delay of the input signals.
		1dP	9296					
		2dP	17488					
		3dP	25680					

2 InP.1

● PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
E.tc1	r/w	base	1105	34978	Float	0...100	☑	External temperature compensation (temperature at the junction of thermocouple/copper lead with external temperature compensation).
		1dP	9297					
		2dP	17489					
		3dP	25681					

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.1r	r	base	1170	35108	Float	-1999...9999	☐	Measurement value before the measurement value correction (unprocessed).
		1dP	9362					
		2dP	17554					
		3dP	25746					
Fail	r	base	1171	35110	Enum	Enum_InpFail		Input circuit fault: faulty or incorrectly connected sensor.
		1dP	9363					
		2dP	17555					
		3dP	25747					

0	no error
1	sensor break
2	Incorrect polarity at input.
4	Short circuit at input.

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.1	r	base	1172	35112	Float	-1999...9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
		1dP	9364					
		2dP	17556					
		3dP	25748					
F.Inp	r/w	base	1180	35128	Float	-1999...9999	☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)
		1dP	9372					
		2dP	17564					
		3dP	25756					

3 InP.2

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
I.Fnc	r/w	base	161	33090	Enum	Enum_IFnc	Selection of the function assigned to the value at INP2, e.g. value at INP2 is the external setpoint.
		1dP	8353				
		2dP	16545				
		3dP	24737				

0	no function (subsequent input data are skipped)
1	Heating current input.
2	External setpoint SP.E or (depending on version) external setpoint shift SP.E. (Switchover is done via -> LOGI/SP.E).
3	Position feedback signal Yp.
4	Second process value X2. For process value functions such as ratio, min, max, mean. Adjustment via Cntr/C.tYP.
5	Preset for external positioning value Y.E (switchover via -> LOGI/Y.E)
6	No controller input (replaced e.g. by limit value signalling).
7	Process value X1.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
S.tYP	r/w	base	1250	35268	Enum	Enum_StYP2	Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted.
		1dP	9442				
		2dP	17634				
		3dP	25826				

30	Current : 0...20 mA / 4...20 mA
31	0...50 mA current (AC)
50	Potentiometer 0...160 Ohm
51	Potentiometer 0...450 Ohm
52	Potentiometer 0...1600 Ohm
53	Potentiometer 0...4500 Ohm

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Corr	r/w	base	162	33092	Enum	Enum_Corr	Measured value correction / scaling
		1dP	8354				
		2dP	16546				
		3dP	24738				

0	Without scaling
1	The offset correction (in the CAL Level) can be done on-line in the process. If InL shows the lower input value of the scaling point, then OuL must be adjusted to the corresponding display value. Adjustments are made via the front panel keys of the device only.
2	2-point correction (in CAL-Level) ist possible offline via process value transmitter or on-line in the process. Set process value for the upper and lower scaling point and confirm as input value InL or InH, then set the belonging displayed value OuL and OuH. The settings are done via the front of the device.
3	Scaling (at PArA-level). The input values for the upper (InL, OuL) and lower scaling point (InH. OuH) are visible at the parameter level. Adjustment is made via front operation or the engineering tool.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
In.F	r/w	base	1252	35272	Float	-1999...9999 ☑	Substitute value in case of a fault. This value is used for calculations, if there is a fault at the input (e.g. FAIL).
		1dP	9444				
		2dP	17636				
		3dP	25828				

3 InP.2

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
InL.2	r/w	base 1dP 2dP 3dP	1200 9392 17584 25776	35168	Float	-1999...9999	☐	Input value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the lower scaling point (e.g. 4 mA) is done using the corresponding electrical value.
OuL.2	r/w	base 1dP 2dP 3dP	1201 9393 17585 25777	35170	Float	-1999...9999	☐	Display value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the lower scaling point, e.g. 4 mA is displayed as 2 [pH].
InH.2	r/w	base 1dP 2dP 3dP	1202 9394 17586 25778	35172	Float	-1999...9999	☐	Input value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the upper scaling point (e.g. 20 mA) is done using the corresponding electrical value.
OuH.2	r/w	base 1dP 2dP 3dP	1203 9395 17587 25779	35174	Float	-1999...9999	☐	Display value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the upper scaling point, e.g. 20 mA is displayed as 12 [pH].
t.F2	r/w	base 1dP 2dP 3dP	1204 9396 17588 25780	35176	Float	0...100	☐	Filter time constant [s]. Every input is fitted with a digital (software) low-pass filter for suppressing process-related disturbances on the input leads. Higher filter settings improve the suppression, but increase the delay of the input signals.

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.2	r	base 1dP 2dP 3dP	1270 9462 17654 25846	35308	Float	-1999...9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
Fail	r	base 1dP 2dP 3dP	1271 9463 17655 25847	35310	Enum	Enum_InpFail		Input circuit fault: faulty or incorrectly connected sensor.

0	no error
1	sensor break
2	Incorrect polarity at input.
4	Short circuit at input.

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.2r	r	base 1dP 2dP 3dP	1272 9464 17656 25848	35312	Float	-1999...9999	☐	Measurement value before the measurement value correction (unprocessed).
F.Inp	r/w	base 1dP 2dP 3dP	1280 9472 17664 25856	35328	Float	-1999...9999	☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)

4 InP.3

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
I.Fnc	r/w	base	166	33100	Enum	Enum_IFnc	Selection of the function assigned to the value at INP3, e.g. value at INP3 is the external setpoint.
		1dP	8358				
		2dP	16550				
		3dP	24742				

0	no function (subsequent input data are skipped)
1	Heating current input.
2	External setpoint SP.E or (depending on version) external setpoint shift SP.E. (Switchover is done via -> LOGI/SP.E).
3	Position feedback signal Yp.
4	Second process value X2. For process value functions such as ratio, min, max, mean. Adjustment via Cntr/C.tYP.
5	Preset for external positioning value Y.E (switchover via -> LOGI/Y.E)
6	No controller input (replaced e.g. by limit value signalling).
7	Process value X1.

4 InP.3

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
S.tYP	r/w	base 1dP 2dP 3dP	1350 9542 17734 25926	35468	Enum	Enum_StYP3	Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted.

	0	thermocouple type L (-100...900°C), Fe-CuNi DIN Fahrenheit: -148...1652°F	
	1	thermocouple type J (-100...1200°C), Fe-CuNi Fahrenheit: -148...2192°F	
	2	thermocouple type K (-100...1350°C), NiCr-Ni Fahrenheit: -148...2462°F	
	3	thermocouple type N (-100...1300°C), Nicrosil-Nisil Fahrenheit: -148...2372°F	
	4	thermocouple type S (0...1760°C), PtRh-Pt10% Fahrenheit: 32...3200°F	
	5	thermocouple type R (0...1760°C), PtRh-Pt13% Fahrenheit: 32...3200°F	
	6	thermocouple type T (-200...400°C), Cu-CuNi Fahrenheit: -328...752°F	
	7	thermocouple type C (0...2315°C), W5%Re-W26%Re Fahrenheit: 32...4199°F	
	8	thermocouple type D (0...2315°C), W3%Re-W25%Re Fahrenheit: 32...4199°F	
	9	thermocouple type E (-100...1000°C), NiCr-CuNi Fahrenheit: -148...1832°F	
	10	thermocouple type B (0/100...1820°C), PtRh-Pt6% Fahrenheit: 32(212)...3308°F	
	18	Special thermocouple with a linearization characteristic selectable by the user. This enables non-linear signals to be simulated or linearized.	
	20	Pt100 (-200.0 ... 100.0(150.0)°C) Measuring range at reduced lead resistance up to 150°C. Fahrenheit: -328...212(302)°F	
	21	Pt100 (-200.0 ... 850,0 °C) Fahrenheit: -328...1562 °F	
	22	Pt 1000 (-200.0...850.0 °C) Fahrenheit: -328...1562 °F	
	23	Special : 0...4500 Ohms. For KTY 11-6 with preset special linearization (-50...150 °C or -58...302 °F).	
	24	Special : 0...450 Ohms	
	30	Current : 0...20 mA / 4...20 mA	
	41	Special : -2,5...115 mV	
	42	Special : -25...1150 mV	
	50	Potentiometer :0...160 Ohms	
	51	Potentiometer :0...450 Ohms	
	52	Potentiometer :0...1600 Ohms	
	53	Potentiometer :0...4500 Ohms	

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
S.Lin	r/w	base 1dP 2dP 3dP	1351 9543 17735 25927	35470	Enum	Enum_SLin	Linearization (not adjustable for all sensor types S.tYP). Special linearization. The linearization table can be created with the Engineering Tool. The default characteristic is for KTY 11-6 temperature sensors.

	0	No special linearization.
	1	Special linearization. Definition of the linearization table is possible with the Engineering Tool. The default setting is the characteristic of the KTY 11-6 temperature sensor.

4 InP.3

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Corr	r/w	base 1dP 2dP 3dP	165 8357 16549 24741	33098	Enum	Enum_Corr3		Measured value correction / scaling

						0		Without scaling
						1		The offset correction (in the CAL Level) can be done on-line in the process. If InL shows the lower input value of the scaling point, then OuL must be adjusted to the corresponding display value. Adjustments are made via the front panel keys of the device only.
						2		Two-point correction (in CAL-Level) ist possible offline via process value transmitter or on-line in the process. Set process value for the upper and lower scaling point and confirm as input value InL or InH, then set the belonging displayed value OuL and OuH. The settings are done via the front of the device.
						3		Scaling (at PArA-level). The input values for the upper (InL, OuL) and lower scaling point (InH. OuH) are visible at the parameter level. Adjustment is made via front operation or the engineering tool.
						4		Automatic calibration of the position feedback potentiometer. For 3-point stepping controllers with position feedback Yp from a potentiometer, and for continuous controllers operating a positioner with position feedback Yp from a potentiometer.

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.F	r/w	base 1dP 2dP 3dP	1352 9544 17736 25928	35472	Float	-1999...9999	☑	Substitute value in case of a fault. This value is used for calculations, if there is a fault at the input (e.g. FAIL).

● PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
InL.3	r/w	base 1dP 2dP 3dP	1300 9492 17684 25876	35368	Float	-1999...9999	☐	Input value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the lower scaling point (e.g. 4 mA) is done using the corresponding electrical value.
OuL.3	r/w	base 1dP 2dP 3dP	1301 9493 17685 25877	35370	Float	-1999...9999	☐	Display value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the lower scaling point, e.g. 4 mA is displayed as 2 [pH].
InH.3	r/w	base 1dP 2dP 3dP	1302 9494 17686 25878	35372	Float	-1999...9999	☐	Input value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the upper scaling point (e.g. 20 mA) is done using the corresponding electrical value.
OuH.3	r/w	base 1dP 2dP 3dP	1303 9495 17687 25879	35374	Float	-1999...9999	☐	Display value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the upper scaling point, e.g. 20 mA is displayed as 12 [pH].
t.F3	r/w	base 1dP 2dP 3dP	1304 9496 17688 25880	35376	Float	0...999,9	☐	Filter time constant [s]. Every input is fitted with a digital (software) low-pass filter for suppressing process-related disturbances on the input leads. Higher filter settings improve the suppression, but increase the delay of the input signals.

4 InP.3

● PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
E.tc3	r/w	base	1305	35378	Float	0...100	☑	External temperature compensation (temperature at the junction of thermocouple/copper lead with external temperature compensation).
		1dP	9497					
		2dP	17689					
		3dP	25881					

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.3	r	base	1370	35508	Float	-1999...9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
		1dP	9562					
		2dP	17754					
		3dP	25946					
Fail	r	base	1371	35510	Enum	Enum_InpFail		Input circuit fault: faulty or incorrectly connected sensor.
		1dP	9563					
		2dP	17755					
		3dP	25947					

0	no error
1	sensor break
2	Incorrect polarity at input.
4	Short circuit at input.

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.3r	r	base	1372	35512	Float	-1999...9999	☐	Measurement value before the measurement value correction (unprocessed).
		1dP	9564					
		2dP	17756					
		3dP	25948					
F.Inp	r/w	base	1380	35528	Float	-1999...9999	☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)
		1dP	9572					
		2dP	17764					
		3dP	25956					

5 Lim

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Fnc.1	r/w	base	2150	37068	Enum	Enum_Fcn	Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.
		1dP	10342				
		2dP	18534				
		3dP	26726				

0	No limit value monitoring.
1	measured value monitoring. The alarm signal is generated, if the limit is exceeded. If the measured value is within the limits (including hysteresis) again, this alarm signal is resetted.
2	Measured value monitoring + alarm status latch. An alarm signal is generated, if the limit is exceeded. A latched alarm signal remains latched until it is manually resetted.
3	Signal monitoring for rate of change (per minute).
4	Signal monitoring for rate of change (per minute) + storage of the alarm status.

5 Lim

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Src.1	r/w	base	2151	37070	Enum	Enum_Src	Source for limit value. Selection of which value is to be monitored.
		1dP	10343				
		2dP	18535				
		3dP	26727				

0	Process value = absolute alarm
1	control deviation xw (process value - set-point) = relative alarm Note: Monitoring with the effective set-point Weff. For example using a ramp it is the changing set-point, not the target set-point of the ramp.
2	Control deviation Xw (= relative alarm) with suppression during start-up and setpoint changes. Limit value monitoring is continued as soon as the control deviation comes within the alarm limits again, at the latest after 10 * Tn.
3	Measured value of the analog input INP1.
4	Measured value of the analog input INP2.
5	Measured value of the analog input INP3.
6	effective set-point Weff. For example the ramp-function changes the effective set-point untill it matches the internal (target) set-point.
7	correcting variable y (controller output)
8	control variable deviation xw (actual value - internal set-point) = deviation alarm to internal set-point Note: Monitoring with the internal set-point Wint. For example using a ramp it is the target setpoint, not the changing set-point of the ramp.
9	Difference x1 - x2 (e.g. in combination with the process value function "Mean value", applicable for detecting aged thermocouples), difference between first and second process value.
11	Control deviation Xw (= relative alarm) with suppression during start-up and setpoint change. Limit value monitoring is continued as soon as the control deviation comes within the alarm limits again.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
HC.AL	r/w	base	2050	36868	Enum	Enum_HCAL	Activation of alarm heat current function. Either overload or break can be monitored, overload = current I > heat current limit, or break = current I < heat current limit. Short circuit is monitored in both cases.
		1dP	10242				
		2dP	18434				
		3dP	26626				

0	No heating current alarm.
1	Overload and short circuit monitoring. Overload = current I > heat current limit.
2	Break and short circuit monitoring. Break = current I < heat current limit.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
LP.AL	r/w	base	5058	42884	Enum	Enum_LPAL	Monitoring of control loop interruption (not possible with 3-point stepping controller, not possible with signaller)
		1dP	13250				
		2dP	21442				
		3dP	29634				

0	switched off / inactive
1	LOOP alarm is generated, if with Y=100% there is no corresponding reaction of the process variable within the time of 2 x ti. Possible remedial action: Check heating or cooling circuit, check sensor and replace it, if necessary, check controller and switching device.

5 Lim

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
dAc.A	r/w	base 1dP 2dP 3dP	3550 11742 19934 28126	39868	Enum	Enum_DacAktiv	Activates the monitor for the 3-point stepping output. On all controllers with position feedback Yp, the actuator can be monitored for possible malfunctions, e.g. a motor defect or excessive play due to wear. In case of a disturbance, the controller switches into manual operation and switches the outputs off.
						0	Not active
						1	Active DAC (monitoring). Digital Actuator Control DAC is the actuator monitoring function.

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L.1	r/w	base 1dP 2dP 3dP	2100 10292 18484 26676	36968	Float	-1999...9999	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
H.1	r/w	base 1dP 2dP 3dP	2101 10293 18485 26677	36970	Float	-1999...9999	☑	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.
HYS.1	r/w	base 1dP 2dP 3dP	2102 10294 18486 26678	36972	Float	0...9999	☐	Hysteresis of the limit value. Switching difference for upper and lower limit value. The limit value must change by this amount (rise above upper limit or fall below lower limit) before the limit value alarm is reset.
dEL.1	r/w	base 1dP 2dP 3dP	2103 10295 18487 26679	36974	Float	0...9999	☐	Delayed alarm of a limit value. The alarm is only triggered after the defined delay time. It is only indicated, and possibly stored, if it is still present after the delay time has elapsed.
HC.A	r/w	base 1dP 2dP 3dP	2000 10192 18384 26576	36768	Float	-1999...9999	☐	Heating current monitoring limit [A]. Depending on configuration, and apart from short-circuit monitoring, an overload test checks whether the heating current is above the adjusted current limit, or below the limit when the heating is switched off. The heating current is measured by means of a current transformer (accessory), and the current range can be adapted.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
St.HC	r	base 1dP 2dP 3dP	2070 10262 18454 26646	36908	Int	0...3	☐	Status of the heating current alarm. Displayable are heating current short-circuit and/or heating current alarm. Depending on configuration, the heating current alarm is either an interruption of heating current (I < limit value) or heating current overload (I > limit value).

5 Lim

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
HC	r	base 1dP 2dP 3dP	2071 10263 18455 26647	36910	Float	-1999...9999	☐	Measured heating current [A]. Apart from the short circuit test, and depending on configuration, an overcurrent test (current I > heating current limit) and an open circuit test (current I < heating current limit) is executed. The heating current is measured by means of a (separate) current transformer, whereby the input range can be scaled.
SSr	r	base 1dP 2dP 3dP	2072 10264 18456 26648	36912	Float	-1999...9999	☐	Measured current with SSr [A]. The heating current (SSR) is short circuited, if there is a current flow even though the controller output is switched off.Suggested remedy: check heating current circuit, replace solid-state relay if necessary.
St.Lim	r	base 1dP 2dP 3dP	2170 10362 18554 26746	37108	Enum	Enum_LimStatus		Limit value status: No alarm present or stored.

0	no alarm
1	latched alarm
2	A limit value has been exceeded.

6 Lim2

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Fnc.2	r/w	base 1dP 2dP 3dP	2250 10442 18634 26826	37268	Enum	Enum_Fcn	Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.

0	No limit value monitoring.
1	measured value monitoring. The alarm signal is generated, if the limit is exceeded. If the measured value is within the limits (including hysteresis) again, this alarm signal is resetted.
2	Measured value monitoring + alarm status latch. An alarm signal is generated, if the limit is exceeded. A latched alarm signal remains latched until it is manually resetted.
3	Signal monitoring for rate of change (per minute).
4	Signal monitoring for rate of change (per minute) + storage of the alarm status.

6 Lim2

● ConF

Name	r/w	Adr. Integer	real	Typ	Value/off	Description
Src.2	r/w	base 2251 1dP 10443 2dP 18635 3dP 26827	37270	Enum	Enum_Src	Source for limit value. Selection of which value is to be monitored.

0	Process value = absolute alarm
1	control deviation xw (process value - set-point) = relative alarm Note: Monitoring with the effective set-point Weff. For example using a ramp it is the changing set-point, not the target set-point of the ramp.
2	Control deviation Xw (= relative alarm) with suppression during start-up and setpoint changes. Limit value monitoring is continued as soon as the control deviation comes within the alarm limits again, at the latest after 10 * Tn.
3	Measured value of the analog input INP1.
4	Measured value of the analog input INP2.
5	Measured value of the analog input INP3.
6	effective set-point Weff. For example the ramp-function changes the effective set-point untill it matches the internal (target) set-point.
7	correcting variable y (controller output)
8	control variable deviation xw (actual value - internal set-point) = deviation alarm to internal set-point Note: Monitoring with the internal set-point Wint. For example using a ramp it is the target setpoint, not the changing set-point of the ramp.
9	Difference x1 - x2 (e.g. in combination with the process value function "Mean value", applicable for detecting aged thermocouples), difference between first and second process value.
11	Control deviation Xw (= relative alarm) with suppression during start-up and setpoint change. Limit value monitoring is continued as soon as the control deviation comes within the alarm limits again.

● PArA

Name	r/w	Adr. Integer	real	Typ	Value/off		Description
L.2	r/w	base 2200 1dP 10392 2dP 18584 3dP 26776	37168	Float	-1999...9999	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
H.2	r/w	base 2201 1dP 10393 2dP 18585 3dP 26777	37170	Float	-1999...9999	☑	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.
HYS.2	r/w	base 2202 1dP 10394 2dP 18586 3dP 26778	37172	Float	0...9999	☐	Hysteresis of the limit value. Switching difference for upper and lower limit value. The limit value must change by this amount (rise above upper limit or fall below lower limit) before the limit value alarm is reset.
dEL.2	r/w	base 2203 1dP 10395 2dP 18587 3dP 26779	37174	Float	0...9999	☐	Delayed alarm of a limit value. The alarm is only triggered after the defined delay time. It is only indicated, and possibly stored, if it is still present after the delay time has elapsed.

6 Lim2

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
St.Lim	r	base	2270	37308	Enum	Enum_LimStatus	Limit value status: No alarm present or stored.
		1dP	10462				
		2dP	18654				
		3dP	26846				

0	no alarm
1	latched alarm
2	A limit value has been exceeded.

7 Lim3

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Fnc.3	r/w	base	2350	37468	Enum	Enum_Fcn	Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.
		1dP	10542				
		2dP	18734				
		3dP	26926				

0	No limit value monitoring.
1	measured value monitoring. The alarm signal is generated, if the limit is exceeded. If the measured value is within the limits (including hysteresis) again, this alarm signal is resetted.
2	Measured value monitoring + alarm status latch. An alarm signal is generated, if the limit is exceeded. A latched alarm signal remains latched until it is manually resetted.
3	Signal monitoring for rate of change (per minute).
4	Signal monitoring for rate of change (per minute) + storage of the alarm status.

7 Lim3

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Src.3	r/w	base	2351	37470	Enum	Enum_Src		Source for limit value. Selection of which value is to be monitored.
		1dP	10543					
		2dP	18735					
		3dP	26927					

0	Process value = absolute alarm
1	control deviation xw (process value - set-point) = relative alarm Note: Monitoring with the effective set-point Weff. For example using a ramp it is the changing set-point, not the target set-point of the ramp.
2	Control deviation Xw (= relative alarm) with suppression during start-up and setpoint changes. Limit value monitoring is continued as soon as the control deviation comes within the alarm limits again, at the latest after 10 * Tn.
3	Measured value of the analog input INP1.
4	Measured value of the analog input INP2.
5	Measured value of the analog input INP3.
6	effective set-point Weff. For example the ramp-function changes the effective set-point untill it matches the internal (target) set-point.
7	correcting variable y (controller output)
8	control variable deviation xw (actual value - internal set-point) = deviation alarm to internal set-point Note: Monitoring with the internal set-point Wint. For example using a ramp it is the target setpoint, not the changing set-point of the ramp.
9	Difference x1 - x2 (e.g. in combination with the process value function "Mean value", applicable for detecting aged thermocouples), difference between first and second process value.
11	Control deviation Xw (= relative alarm) with suppression during start-up and setpoint change. Limit value monitoring is continued as soon as the control deviation comes within the alarm limits again.

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
L.3	r/w	base	2300	37368	Float	-1999...9999	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
		1dP	10492					
		2dP	18684					
		3dP	26876					
H.3	r/w	base	2301	37370	Float	-1999...9999	☑	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.
		1dP	10493					
		2dP	18685					
		3dP	26877					
HYS.3	r/w	base	2302	37372	Float	0...9999	☐	Hysteresis of the limit value. Switching difference for upper and lower limit value. The limit value must change by this amount (rise above upper limit or fall below lower limit) before the limit value alarm is reset.
		1dP	10494					
		2dP	18686					
		3dP	26878					
dEL.3	r/w	base	2303	37374	Float	0...9999	☐	Delayed alarm of a limit value. The alarm is only triggered after the defined delay time. It is only indicated, and possibly stored, if it is still present after the delay time has elapsed.
		1dP	10495					
		2dP	18687					
		3dP	26879					

7 Lim3

● Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
St.Lim	r	base	2370	37508	Enum	Enum_LimStatus	Limit value status: No alarm present or stored.
		1dP	10562				
		2dP	18754				
		3dP	26946				

0	no alarm
1	latched alarm
2	A limit value has been exceeded.

8 LOGI

● ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
L_r	r/w	base	1051	34870	Enum	Enum_dInP1	Local / remote switchover (Remote: Adjustment of all values via the front panel is blocked).
		1dP	9243				
		2dP	17435				
		3dP	25627				

0	no function (switch-over via interface is possible)
1	always active
2	Digital Input DI1 switches
3	DI2 switches (only visible with OPTION)
4	DI3 switches (only visible with OPTION)
5	F-key switches.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
SP.2	r/w	base	1052	34872	Enum	Enum_dInP4	Source of the control signal for activating the second (safety) setpoint (SP.2=) W2. Note: W2 is not restricted by the setpoint limits.
		1dP	9244				
		2dP	17436				
		3dP	25628				

0	no function (switch-over via interface is possible)
2	Digital Input DI1 switches
3	DI2 switches (only visible with OPTION)
4	DI3 switches (only visible with OPTION)
5	F-key switches.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
SP.E	r/w	base	1053	34874	Enum	Enum_dInP1	Switching between internal set-point an external setpoint SP.E. The external SP.E is either the absolute set-point Wext or the offset to the set-point (dependent on instrument and configuration).
		1dP	9245				
		2dP	17437				
		3dP	25629				

0	no function (switch-over via interface is possible)
1	always active
2	Digital Input DI1 switches
3	DI2 switches (only visible with OPTION)
4	DI3 switches (only visible with OPTION)
5	F-key switches.

8 LOGI

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Y2	r/w	base 1dP 2dP 3dP	1054 9246 17438 25630	34876	Enum	Enum_dInP3	Source of the control signal for activating the second positioning output Y2. Activated Y2 = positioner control. Caution: The parameter 'positioning output Y2' must not be confused with the controller output Y2!
						0	no function (switch-over via interface is possible)
						2	Digital Input DI1 switches
						3	DI2 switches (only visible with OPTION)
						4	DI3 switches (only visible with OPTION)
						5	F-key switches.
						6	Auto/manual key switches (A/M key)
Y.E	r/w	base 1dP 2dP 3dP	1055 9247 17439 25631	34878	Enum	Enum_dInP2	Signal for activating the external output value. The internal output value Ypid is the controllers reaction on the process, with external output value Y.E the controller output is controlled.
						0	no function (switch-over via interface is possible)
						1	always activated (manual station)
						2	Digital Input DI1 switches
						3	DI2 switches (only visible with OPTION)
						4	DI3 switches (only visible with OPTION)
						5	F-key switches.
						6	Auto/manual key switches (A/M key)
mAn	r/w	base 1dP 2dP 3dP	1056 9248 17440 25632	34880	Enum	Enum_dInp2	Source of the control signal for auto/manual switchover. In the automatic mode, the controller is in charge. In the manual mode, the outputs can be varied independently of the process.
						0	no function (switch-over via interface is possible)
						1	always activated (manual station)
						2	Digital Input DI1 switches
						3	DI2 switches (only visible with OPTION)
						4	DI3 switches (only visible with OPTION)
						5	F-key switches.
						6	Auto/manual key switches (A/M key)
C.oFF	r/w	base 1dP 2dP 3dP	1057 9249 17441 25633	34882	Enum	Enum_dInP3	Source of the control signal for disabling all the controller outputs.Note: Forcing has priority, and remains active; alarm processing also remains active.
						0	no function (switch-over via interface is possible)
						2	Digital Input DI1 switches
						3	DI2 switches (only visible with OPTION)
						4	DI3 switches (only visible with OPTION)
						5	F-key switches.
						6	Auto/manual key switches (A/M key)

8 LOGI

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
m.Loc	r/w	base 1dP 2dP 3dP	1058 9250 17442 25634	34884	Enum	Enum_dlnp4	Source of the control signal to disable the auto/manual key. If the A/M key is disabled, switchover to manual operation is not possible.

0	no function (switch-over via interface is possible)
2	Digital Input DI1 switches
3	DI2 switches (only visible with OPTION)
4	DI3 switches (only visible with OPTION)
5	F-key switches.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Err.r	r/w	base 1dP 2dP 3dP	1059 9251 17443 25635	34886	Enum	Enum_dlnP3	Source of the control signal for resetting all stored entries in the error list (the list contains all error messages and alarms). If an alarm is still present, i.e. the source of trouble has not been remedied, stored alarms cannot be acknowledged (reset).

0	no function (switch-over via interface is possible)
2	Digital Input DI1 switches
3	DI2 switches (only visible with OPTION)
4	DI3 switches (only visible with OPTION)
5	F-key switches.
6	Auto/manual key switches (A/M key)

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Pid.2	r/w	base 1dP 2dP 3dP	1061 9253 17445 25637	34890	Enum	Enum_dlnP4	Source of the control signal for switchover between the two parameter sets. The second parameter set is complete, and comprises Pb (= proportional band), ti (= integral action time), and td (= derivative action time) for heating and for cooling. All other control parameters, e.g. the switching duty cycles, are valid for both parameter sets.

0	no function (switch-over via interface is possible)
2	Digital Input DI1 switches
3	DI2 switches (only visible with OPTION)
4	DI3 switches (only visible with OPTION)
5	F-key switches.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
I.Chg	r/w	base 1dP 2dP 3dP	1064 9256 17448 25640	34896	Enum	Enum_dlnP4	Signal source for switching the effective process value between the first process value X1 and second process value X2.

0	no function (switch-over via interface is possible)
2	Digital Input DI1 switches
3	DI2 switches (only visible with OPTION)
4	DI3 switches (only visible with OPTION)
5	F-key switches.

8 LOGI

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
di.Fn	r/w	base	1050	34868	Enum	Enum_diFn		Function of digital inputs (valid for all inputs)
		1dP	9242					
		2dP	17434					
		3dP	25626					

					0	Basic setting 'Off': A permanent positive signal switches this function 'On', which is connected to the digital input. Removal of the signal switches the function 'Off' again.
					1	Basic setting 'On': A permanent positive signal switches this function 'Off', which is connected to the digital input. Removal of the signal switches the function 'On' again.
					2	Push-button function. Basic setting 'Off'. Only positive signals are effective. The first positive signal switches 'On'. Removal of the signal is necessary before the next positive signal can switch 'Off'.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
St.Di	r	base	1070	34908	Int	0...7	☑	Status of the digital inputs or of push-buttons (binary coded).
		1dP	9262					
		2dP	17454					
		3dP	25646					

Bit 0 Input 1
Bit 1 Input 2
Bit 2 Input 3
Bit 8 Status of 'F' key
Bit 9 Status of 'A/M' key
Bit 10 Status of 'Sel' key
Bit 11 Status of 'Down' key
Bit 12 Status of 'Up' key
Bit 13 Status of 'Loc' key

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L-R	r/w	base	1080	34928	Int	0...1	☐	Remote operation. Remote means that all values can only be adjusted via the interface. Adjustments via the front panel are blocked.
		1dP	9272					
		2dP	17464					
		3dP	25656					
W_W2	r/w	base	1081	34930	Int	0...1	☐	Signal for activating the second (safety) setpoint (SP.2=) W2. Note: Setpoint W2 is not restricted by the setpoint limits!
		1dP	9273					
		2dP	17465					
		3dP	25657					
Wi_We	r/w	base	1082	34932	Int	0...1	☐	Signal for activating the external setpoint value. SP.E is the external setpoint, or dependent on the device and configuration of the setpoint shift.
		1dP	9274					
		2dP	17466					
		3dP	25658					
Y_Y2	r/w	base	1083	34934	Int	0...1	☐	Signal for activating the 2nd output value Y2. With selected Y2, the output is operated as a positioner.Caution: Do not confuse the parameter 'fixed output Y2' with the controller output Y2!
		1dP	9275					
		2dP	17467					
		3dP	25659					
Y_Y.E	r/w	base	1084	34936	Int	0...1	☐	Signal for activating the external positioning value. The controller is operated as positioner.
		1dP	9276					
		2dP	17468					
		3dP	25660					

8 LOGI

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
A-M	r/w	base 1dP 2dP 3dP	1085 9277 17469 25661	34938	Int	0...1 ☐	Signal for activating manual operation. In the manual mode, the controller provides output signals independent of the process.
C.Off	r/w	base 1dP 2dP 3dP	1086 9278 17470 25662	34940	Int	0...1 ☐	Signal for disabling all the controller outputs. Note: Forcing has priority; alarm processing remains active.
L.AM	r/w	base 1dP 2dP 3dP	1087 9279 17471 25663	34942	Int	0...1 ☐	Signal for disabling manual operation. Triggers a forced switchover to automatic mode, and disables the front panel A/M key (also if other functions have been assigned to the key).
Err.r	r/w	base 1dP 2dP 3dP	1088 9280 17472 25664	34944	Int	0...1 ☐	Signal for resetting the entire error list. The error list contains all errors that are reported, e.g. device faults and limit values. It also contains queued as well as stored errors after their correction. The reset acknowledges all errors, whereby queued errors will reappear after the next error detection (measurement).
SSR.Res	r/w	base 1dP 2dP 3dP	1089 9281 17473 25665	34946	Int	0...1 ☐	Reset of the alarm triggered by a solid-state relay (SSR). SSRs are mostly used for frequent switching of heating elements, because they have no mechanical contacts that can wear out. However, an unnoticed short circuit could lead to overheating of the machine.
Set1.2	r/w	base 1dP 2dP 3dP	1091 9283 17475 25667	34950	Int	0...1 ☐	Switch-over of parameter set. The 2nd parameter set contains one complete set each of Pb (= proportional band), ti (= integral action time), and td (= derivative action time) for heating and for cooling. All other control parameters, such as switching duty cycles, are valid for both parameter sets.
F.Di	r/w	base 1dP 2dP 3dP	1094 9286 17478 25670	34956	Int	0...7 ☐	Forcing of digital inputs. Forcing involves the external operation of at least one input. The instrument takes over this input value (preset value for inputs from a superordinate system, e.g. for a function test.)
						Bit 0 Forcing of digital input 1 Bit 1 Forcing of digital input 2 Bit 2 Forcing of digital input 3 Bit 3 Forcing of digital input 4 Bit 4 Forcing of digital input 5	
I.Chg	r/w	base 1dP 2dP 3dP	1095 9287 17479 25671	34958	Int	0...1 ☐	Signal for switching the effective process value between the first process value X1 and second process value X2.

9 ohnE

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
CDis3	r/w	base 1dP 2dP 3dP	126 8318 16510 24702	33020	Enum	Enum_ContrDis3		Display 3 of controller Operating Level (only visible with Engineering Tool), e.g. text only, value display or bargraph. If text only is selected, this is fixed in the display. With the other settings, entering a text causes the display to switch cyclically from one to the other.

						0	No value / only a fixed text.
						1	value display
						2	Output value as a bargraph.
						3	Control deviation as a bargraph.
						4	Process value as a bargraph.

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
ContStdS	r/w	base 1dP 2dP 3dP	120 8312 16504 24696	33008	Float	1...9999999	☑	This address consists of 2 float data transferred always together: 1st data defines the number of operating hours after reaching InF.1 will be set. 2nd data defines the number of duty cycles after reaching InF.2 will be set.
DigForc	r/w	base 1dP 2dP 3dP	121 8313 16505 24697	33010	Int	0...255	☑	This address consists of 2 bytes, which can only be transmitted together: 1st datum defines which inputs are to be forced. Bit 0 = analog Input 1 Bit 1 = analog Input 2 Bit 2 = analog Input 3 Bit 3 = not used Bit 4 = digital Input 1 Bit 5 = digital Input 2 Bit 6 = digital Input 3 Bit 7 = not used 2nd datum defines which outputs are to be forced. Bit 0 = Output 1 Bit 1 = Output 2 Bit 2 = Output 3 Bit 3 = Output 4 Bit 4 = Output 5 Bit 5 = Output 6
ErwBedie	r/w	base 1dP 2dP 3dP	124 8316 16508 24700	33016	Int	0...8000	☐	This address consists of 9 words. The words can only be transmitted together. The first 8 words describe the data to be displayed in the extended Operating Level. The 9th word defines the datum to be shown in the 2nd display value (instead of the setpoint). The basic address is to be entered as the value.
Lin	r/w	base 1dP 2dP 3dP	139 8331 16523 24715	33046	Float	-9999...9999	☑	16 float values for linearization table with 16 entries structure: input1, output1 input2, output2 ... Input values must be strictly monotonous rising. Starting from input3 a switching off value can be given.
LocBedie	r/w	base 1dP 2dP 3dP	123 8315 16507 24699	33014	Int	0...255	☐	This address consists of 2 rsp. 3 bytes defining the release of operating levels. They can olny be transferred together. byte 1 blocking of operating level standard device: byte 2 blocking of operating level programmer: byte 2 blocking of programmer level byte 3 blocking of operating level (content on request)

9 ohnE

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Pass	r/w	base 1dP 2dP 3dP	125 8317 16509 24701	33018	Int	0...9999	☑	Password. 4-digit number for the password-protected access to blocked operating functions such as e.g. the Calibrating Level.
T.dis3	r/w	base 1dP 2dP 3dP	900 9092 17284 25476	34568	Text	0...255	☐	This address contains 8 bytes for the text that is to appear in Display 3.No text: 1st byte 0x00.
T.Inf	r/w	base 1dP 2dP 3dP	901 9093 17285 25477	34570	Text	0...255	☐	This address contains 16 bytes. Bytes 1 – 8: user-defined text for message Inf.1 Bytes 9 – 16: user-defined text for message Inf.2 No text: 1st byte 0x00
Tdis3	r/w	base 1dP 2dP 3dP	128 8320 16512 24704	33024	Int	2...60	☐	Display cycle for Display 3 in seconds. If a value or a bargraph is shown in Display 3, an additional text can be selected. The text is displayed briefly after every cycle time instead of the value or bargraph.
ValuDis3	r/w	base 1dP 2dP 3dP	127 8319 16511 24703	33022	Int	0...8000	☐	Address, which defines the display value in Display 3.
VisibelM	r/w	base 1dP 2dP 3dP	903 9095 17287 25479	34574	Int	0...255	☑	This address consists of 55 bytes, which define the visibility mask. They can be transferred only together. The mask defines the configurations and parameter represented in the operation (contents on request).

● PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Conf	r/w	base 1dP 2dP 3dP	1 8193 16385 24577	32770	Int	0...2	☐	Start/Stop and abortion of the configuration mode 0 = End of configuration 1 = Start of configuration 2 = Abort configuration

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
UPD	r/w	base 1dP 2dP 3dP	95 8287 16479 24671	32958	Enum	Enum_Aenderungsflag	Status message indicating that parameter / configuration have been changed via the front panel.

0	No change via the front panel keys.
1	A change has been made via the front panel keys, which must be processed.

9 ohnE

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Hw.Opt	r	base 1dP 2dP 3dP	200 8392 16584 24776	33168	Int	0...65535	☑	
Sw.Op	r	base 1dP 2dP 3dP	201 8393 16585 24777	33170	Int	0...255	☐	Software version XY Major and Minor Release (e.g. 21 = Version 2.1). The software version specifies the firmware in the unit. For the correct interaction of E-Tool and device, it must match the operating version (OpVersion) in the E-Tool.
Bed.V	r	base 1dP 2dP 3dP	202 8394 16586 24778	33172	Int	0...255	☐	Operating version (numeric value). For the correct interaction of E-Tool and device, the software version and operating version must match.
Unit	r	base 1dP 2dP 3dP	203 8395 16587 24779	33174	Int	0...255	☐	Identification of the device.
S.Vers	r	base 1dP 2dP 3dP	204 8396 16588 24780	33176	Int	100...255	☐	The sub-version number is given as an additional index for precise definition of software version.
Uident	r	base 1dP 2dP 3dP	910 9102 17294 25486	34588	Text	...	☐	Device identification. Via this Modbus address, up to 14 data units (28 bytes) can be defined. Bytes 1 - 15 order number of the device Bytes 16 - 19 Ident number 1 Bytes 20 + 21 Ident number 2 Bytes 22 - 25 OEM number Bytes 26 - 28 Software order number
IntUnitD	r	base 1dP 2dP 3dP	911 9103 17295 25487	34590	Text	...	☐	Internal device data

9 ohnE

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
St.Ala	r	base 1dP 2dP 3dP	250 8442 16634 24826	33268	Int	0...31	☐	Alarm status: Bit-wise coded status of the individual alarms, e.g. exceeded limit value or Loop.

Bit 0 Existing/stored exceeded limit 1
Bit 1 Existing/stored exceeded limit 2
Bit 2 Existing/stored exceeded limit 3
Bit 3 Not used
Bit 4 Existing/stored loop alarm
Bit 5 Existing/stored heating current alarm
Bit 6 Existing/stored SSR alarm
Bit 7 Not used
Bit 8 Existing exceeded limit 1
Bit 9 Existing exceeded limit 2
Bit 10 Existing exceeded limit 3
Bit 11 Not used
Bit 12 Existing loop alarm
Bit 13 Existing heating current alarm
Bit 14 Existing SSR alarm
Bit 15 Not used

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
St.Do	r	base 1dP 2dP 3dP	251 8443 16635 24827	33270	Int	0...31	☐	Status of the digital outputs Bit 0 digital output 1 Bit 1 digital output 2 Bit 2 digital output 3 Bit 3 digital output 4 Bit 4 digital output 5 Bit 5 digital output 6
St.Ain	r	base 1dP 2dP 3dP	252 8444 16636 24828	33272	Int	0...7	☐	Bit-coded status of the analog input (fault, e.g. short circuit)

Bit 0 Break at Input 1
Bit 1 Reversed polarity at Input 1
Bit 2 Short circuit at Input 1
Bit 3 Not used
Bit 4 Break at Input 2
Bit 5 Reversed polarity at Input 2
Bit 6 Short-circuit at Input 2
Bit 7 Not used
Bit 8 Break at Input 3 (only KS 90)
Bit 9 Reversed polarity at Input 3 (only KS 90)
Bit 10 Short-circuit at Input 3 (only KS 90)
Bit 11 Not used

9 ohnE

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
St.Di	r	base	253	33274	Int	0...7 ☐	Status of the digital inputs or of push-buttons (binary coded).
		1dP	8445				
		2dP	16637				
		3dP	24829				

Bit 0 Input 1
Bit 1 Input 2
Bit 2 Input 3
Bit 8 Status of 'F' key
Bit 9 Status of 'A/M' key
Bit 10 Status of 'Sel' key
Bit 11 Status of 'Down' key
Bit 12 Status of 'Up' key
Bit 13 Status of 'Loc' key

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
F.Di	r/w	base	303	33374	Int	0...1 ☐	Forcing of digital inputs. Forcing involves the external operation of at least one input. The instrument takes over this input value (preset value for inputs from a superordinate system, e.g. for a function test.)
		1dP	8495				
		2dP	16687				
		3dP	24879				

Bit 0 Forcing of digital input 1
Bit 1 Forcing of digital input 2
Bit 2 Forcing of digital input 3
Bit 3 Forcing of digital input 4
Bit 4 Forcing of digital input 5

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
F.Do	r/w	base	304	33376	Int	0...15 ☐	Forcing of digital outputs. Forcing involves the external operation of at least one output. The instrument has no influence on this output (use of free outputs by superordinate system).
		1dP	8496				
		2dP	16688				
		3dP	24880				
dAc.S	r/w	base	3570	39908	Enum	Enum_DacStart	Start of the automatic calibration for the Yp input (DAC function). On all controllers with position feedback Yp, the actuator can be monitored for possible malfunctions, e.g. a motor defect or excessive play due to wear. In case of a disturbance, the controller switches into manual operation and switches the outputs off.
		1dP	11762				
		2dP	19954				
		3dP	28146				

0	Calibration disabled.
1	Calibration started.
2	Searches for a value for the average change.
3	Search for the 0% calibration values
4	Calibration value for 0% was found.
5	Search for the 100% calibration values
6	Calibration value for 100% was found.
7	Returns to the starting point of the calibration.
8	Calibration has been completed successfully.

9 ohnE

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
dAc.A	r	base 1dP 2dP 3dP	3581 11773 19965 28157	39930	Enum	Enum_DacAlarm	Fault in the DAC function. On all controllers with position feedback Yp, the actuator can be monitored for possible malfunctions, e.g. a motor defect or excessive play due to wear. In case of a disturbance, the controller switches into manual operation and switches the outputs off.

0	no error
3	Output is blocked - check the drive for blockage After solving the technical problem the DAC errror can be acknowledged in the error list. Thereafter the controller works again in normal operation mode.
4	Wrong method of operation - rong phasing, defect motor capacitor After solving the technical problem the DAC errror can be acknowledged in the error list. Thereafter the controller works again in normal operation mode.
5	Fail at Yp measurement - check the connection to the Yp input After solving the technical problem the DAC errror can be acknowledged in the error list. Thereafter the controller works again in normal operation mode.
6	Calibration error - manual calibration necessary After solving the technical problem the DAC errror can be acknowledged in the error list. Thereafter the controller works again in normal operation mode.

10 ohnE1

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.1	r	base 1dP 2dP 3dP	232 8424 16616 24808	33232	Float	-1999...9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
In.1r	r	base 1dP 2dP 3dP	240 8432 16624 24816	33248	Float	-1999...9999	☐	Measurement value before the measurement value correction (unprocessed).
F.Inp	r/w	base 1dP 2dP 3dP	300 8492 16684 24876	33368	Float	-1999...9999	☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)

11 ohnE2

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.2	r	base 1dP 2dP 3dP	233 8425 16617 24809	33234	Float	-1999...9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).

11 ohnE2

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.2r	r	base 1dP 2dP 3dP	241 8433 16625 24817	33250	Float	-1999...9999	☐	Measurement value before the measurement value correction (unprocessed).
F.Inp	r/w	base 1dP 2dP 3dP	301 8493 16685 24877	33370	Float	-1999...9999	☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)

12 ohnE3

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.3	r	base 1dP 2dP 3dP	234 8426 16618 24810	33236	Float	-1999...9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
In.3r	r	base 1dP 2dP 3dP	242 8434 16626 24818	33252	Float	-1999...9999	☐	Measurement value before the measurement value correction (unprocessed).
F.Inp	r/w	base 1dP 2dP 3dP	302 8494 16686 24878	33372	Float	-1999...9999	☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)
F.Out1	r/w	base 1dP 2dP 3dP	305 8497 16689 24881	33378	Float	0...120	☐	Forcing value of the analog output. Forcing involves the external operation of an output, i.e. the instrument has no influence on this output. (Used for the operation of free outputs e.g. by a supervisory PLC.)

13 ohnE4

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
F.Out2	r/w	base 1dP 2dP 3dP	306 8498 16690 24882	33380	Float	0...120	☐	Forcing value of the analog output. Forcing involves the external operation of an output, i.e. the instrument has no influence on this output. (Used for the operation of free outputs e.g. by a supervisory PLC.)

14 othr

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
bAud	r/w	base 1dP 2dP 3dP	180 8372 16564 24756	33128	Enum	Enum_Baud		Bit rate of the interface (only visible with OPTION). The bit rate determines the transmission speed.
						0	2400 Baud	
						1	4800 Baud	
						2	9600 Baud	
						3	19200 Baud	
Addr	r/w	base 1dP 2dP 3dP	181 8373 16565 24757	33130	Int	1...247 ☐		Address on the interface (only visible with OPTION)
PrtY	r/w	base 1dP 2dP 3dP	182 8374 16566 24758	33132	Enum	Enum_Parity		Parity of data on the interface (only visible with OPTION). Simple possibility of checking that transferred data is correct.
						0	No parity, with 2 stop bits.	
						1	even parity	
						2	odd parity	
						3	no parity (1 stop bit)	
dELY	r/w	base 1dP 2dP 3dP	183 8375 16567 24759	33134	Int	0...200 ☐		Response delay [ms] (only visible with OPTION). Additional delay time before the received message may be answered on the Modbus. (Might be necessary, if the same line is used for transmit/receive.)
dp.Ad	r/w	base 1dP 2dP 3dP	195 8387 16579 24771	33158	Int	0...126 ☐		Address of the device on the PROFIBUS. The address identifies the device clearly.
bc.uP	r/w	base 1dP 2dP 3dP	196 8388 16580 24772	33160	Enum	Enum_BackupControl		behaviour as backup controller. The control function is done by the master. The instrument provides the display, reads the measured values and outputs the correcting variable. If bus communication (or the master) fails, the controller changes to normal operation.
						0	The backup function is not active.	
						1	With backup function. Operates in the positioner mode as long as bus communication is functional. If bus communication (or the master) fails, the controller changes to normal operation.	
O2	r/w	base 1dP 2dP 3dP	173 8365 16557 24749	33114	Enum	O2Unit		Parameter definition for O2 measurement. With O2 measurement it is necessary to define whether the parameter is to be evaluated in ppm or %.
						0	Parameter for O2 function in ppm	
						1	Parameter for O2 function in %	

14 othr

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Unit	r/w	base 1dP 2dP 3dP	170 8362 16554 24746	33108	Enum	Enum_Unit		Physical unit (temperature), f.e.°C
						0	without unit	
						1	°C	
						2	°F	
dP	r/w	base 1dP 2dP 3dP	171 8363 16555 24747	33110	Enum	Enum_dP		Decimal point (max. no of decimals). Format of the measured value display.
						0	no digit behind the decimal point	
						1	Display has one decimal.	
						2	Display has two decimals.	
						3	Display has three decimals.	
LEd	r/w	base 1dP 2dP 3dP	190 8382 16574 24766	33148	Enum	Enum_Led		Meaning of the signalling LEDs. Selection of a combination of the displayable signals.
						10	The digital outputs OUT1, OUT2, OUT3, and OUT4 are displayed.	
						11	Display of controller output y1 (heating / open), alarm1, alarm2, alarm3	
						12	Display of controller output y1 (heating / open), controller output y2 (cooling / close), alarm1, alarm2	
						13	Display of controller output y2 (cooling / close), controller output y1 (heating / open), alarm1, alarm2	
dISP	r/w	base 1dP 2dP 3dP	172 8364 16556 24748	33112	Int	0...10 ☐		Brightness of the display.
C.dEL	r/w	base 1dP 2dP 3dP	184 8376 16568 24760	33136	Int	0...200 ☐		For both interfaces, Modbus only. Additional acceptable delay time between 2 received bytes, before "end of message" is assumed. This time is needed if data is not transmitted continousely by the modem.
FrEq	r/w	base 1dP 2dP 3dP	150 8342 16534 24726	33068	Enum	Enum_FrEq		Switchover of the applied mains frequency 50 / 60 Hz, thereby better adaptation of the input filter for hum suppression.
						0	Mains frequency is 50 Hz.	
						1	Mains frequency is 60 Hz.	
MASt	r/w	base 1dP 2dP 3dP	185 8377 16569 24761	33138	Enum	Enum_MASt		Device works as Modbus master. The communication is executed according to the master/slave principle, whereby the device can be operated as master or as slave. Operation as master must be configured here.
						0	No, the unit is operated as a Modbus slave.	
						1	Yes, the unit is operated as a Modbus master.	

14 othr

● ConF

Name	r/w	Adr. Integer	real	Typ	Value/off		Description
Cycl	r/w	base 186	33140	Int	0...200	☐	Cycle time (in seconds) during which the Modbus master transmits its message on the bus.
		1dP 8378					
		2dP 16570					
		3dP 24762					
AdrO	r/w	base 187	33142	Int	1...65535	☐	Target address to which the data specified with AdrU are output on the bus.
		1dP 8379					
		2dP 16571					
		3dP 24763					
AdrU	r/w	base 188	33144	Int	1...65535	☐	Modbus address of the data output on the bus by the Modbus master.
		1dP 8380					
		2dP 16572					
		3dP 24764					
Numb	r/w	base 189	33146	Int	0...100	☐	Quantity of data that are to be transmitted from the Modbus master.
		1dP 8381					
		2dP 16573					
		3dP 24765					

● Signal

Name	r/w	Adr. Integer	real	Typ	Value/off	Description
E.1	r/w	base 210	33188	Enum	Defect	Err 1 (internal error) Contact Service.
		1dP 8402				
		2dP 16594				
		3dP 24786				

0	No fault exists (Reset).
2	The device is defective.

Name	r/w	Adr. Integer	real	Typ	Value/off	Description
E.2	r/w	base 211	33190	Enum	Problem	Err 2 (internal error, resettable) (As a process value via fieldbus interface not writable!)
		1dP 8403				
		2dP 16595				
		3dP 24787				

0	No fault,	resetting possible (Reset).
1	A fault has occurred and has been stored.	

Name	r/w	Adr. Integer	real	Typ	Value/off	Description
FbF.1	r/w	base 212	33192	Enum	Break	Sensor break at input INP1. Typical causes and suggested remedies: Sensor fault: replace INP1 sensor. Wiring fault: check connections of INP1. (As a process value via fieldbus interface not writable!)
		1dP 8404				
		2dP 16596				
		3dP 24788				

0	No fault,	resetting of the sensor break alarm possible (Reset).
1	The sensor fault alarm has been triggered and stored; the fault is no longer present. The operator must acknowledge the error message in order to delete it from the error list.	
2	Sensor break: The sensor is defective or there is a wiring fault.	

14 othr

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Sht.1	r/w	base	213	33194	Enum	Short	Short circuit at input INP1. Typical causes and suggested remedies: Sensor fault: replace INP1 sensor. Wiring fault: check connections of INP1. (As a process value via fieldbus interface not writable!)
		1dP	8405				
		2dP	16597				
		3dP	24789				
						0	No fault, resetting of the short-circuit alarm possible (Reset).
						1	A short-circuit fault has occurred and has been stored.
						2	A short-circuit fault has occurred.
POL.1	r/w	base	214	33196	Enum	Polarity	Incorrect polarity at input INP1. Suggested remedy: reverse the polarity at INP1. (As a process value via fieldbus interface not writable!)
		1dP	8406				
		2dP	16598				
		3dP	24790				
						0	No fault, resetting of the incorrect polarity alarm possible (Reset).
						1	An incorrect polarity fault has occurred and has been stored.
						2	Incorrect polarity. The wiring of the input circuit is not correct.
FbF.2	r/w	base	215	33198	Enum	Break	Sensor break at input INP2. Typical causes and suggested remedies: Sensor fault: replace INP2 sensor. Wiring fault: check connections of INP2. (As a process value via fieldbus interface not writable!)
		1dP	8407				
		2dP	16599				
		3dP	24791				
						0	No fault, resetting of the sensor break alarm possible (Reset).
						1	The sensor fault alarm has been triggered and stored; the fault is no longer present. The operator must acknowledge the error message in order to delete it from the error list.
						2	Sensor break: The sensor is defective or there is a wiring fault.
Sht.2	r/w	base	216	33200	Enum	Short	Short circuit at input INP2. Typical causes and suggested remedies: Sensor fault: replace INP2 sensor. Wiring fault: check connections of INP2. (As a process value via fieldbus interface not writable!)
		1dP	8408				
		2dP	16600				
		3dP	24792				
						0	No fault, resetting of the short-circuit alarm possible (Reset).
						1	A short-circuit fault has occurred and has been stored.
						2	A short-circuit fault has occurred.
POL.2	r/w	base	217	33202	Enum	Polarity	Incorrect polarity at input INP2. Suggested remedy: reverse the polarity at INP2. (As a process value via fieldbus interface not writable!)
		1dP	8409				
		2dP	16601				
		3dP	24793				
						0	No fault, resetting of the incorrect polarity alarm possible (Reset).
						1	An incorrect polarity fault has occurred and has been stored.
						2	Incorrect polarity. The wiring of the input circuit is not correct.
HCA	r/w	base	218	33204	Enum	HeatCurr	Heating current alarm.Possible fault s are an open heating current circuit with current I < heating current limit, or current I > heating current limit (depending on configuration), or defective heater band.Suggested remedy: check heating current circuit, replace heater band if necessary. (As a process value via fieldbus interface not writable!)
		1dP	8410				
		2dP	16602				
		3dP	24794				
						0	No fault, resetting of the heating current alarm possible (Reset).
						1	A heating current fault has occurred and has been stored.

14 othr

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SSr	r/w	base 1dP 2dP 3dP	219 8411 16603 24795	33206	Enum	Short	Alarm message: SSr Possible causes: a current flow in the heating circuit although controller is 'off', or the SSR is defective. Suggested remedy: check heating current circuit, replace the solid-state relay, if necessary. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting of the short-circuit alarm possible (Reset).
						1	A short-circuit fault has occurred and has been stored.
						2	A short-circuit fault has occurred.
LooP	r/w	base 1dP 2dP 3dP	220 8412 16604 24796	33208	Enum	LoopAlarm	Alarm message: LooP Possible causes: faulty or incorrectly connected input circuit, or output not connected correctly. Suggested remedy: check heating or cooling circuit, check sensor function and replace if necessary, check controller and output switching actuator. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting of the loop alarm possible (Reset).
						1	A control loop fault has occurred and has been stored.
						2	A control loop fault has occurred, there was no clear process response following a step change of the output.
AdA.H	r/w	base 1dP 2dP 3dP	221 8413 16605 24797	33210	Enum	Tune	Error message from "heating" self-tuning and reason for aborted tuning attempt. Hints for trouble-shooting: Check operating sense of actuator. Is the loop closed? Is there an output limit? Adapt the setpoint. Increase step output for Yopt. (As a process value via fieldbus interface not writable!)
						0	no error
						3	Process responds in the wrong direction. Possible remedy: Check the output signal sense (inverse <-> direct), and re-configure the controller if necessary (inverse <-> direct).
						4	No response from the process. Perhaps the control loop is open. Possible remedy: Check sensor, connections, and process.
						5	The process value turning point of the step response is too low. Possible remedy: Increase the permitted step output range, i.e. increase the parameter Y.Hi ('heating') or reduce the parameter Y.Lo ('cooling').
						6	Self-tuning was aborted due to the risk of an exceeded setpoint. Possible remedy: Repeat the attempt with an increased setpoint reserve.
						7	The step output change is not large enough (minimum change > 5 %). Possible remedy: Increase the permitted step output range, i.e. increase the parameter Y.Hi ('heating') or reduce the parameter Y.Lo ('cooling').
						8	Setpoint reserve must be given before generating the step output change. Possible remedy: decrease set-point range, change set-point, or change process value.
						9	The pulse response attempt has failed. No useful parameters were determined. Perhaps the control loop is open. Possible remedy: Check sensor, connections, and process.

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● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
AdA.C	r/w	base 1dP 2dP 3dP	222 8414 16606 24798	33212	Enum	Tune		Error message from "cooling" self-tuning and reason for aborted tuning attempt. Hints for trouble-shooting: Check operating sense of actuator. Is the loop closed? Is there an output limit? Adapt the setpoint. Increase step output for Yopt. (As a process value via fieldbus interface not writable!)
						0	no error	
						3	Process responds in the wrong direction. Possible remedy: Check the output signal sense (inverse <-> direct), and re-configure the controller if necessary (inverse <-> direct).	
						4	No response from the process. Perhaps the control loop is open. Possible remedy: Check sensor, connections, and process.	
						5	The process value turning point of the step response is too low. Possible remedy: Increase the permitted step output range, i.e. increase the parameter Y.Hi ('heating') or reduce the parameter Y.Lo ('cooling').	
						6	Self-tuning was aborted due to the risk of an exceeded setpoint. Possible remedy: Repeat the attempt with an increased setpoint reserve.	
						7	The step output change is not large enough (minimum change > 5 %). Possible remedy: Increase the permitted step output range, i.e. increase the parameter Y.Hi ('heating') or reduce the parameter Y.Lo ('cooling').	
						8	Setpoint reserve must be given before generating the step output change. Possible remedy: decrease set-point range, change set-point, or change process value.	
						9	The pulse response attempt has failed. No useful parameters were determined. Perhaps the control loop is open. Possible remedy: Check sensor, connections, and process.	
Lim.1	r/w	base 1dP 2dP 3dP	223 8415 16607 24799	33214	Enum	Limit		Limit value 1 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting of the limit value alarm possible (Reset).	
						1	The limit value has been exceeded, and the fault has been stored.	
						2	The limit value has been exceeded; the monitored (measurement) value is outside the set limits.	
Lim.2	r/w	base 1dP 2dP 3dP	224 8416 16608 24800	33216	Enum	Limit		Limit value 2 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting of the limit value alarm possible (Reset).	
						1	The limit value has been exceeded, and the fault has been stored.	
						2	The limit value has been exceeded; the monitored (measurement) value is outside the set limits.	
Lim.3	r/w	base 1dP 2dP 3dP	225 8417 16609 24801	33218	Enum	Limit		Limit value 3 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting of the limit value alarm possible (Reset).	
						1	The limit value has been exceeded, and the fault has been stored.	
						2	The limit value has been exceeded; the monitored (measurement) value is outside the set limits.	

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Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
InF.1	r/w	base 1dP 2dP 3dP	226 8418 16610 24802	33220	Enum	Time	Message from the operating hours counter that the preset no. of hours for this maintenance period has been reached. The op-hours counter for the maintenance period is reset when this message is acknowledged. Counting the operating hours is used for preventive maintenance. - Acknowledge the error to reset it. (As a process value via fieldbus interface not writable!)
						0	No signal, resetting of the time limit signal possible (Reset).
						1	Operating hours - limit value (maintenance period) reached: please acknowledge.
InF.2	r/w	base 1dP 2dP 3dP	227 8419 16611 24803	33222	Enum	Switch	Message from the switching cycle counter that the preset no. of switch cycles for this maintenance period has been reached. The cycle counter for the maintenance period is reset when this message is acknowledged. Counting the switching cycles is used for preventive maintenance. - Acknowledge the error to reset it. (As a process value via fieldbus interface not writable!)
						0	No error message, resetting of the switching cycle counter possible (Reset).
						1	Set limit of the switching cycle counter (maintenance period) has been reached: please acknowledge.
E.4	r/w	base 1dP 2dP 3dP	228 8420 16612 24804	33224	Enum	Problem	Hardware fault.Cause: Code number and hardware are not identical. Remedy: Contact Service. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting possible (Reset).
						1	A fault has occurred and has been stored.
FbF.3	r/w	base 1dP 2dP 3dP	400 8592 16784 24976	33568	Enum	Break3	Sensor break at input INP3. Typical causes and suggested remedies: Sensor fault: replace INP3 sensor. Wiring fault: check connections of INP3. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting of the sensor break alarm possible (Reset).
						1	The sensor fault alarm has been triggered and stored; the fault is no longer present. The operator must acknowledge the error message in order to delete it from the error list.
						2	Sensor break: The sensor is defective or there is a wiring fault.
Sht.3	r/w	base 1dP 2dP 3dP	401 8593 16785 24977	33570	Enum	Short3	Short circuit at input INP3. Typical causes and suggested remedies: Sensor fault: replace INP3 sensor. Wiring fault: check connections of INP3. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting of the short-circuit alarm possible (Reset).
						1	A short-circuit fault has occurred and has been stored.
						2	A short-circuit fault has occurred.
POL.3	r/w	base 1dP 2dP 3dP	402 8594 16786 24978	33572	Enum	Polarity3	Incorrect polarity at input INP3. Suggested remedy: reverse the polarity at INP3. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting of the incorrect polarity alarm possible (Reset).
						1	An incorrect polarity fault has occurred and has been stored.
						2	Incorrect polarity. The wiring of the input circuit is not correct.

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Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
E.3	r/w	base 1dP 2dP 3dP	403 8595 16787 24979	33574	Enum	ConfErr	configuration fault. Typical causes and suggested remedies: Missing or faulty configuration: check interactions in the configuration and parameter settings. (As a process value via fieldbus interface not writable!)
						0	No configuration error
						2	There is a configuration error. The configuration is missing or wrong, or it does not match the parameter settings.
dAc	r/w	base 1dP 2dP 3dP	404 8596 16788 24980	33576	Enum	Enum_DacAlarm	DAC alarm, possibly with cause. On all controllers with position feedback Yp, the actuator can be monitored for incorrect operation, e.g. defective motor or excessive play due to wear. In all cases, the controller changes into manual operation and switches the outputs off. (As a process value via fieldbus interface not writable!)
						0	no error
						3	Output is blocked - check the drive for blockage After solving the technical problem the DAC errror can be acknowledged in the error list. Thereafter the controller works again in normal operation mode.
						4	Wrong method of operation - rong phasing, defect motor capacitor After solving the technical problem the DAC errror can be acknowledged in the error list. Thereafter the controller works again in normal operation mode.
						5	Fail at Yp measurement - check the connection to the Yp input After solving the technical problem the DAC errror can be acknowledged in the error list. Thereafter the controller works again in normal operation mode.
						6	Calibration error - manual calibration necessary After solving the technical problem the DAC errror can be acknowledged in the error list. Thereafter the controller works again in normal operation mode.
E.5	r/w	base 1dP 2dP 3dP	410 8602 16794 24986	33588	Enum	E5	PROFIBUS fault. Problem (1): The fault occurrence has been stored. The fault is no longer present, but has not yet been acknowledged. Defect (2): The PROFIBUS communication is faulty. Please contact Service. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting possible (Reset).
						1	A Profibus error has occurred and has been stored.
						2	Please contact Service.
dP.1	r/w	base 1dP 2dP 3dP	411 8603 16795 24987	33590	Enum	Problem_dp	PROFIBUS access fault. Possible causes: bus fault, connector problem or no connection to bus. Possible remedies: Check bus cable, check connector & leads. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting possible (Reset).
						2	A Profibus fault has occurred, there is no communication.
dP.2	r/w	base 1dP 2dP 3dP	412 8604 16796 24988	33592	Enum	Problem_dp	PROFIBUS configuration fault. Possible cause: incorrectly configured DP telegram. Suggested remedy: check DP telegram configuration in the master. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting possible (Reset).
						2	A Profibus fault has occurred, there is no communication.

Signal

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● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
dP.3	r/w	base 1dP 2dP 3dP	413 8605 16797 24989	33594	Enum	Problem_dp	PROFIBUS parameter fault. Possible cause: incorrect parameters in DP telegram. Suggested remedy: check DP telegram parameters in the master (As a process value via fieldbus interface not writable!)

						0	No fault,	resetting possible (Reset).
						2	A Profibus fault has occurred, there is no communication.	

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
dP.4	r/w	base 1dP 2dP 3dP	414 8606 16798 24990	33596	Enum	Problem_dp	PROFIBUS data exchange fault. No exchange of user data. Possible causes: bus fault, address fault, master stopped. Suggested remedy: check cable connections, check address, check master setting. (As a process value via fieldbus interface not writable!)

						0	No fault,	resetting possible (Reset).
						2	A Profibus fault has occurred, there is no communication.	

15 Out.1

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.Act	r/w	base 1dP 2dP 3dP	4150 12342 20534 28726	41068	Enum	Enum_OAct	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.

						0	direct / normally open
						1	inverse / normally closed

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Y.1	r/w	base 1dP 2dP 3dP	4151 12343 20535 28727	41070	Enum	Enum_Y1	Output function: Controller output Y1

						0	not active
						1	This output provides the controller output Y1.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Y.2	r/w	base 1dP 2dP 3dP	4152 12344 20536 28728	41072	Enum	Enum_Y2	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !

						0	not active
						1	This output provides the controller output Y2.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Lim.1	r/w	base 1dP 2dP 3dP	4153 12345 20537 28729	41074	Enum	Enum_Lim1	Output function: Signal limit 1

						0	not active
						1	The output is activated by an alarm from limit value 1.

15 Out.1

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Lim.2	r/w	base	4154	41076	Enum	Enum_Lim2	Output function: Signal limit 2
		1dP	12346				
		2dP	20538				
		3dP	28730				
						0	not active
						1	The output is activated by an alarm from limit value 2.
Lim.3	r/w	base	4155	41078	Enum	Enum_Lim3	Output function: Signal limit 3
		1dP	12347				
		2dP	20539				
		3dP	28731				
						0	not active
						1	The output is activated by an alarm from limit value 3.
dAc.A	r/w	base	4156	41080	Enum	Enum_dAcA	Output function: Signal Drive monitoring system (DAC). On all controllers with position feedback Yp, the actuator can be monitored for possible malfunctions, e.g. a motor defect or excessive play due to wear.
		1dP	12348				
		2dP	20540				
		3dP	28732				
						0	not active
						1	The output is switched by a DAC disturbance. Digital Actuator Control DAC is the actuator monitoring function.
LP.AL	r/w	base	4157	41082	Enum	Enum_OUT_LPAL	Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value has to change with an output signal of maximum value, else loop alarm is generated.
		1dP	12349				
		2dP	20541				
		3dP	28733				
						0	not active
						1	The loop alarm (= open loop alarm) is assigned to this output.
HC.AL	r/w	base	4158	41084	Enum	Enum_OUT_HCAL	Output function: Signal Heat current alarm. Either break (= current I < heating current limit) can be monitored or overload (= current I > heating current limit), dependent on configuration.
		1dP	12350				
		2dP	20542				
		3dP	28734				
						0	not active
						1	The heating current alarm is assigned to this output.
HC.SC	r/w	base	4159	41086	Enum	Enum_HCSC	Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output is switched off.
		1dP	12351				
		2dP	20543				
		3dP	28735				
						0	not active
						1	Output activated by an SSR fault.
FAi.1	r/w	base	4162	41092	Enum	Enum_FAi1	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
		1dP	12354				
		2dP	20546				
		3dP	28738				
						0	not active
						1	The output sends the error message 'INP1 fault'.

15 Out.1

• ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
FAi.2	r/w	base 1dP 2dP 3dP	4163 12355 20547 28739	41094	Enum	Enum_FAi2	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
			0				not active
			1				The output sends the error message 'INP2 fault'.

FAi.3	r/w	base 1dP 2dP 3dP	4164 12356 20548 28740	41096	Enum	Enum_FAi3	Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.
			0				not active
			1				The output sends the error message 'INP3 fault'.

dP.Er	r/w	base 1dP 2dP 3dP	4175 12367 20559 28751	41118	Enum	Enum_DP_ERR	Output function: Signal Fault in the Profibus communication. This output is set when a fault in the Profibus communication occurs. There is no more communication with this device.
			0				Not active
			1				This output sends the Profibus fault.

• Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Out1	r	base 1dP 2dP 3dP	4180 12372 20564 28756	41128	Enum	Enum_Ausgang	Status of the digital output
			0				off
			1				on

F.Do1	r/w	base 1dP 2dP 3dP	4181 12373 20565 28757	41130	Enum	Enum_Ausgang	Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
			0				off
			1				on

16 Out.2

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.Act	r/w	base 1dP 2dP 3dP	4250 12442 20634 28826	41268	Enum	Enum_OAct	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.
			0			direct / normally open	
			1			inverse / normally closed	
Y.1	r/w	base 1dP 2dP 3dP	4251 12443 20635 28827	41270	Enum	Enum_Y1	Output function: Controller output Y1
			0			not active	
			1			This output provides the controller output Y1.	
Y.2	r/w	base 1dP 2dP 3dP	4252 12444 20636 28828	41272	Enum	Enum_Y2	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
			0			not active	
			1			This output provides the controller output Y2.	
Lim.1	r/w	base 1dP 2dP 3dP	4253 12445 20637 28829	41274	Enum	Enum_Lim1	Output function: Signal limit 1
			0			not active	
			1			The output is activated by an alarm from limit value 1.	
Lim.2	r/w	base 1dP 2dP 3dP	4254 12446 20638 28830	41276	Enum	Enum_Lim2	Output function: Signal limit 2
			0			not active	
			1			The output is activated by an alarm from limit value 2.	
Lim.3	r/w	base 1dP 2dP 3dP	4255 12447 20639 28831	41278	Enum	Enum_Lim3	Output function: Signal limit 3
			0			not active	
			1			The output is activated by an alarm from limit value 3.	
dAc.A	r/w	base 1dP 2dP 3dP	4256 12448 20640 28832	41280	Enum	Enum_dAcA	Output function: Signal Drive monitoring system (DAC). On all controllers with position feedback Yp, the actuator can be monitored for possible malfunctions, e.g. a motor defect or excessive play due to wear.
			0			not active	
			1			The output is switched by a DAC disturbance. Digital Actuator Control DAC is the actuator monitoring function.	

16 Out.2

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
LP.AL	r/w	base	4257	41282	Enum	Enum_OUT_LPAL	Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value has to change with an output signal of maximum value, else loop alarm is generated.
		1dP	12449				
		2dP	20641				
		3dP	28833				
						0	not active
						1	The loop alarm (= open loop alarm) is assigned to this output.
HC.AL	r/w	base	4258	41284	Enum	Enum_OUT_HCAL	Output function: Signal Heat current alarm. Either break (= current I < heating current limit) can be monitored or overload (= current I > heating current limit), dependent on configuration.
		1dP	12450				
		2dP	20642				
		3dP	28834				
						0	not active
						1	The heating current alarm is assigned to this output.
HC.SC	r/w	base	4259	41286	Enum	Enum_HCSC	Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output is switched off.
		1dP	12451				
		2dP	20643				
		3dP	28835				
						0	not active
						1	Output activated by an SSR fault.
FAi.1	r/w	base	4262	41292	Enum	Enum_FAi1	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
		1dP	12454				
		2dP	20646				
		3dP	28838				
						0	not active
						1	The output sends the error message 'INP1 fault'.
FAi.2	r/w	base	4263	41294	Enum	Enum_FAi2	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
		1dP	12455				
		2dP	20647				
		3dP	28839				
						0	not active
						1	The output sends the error message 'INP2 fault'.
FAi.3	r/w	base	4264	41296	Enum	Enum_FAi3	Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.
		1dP	12456				
		2dP	20648				
		3dP	28840				
						0	not active
						1	The output sends the error message 'INP3 fault'.
dP.Er	r/w	base	4275	41318	Enum	Enum_DP_ERR	Output function: Signal Fault in the Profibus communication. This output is set when a fault in the Profibus communication occurs. There is no more communication with this device.
		1dP	12467				
		2dP	20659				
		3dP	28851				
						0	Not active
						1	This output sends the Profibus fault.

- ## Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Out2	r	base	4280	41328	Enum	Enum_Ausgang		Status of the digital output
		1dP	12472					
		2dP	20664					
		3dP	28856					
						0	off	
						1	on	
F.Do2	r/w	base	4281	41330	Enum	Enum_Ausgang		Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
		1dP	12473					
		2dP	20665					
		3dP	28857					
						0	off	
						1	on	

17 Out.3

- ## ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
O.tYP	r/w	base	4370	41508	Enum	Enum_OtYP		Signal type selection OUT
		1dP	12562					
		2dP	20754					
		3dP	28946					
						0	Relay / logic	
						1	0 ... 20 mA continuous	
						2	4 ... 20 mA continuous	
						3	0...10 V continuous	
						4	2...10 V continuous	
						5	transmitter supply	
O.Act	r/w	base	4350	41468	Enum	Enum_OAct		Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.
		1dP	12542					
		2dP	20734					
		3dP	28926					
						0	direct / normally open	
						1	inverse / normally closed	
Y.1	r/w	base	4351	41470	Enum	Enum_Y1		Output function: Controller output Y1
		1dP	12543					
		2dP	20735					
		3dP	28927					
						0	not active	
						1	This output provides the controller output Y1.	

17 Out.3

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Y.2	r/w	base 1dP 2dP 3dP	4352 12544 20736 28928	41472	Enum	Enum_Y2	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
						0 not active	
						1 This output provides the controller output Y2.	
Lim.1	r/w	base 1dP 2dP 3dP	4353 12545 20737 28929	41474	Enum	Enum_Lim1	Output function: Signal limit 1
						0 not active	
						1 The output is activated by an alarm from limit value 1.	
Lim.2	r/w	base 1dP 2dP 3dP	4354 12546 20738 28930	41476	Enum	Enum_Lim2	Output function: Signal limit 2
						0 not active	
						1 The output is activated by an alarm from limit value 2.	
Lim.3	r/w	base 1dP 2dP 3dP	4355 12547 20739 28931	41478	Enum	Enum_Lim3	Output function: Signal limit 3
						0 not active	
						1 The output is activated by an alarm from limit value 3.	
dAc.A	r/w	base 1dP 2dP 3dP	4356 12548 20740 28932	41480	Enum	Enum_dAcA	Output function: Signal Drive monitoring system (DAC). On all controllers with position feedback Yp, the actuator can be monitored for possible malfunctions, e.g. a motor defect or excessive play due to wear.
						0 not active	
						1 The output is switched by a DAC disturbance. Digital Actuator Control DAC is the actuator monitoring function.	
LP.AL	r/w	base 1dP 2dP 3dP	4357 12549 20741 28933	41482	Enum	Enum_OUT_LPAL	Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value has to change with an output signal of maximum value, else loop alarm is generated.
						0 not active	
						1 The loop alarm (= open loop alarm) is assigned to this output.	
HC.AL	r/w	base 1dP 2dP 3dP	4358 12550 20742 28934	41484	Enum	Enum_OUT_HCAL	Output function: Signal Heat current alarm. Either break (= current I < heating current limit) can be monitored or overload (= current I > heating current limit), dependent on configuration.
						0 not active	
						1 The heating current alarm is assigned to this output.	

17 Out.3

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
HC.SC	r/w	base 1dP 2dP 3dP	4359 12551 20743 28935	41486	Enum	Enum_HCSC	Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output is switched off.
						0 not active	
						1 Output activated by an SSR fault.	
FAi.1	r/w	base 1dP 2dP 3dP	4362 12554 20746 28938	41492	Enum	Enum_FAi1	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
						0 not active	
						1 The output sends the error message 'INP1 fault'.	
FAi.2	r/w	base 1dP 2dP 3dP	4363 12555 20747 28939	41494	Enum	Enum_FAi2	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
						0 not active	
						1 The output sends the error message 'INP2 fault'.	
FAi.3	r/w	base 1dP 2dP 3dP	4364 12556 20748 28940	41496	Enum	Enum_FAi3	Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.
						0 not active	
						1 The output sends the error message 'INP3 fault'.	
dP.Er	r/w	base 1dP 2dP 3dP	4375 12567 20759 28951	41518	Enum	Enum_DP_ERR	Output function: Signal Fault in the Profibus communication. This output is set when a fault in the Profibus communication occurs. There is no more communication with this device.
						0 Not active	
						1 This output sends the Profibus fault.	
Out.0	r/w	base 1dP 2dP 3dP	4371 12563 20755 28947	41510	Float	-1999...9999 ☐	Lower scaling limit of the analog output (corresponds to 0%). If current and voltage signals are used as output values, the display can be scaled to the output value in the Parameter Level. The output value of the lower scaling point is indicated in the respective electrical unit (mA / V).
Out.1	r/w	base 1dP 2dP 3dP	4372 12564 20756 28948	41512	Float	-1999...9999 ☐	Upper scaling limit of the analog output (corresponds to 100%). If current and voltage signals are used as output values, the display can be scaled to the output value in the Parameter Level. The output value of the upper scaling point is indicated in the respective electrical unit (mA / V).

17 Out.3

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.Src	r/w	base	4373	41514	Enum	Enum_OSrc	Signal source of the analog output (visible not with all output signal types O.TYP).
		1dP	12565				
		2dP	20757				
		3dP	28949				

0	not used
1	Controller output y1 (continuous)
2	Controller output y2 (continuous)
3	process value
4	The effective setpoint Weff, which is used for control. Example: The gradient changes the effective setpoint until it reaches the internal (target) setpoint.
5	control deviation xw (process value - set-point)= relative alarm Note: Monitoring with the effective set-point Weff. For example using a ramp it is the changing set-point, not the target set-point of the ramp.
6	Position feedback signal Yp.
7	measured value INP1
8	measured value INP2
9	measured value INP3

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.FAI	r/w	base	4374	41516	Enum	Enum_OFail	fail behaviour
		1dP	12566				
		2dP	20758				
		3dP	28950				

0	upscale
1	downscale

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Out1	r	base	4380	41528	Enum	Enum_Ausgang	Status of the digital output
		1dP	12572				
		2dP	20764				
		3dP	28956				

0	off
1	on

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
F.Do1	r/w	base	4381	41530	Enum	Enum_Ausgang	Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
		1dP	12573				
		2dP	20765				
		3dP	28957				

0	off
1	on

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
F.Out1	r/w	base	4382	41532	Float	0...120	☐	Forcing value of the analog output. Forcing involves the external operation of an output, i.e. the instrument has no influence on this output. (Used for the operation of free outputs e.g. by a supervisory PLC.)
		1dP	12574					
		2dP	20766					
		3dP	28958					

18 Out.4

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
O.tYP	r/w	base	4470	41708	Enum	Enum_OtYP		Signal type selection OUT
		1dP	12662					
		2dP	20854					
		3dP	29046					
						0	Relay / logic	
						1	0 ... 20 mA continuous	
						2	4 ... 20 mA continuous	
						3	0...10 V continuous	
						4	2...10 V continuous	
						5	transmitter supply	
O.Act	r/w	base	4450	41668	Enum	Enum_OAct		Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.
		1dP	12642					
		2dP	20834					
		3dP	29026					
						0	direct / normally open	
						1	inverse / normally closed	
Y.1	r/w	base	4451	41670	Enum	Enum_Y1		Output function: Controller output Y1
		1dP	12643					
		2dP	20835					
		3dP	29027					
						0	not active	
						1	This output provides the controller output Y1.	
Y.2	r/w	base	4452	41672	Enum	Enum_Y2		Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
		1dP	12644					
		2dP	20836					
		3dP	29028					
						0	not active	
						1	This output provides the controller output Y2.	
Lim.1	r/w	base	4453	41674	Enum	Enum_Lim1		Output function: Signal limit 1
		1dP	12645					
		2dP	20837					
		3dP	29029					
						0	not active	
						1	The output is activated by an alarm from limit value 1.	
Lim.2	r/w	base	4454	41676	Enum	Enum_Lim2		Output function: Signal limit 2
		1dP	12646					
		2dP	20838					
		3dP	29030					
						0	not active	
						1	The output is activated by an alarm from limit value 2.	

18 Out.4

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Lim.3	r/w	base 1dP 2dP 3dP	4455 12647 20839 29031	41678	Enum	Enum_Lim3		Output function: Signal limit 3
						0	not active	
						1	The output is activated by an alarm from limit value 3.	
dAc.A	r/w	base 1dP 2dP 3dP	4456 12648 20840 29032	41680	Enum	Enum_dAcA		Output function: Signal Drive monitoring system (DAC). On all controllers with position feedback Yp, the actuator can be monitored for possible malfunctions, e.g. a motor defect or excessive play due to wear.
						0	not active	
						1	The output is switched by a DAC disturbance. Digital Actuator Control DAC is the actuator monitoring function.	
LP.AL	r/w	base 1dP 2dP 3dP	4457 12649 20841 29033	41682	Enum	Enum_OUT_LPAL		Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value has to change with an output signal of maximum value, else loop alarm is generated.
						0	not active	
						1	The loop alarm (= open loop alarm) is assigned to this output.	
HC.AL	r/w	base 1dP 2dP 3dP	4458 12650 20842 29034	41684	Enum	Enum_OUT_HCAL		Output function: Signal Heat current alarm. Either break (= current I < heating current limit) can be monitored or overload (= current I > heating current limit), dependent on configuration.
						0	not active	
						1	The heating current alarm is assigned to this output.	
HC.SC	r/w	base 1dP 2dP 3dP	4459 12651 20843 29035	41686	Enum	Enum_HCSC		Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output is switched off.
						0	not active	
						1	Output activated by an SSR fault.	
FAi.1	r/w	base 1dP 2dP 3dP	4462 12654 20846 29038	41692	Enum	Enum_FAi1		Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
						0	not active	
						1	The output sends the error message 'INP1 fault'.	
FAi.2	r/w	base 1dP 2dP 3dP	4463 12655 20847 29039	41694	Enum	Enum_FAi2		Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
						0	not active	
						1	The output sends the error message 'INP2 fault'.	

18 Out.4

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
FAi.3	r/w	base 1dP 2dP 3dP	4464 12656 20848 29040	41696	Enum	Enum_FAi3		Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.
						0	not active	
						1	The output sends the error message 'INP3 fault'.	
dP.Er	r/w	base 1dP 2dP 3dP	4475 12667 20859 29051	41718	Enum	Enum_DP_ERR		Output function: Signal Fault in the Profibus communication. This output is set when a fault in the Profibus communication occurs. There is no more communication with this device.
						0	Not active	
						1	This output sends the Profibus fault.	
Out.0	r/w	base 1dP 2dP 3dP	4471 12663 20855 29047	41710	Float	-1999...9999 ☐		Lower scaling limit of the analog output (corresponds to 0%). If current and voltage signals are used as output values, the display can be scaled to the output value in the Parameter Level. The output value of the lower scaling point is indicated in the respective electrical unit (mA / V).
Out.1	r/w	base 1dP 2dP 3dP	4472 12664 20856 29048	41712	Float	-1999...9999 ☐		Upper scaling limit of the analog output (corresponds to 100%). If current and voltage signals are used as output values, the display can be scaled to the output value in the Parameter Level. The output value of the upper scaling point is indicated in the respective electrical unit (mA / V).
O.Src	r/w	base 1dP 2dP 3dP	4473 12665 20857 29049	41714	Enum	Enum_OSrc		Signal source of the analog output (visible not with all output signal types O.TYP).
						0	not used	
						1	Controller output y1 (continuous)	
						2	Controller output y2 (continuous)	
						3	process value	
						4	The effective setpoint Weff, which is used for control. Example: The gradient changes the effective setpoint until it reaches the internal (target) setpoint.	
						5	control deviation xw (process value - set-point)= relative alarm Note: Monitoring with the effective set-point Weff. For example using a ramp it is the changing set-point, not the target set-point of the ramp.	
						6	Position feedback signal Yp.	
						7	measured value INP1	
						8	measured value INP2	
						9	measured value INP3	
O.FAI	r/w	base 1dP 2dP 3dP	4474 12666 20858 29050	41716	Enum	Enum_OFail		fail behaviour
						0	upscale	
						1	downscale	

18 Out.4

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Out2	r	base 1dP 2dP 3dP	4480 12672 20864 29056	41728	Enum	Enum_Ausgang		Status of the digital output
						0	off	
						1	on	
F.Do2	r/w	base 1dP 2dP 3dP	4481 12673 20865 29057	41730	Enum	Enum_Ausgang		Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
						0	off	
						1	on	
F.Out2	r/w	base 1dP 2dP 3dP	4482 12674 20866 29058	41732	Float	0...120	☐	Forcing value of the analog output. Forcing involves the external operation of an output, i.e. the instrument has no influence on this output. (Used for the operation of free outputs e.g. by a supervisory PLC.)

19 Out.5

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
O.Act	r/w	base 1dP 2dP 3dP	4550 12742 20934 29126	41868	Enum	Enum_OAct		Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.
						0	direct / normally open	
						1	inverse / normally closed	
Y.1	r/w	base 1dP 2dP 3dP	4551 12743 20935 29127	41870	Enum	Enum_Y1		Output function: Controller output Y1
						0	not active	
						1	This output provides the controller output Y1.	
Y.2	r/w	base 1dP 2dP 3dP	4552 12744 20936 29128	41872	Enum	Enum_Y2		Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
						0	not active	
						1	This output provides the controller output Y2.	

19 Out.5

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Lim.1	r/w	base	4553	41874	Enum	Enum_Lim1	Output function: Signal limit 1
		1dP	12745				
		2dP	20937				
		3dP	29129				
						0 not active	
						1 The output is activated by an alarm from limit value 1.	
Lim.2	r/w	base	4554	41876	Enum	Enum_Lim2	Output function: Signal limit 2
		1dP	12746				
		2dP	20938				
		3dP	29130				
						0 not active	
						1 The output is activated by an alarm from limit value 2.	
Lim.3	r/w	base	4555	41878	Enum	Enum_Lim3	Output function: Signal limit 3
		1dP	12747				
		2dP	20939				
		3dP	29131				
						0 not active	
						1 The output is activated by an alarm from limit value 3.	
dAc.A	r/w	base	4556	41880	Enum	Enum_dAcA	Output function: Signal Drive monitoring system (DAC). On all controllers with position feedback Yp, the actuator can be monitored for possible malfunctions, e.g. a motor defect or excessive play due to wear.
		1dP	12748				
		2dP	20940				
		3dP	29132				
						0 not active	
						1 The output is switched by a DAC disturbance. Digital Actuator Control DAC is the actuator monitoring function.	
LP.AL	r/w	base	4557	41882	Enum	Enum_OUT_LPAL	Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value has to change with an output signal of maximum value, else loop alarm is generated.
		1dP	12749				
		2dP	20941				
		3dP	29133				
						0 not active	
						1 The loop alarm (= open loop alarm) is assigned to this output.	
HC.AL	r/w	base	4558	41884	Enum	Enum_OUT_HCAL	Output function: Signal Heat current alarm. Either break (= current I < heating current limit) can be monitored or overload (= current I > heating current limit), dependent on configuration.
		1dP	12750				
		2dP	20942				
		3dP	29134				
						0 not active	
						1 The heating current alarm is assigned to this output.	
HC.SC	r/w	base	4559	41886	Enum	Enum_HCSC	Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output is switched off.
		1dP	12751				
		2dP	20943				
		3dP	29135				
						0 not active	
						1 Output activated by an SSR fault.	

19 Out.5

- ### ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
FAi.1	r/w	base 1dP 2dP 3dP	4562 12754 20946 29138	41892	Enum	Enum_FAi1	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
						0 not active	
						1 The output sends the error message 'INP1 fault'.	
FAi.2	r/w	base 1dP 2dP 3dP	4563 12755 20947 29139	41894	Enum	Enum_FAi2	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
						0 not active	
						1 The output sends the error message 'INP2 fault'.	
FAi.3	r/w	base 1dP 2dP 3dP	4564 12756 20948 29140	41896	Enum	Enum_FAi3	Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.
						0 not active	
						1 The output sends the error message 'INP3 fault'.	
dP.Er	r/w	base 1dP 2dP 3dP	4575 12767 20959 29151	41918	Enum	Enum_DP_ERR	Output function: Signal Fault in the Profibus communication. This output is set when a fault in the Profibus communication occurs. There is no more communication with this device.
						0 Not active	
						1 This output sends the Profibus fault.	

- ### Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Out3	r	base 1dP 2dP 3dP	4580 12772 20964 29156	41928	Enum	Enum_Ausgang	Status of the digital output
						0 off	
						1 on	
F.Do3	r/w	base 1dP 2dP 3dP	4581 12773 20965 29157	41930	Enum	Enum_Ausgang	Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
						0 off	
						1 on	

20 Out.6

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.Act	r/w	base 1dP 2dP 3dP	4650 12842 21034 29226	42068	Enum	Enum_OAct	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.
						0 direct / normally open	
						1 inverse / normally closed	
Y.1	r/w	base 1dP 2dP 3dP	4651 12843 21035 29227	42070	Enum	Enum_Y1	Output function: Controller output Y1
						0 not active	
						1 This output provides the controller output Y1.	
Y.2	r/w	base 1dP 2dP 3dP	4652 12844 21036 29228	42072	Enum	Enum_Y2	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
						0 not active	
						1 This output provides the controller output Y2.	
Lim.1	r/w	base 1dP 2dP 3dP	4653 12845 21037 29229	42074	Enum	Enum_Lim1	Output function: Signal limit 1
						0 not active	
						1 The output is activated by an alarm from limit value 1.	
Lim.2	r/w	base 1dP 2dP 3dP	4654 12846 21038 29230	42076	Enum	Enum_Lim2	Output function: Signal limit 2
						0 not active	
						1 The output is activated by an alarm from limit value 2.	
Lim.3	r/w	base 1dP 2dP 3dP	4655 12847 21039 29231	42078	Enum	Enum_Lim3	Output function: Signal limit 3
						0 not active	
						1 The output is activated by an alarm from limit value 3.	
dAc.A	r/w	base 1dP 2dP 3dP	4656 12848 21040 29232	42080	Enum	Enum_dAcA	Output function: Signal Drive monitoring system (DAC). On all controllers with position feedback Yp, the actuator can be monitored for possible malfunctions, e.g. a motor defect or excessive play due to wear.
						0 not active	
						1 The output is switched by a DAC disturbance. Digital Actuator Control DAC is the actuator monitoring function.	

20 Out.6

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
LP.AL	r/w	base	4657	42082	Enum	Enum_OUT_LPAL	Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value has to change with an output signal of maximum value, else loop alarm is generated.
		1dP	12849				
		2dP	21041				
		3dP	29233				

	0	not active
	1	The loop alarm (= open loop alarm) is assigned to this output.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
HC.AL	r/w	base	4658	42084	Enum	Enum_OUT_HCAL	Output function: Signal Heat current alarm. Either break (= current I < heating current limit) can be monitored or overload (= current I > heating current limit), dependent on configuration.
		1dP	12850				
		2dP	21042				
		3dP	29234				

	0	not active
	1	The heating current alarm is assigned to this output.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
HC.SC	r/w	base	4659	42086	Enum	Enum_HCSC	Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output is switched off.
		1dP	12851				
		2dP	21043				
		3dP	29235				

	0	not active
	1	Output activated by an SSR fault.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
FAi.1	r/w	base	4662	42092	Enum	Enum_FAi1	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
		1dP	12854				
		2dP	21046				
		3dP	29238				

	0	not active
	1	The output sends the error message 'INP1 fault'.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
FAi.2	r/w	base	4663	42094	Enum	Enum_FAi2	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
		1dP	12855				
		2dP	21047				
		3dP	29239				

	0	not active
	1	The output sends the error message 'INP2 fault'.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
FAi.3	r/w	base	4664	42096	Enum	Enum_FAi3	Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.
		1dP	12856				
		2dP	21048				
		3dP	29240				

	0	not active
	1	The output sends the error message 'INP3 fault'.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
dP.Er	r/w	base	4675	42118	Enum	Enum_DP_ERR	Output function: Signal Fault in the Profibus communication. This output is set when a fault in the Profibus communication occurs. There is no more communication with this device.
		1dP	12867				
		2dP	21059				
		3dP	29251				

	0	Not active
	1	This output sends the Profibus fault.

- ## Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Out4	r	base 1dP 2dP 3dP	4680 12872 21064 29256	42128	Enum	Enum_Ausgang		Status of the digital output
						0	off	
						1	on	
F.Do4	r/w	base 1dP 2dP 3dP	4681 12873 21065 29257	42130	Enum	Enum_Ausgang		Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
						0	off	
						1	on	

21 PAr.2

- ## PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Pb12	r/w	base 1dP 2dP 3dP	5030 13222 21414 29606	42828	Float	0,1...9999	☐	Proportional band 1 (heating) in engineering unit (e.g. °C) of the 2nd parameter set. The Pb defines the ratio between output value and control deviation. The smaller the value of Pb is, the stronger is the control response for a specific control deviation. Too large and too small values for Pb lead to process oscillations (hunting).
Pb22	r/w	base 1dP 2dP 3dP	5031 13223 21415 29607	42830	Float	0,1...9999	☐	Proportional band 2 (cooling) in engineering unit (e.g. °C) of the 2nd parameter set. The Pb defines the ratio between output value and control deviation. The smaller the value of Pb is, the stronger is the control response for a specific control deviation. Too large and too small values for Pb lead to process oscillations (hunting).
ti22	r/w	base 1dP 2dP 3dP	5033 13225 21417 29609	42834	Float	0...9999	☑	Integral action time 2 (cooling) [s]. Second parameter set. Ti is the time constant of the integral portion. The smaller Ti is, the faster is the response of the integral action. Ti too small: Control tends to oscillate. Ti too large: Control is sluggish and needs a long time to line out.
ti12	r/w	base 1dP 2dP 3dP	5032 13224 21416 29608	42832	Float	0...9999	☑	Integral action time 1 (heating) [s]. Second parameter set. Ti is the time constant of the integral portion. The smaller Ti is, the faster is the response of the integral action. Ti too small: Control tends to oscillate. Ti too large: Control is sluggish and needs a long time to line out.
td12	r/w	base 1dP 2dP 3dP	5034 13226 21418 29610	42836	Float	0...9999	☑	Derivative action time 1 (heating) [s], second parameter set. Td is the time constant of the derivative portion. The faster the process value changes, and the larger the value of Td is, the stronger will be the derivative action. Td too small: Very little derivative action. Td too large: Control tends to oscillate.

21 PAr.2

● PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
td22	r/w	base 1dP 2dP 3dP	5035 13227 21419 29611	42838	Float	0...9999	☑	Derivative action time 2 (cooling) [s], second parameter set. Td is the time constant of the derivative portion. The faster the process value changes, and the larger the value of Td is, the stronger will be the derivative action. Td too small: Very little derivative action. Td too large: Control tends to oscillate.

22 SEtP

● PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
SP.LO	r/w	base 1dP 2dP 3dP	3100 11292 19484 27676	38968	Float	-1999...9999	☐	Lower setpoint limit. The setpoint is raised to this value automatically, if a lower setpoint is adjusted. BUT: The (safety) setpoint W2 is not restricted by the setpoint limits! The setpoint reserve for the step function is 10% of SPHi - SPLo.
SP.Hi	r/w	base 1dP 2dP 3dP	3101 11293 19485 27677	38970	Float	-1999...9999	☐	Upper setpoint limit. The setpoint is reduced to this value automatically, if a higher setpoint is adjusted. BUT: The (safety) setpoint W2 is not restricted by the setpoint limits! The setpoint reserve for the step function is 10% of SPHi - SPLo.
SP.2	r/w	base 1dP 2dP 3dP	3102 11294 19486 27678	38972	Float	-1999...9999	☐	Second (safety) setpoint. Ramp function as with other setpoints (effective, external). However, SP2 is not restricted by the setpoint limits.
r.SP	r/w	base 1dP 2dP 3dP	3103 11295 19487 27679	38974	Float	0,01...9999	☑	Setpoint gradient [/min] or ramp. Max. rate of change in order to avoid step changes of the setpoint. The gradient acts in the positive and negative directions. Note for self-tuning: with activated gradient function, the setpoint gradient is started from the process value, so that there is no sufficient setpoint reserve.

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
SP.EF	r	base 1dP 2dP 3dP	3170 11362 19554 27746	39108	Float	-1999...9999	☐	Effective setpoint. The value reached at the end of setpoint processing, after taking W2, external setpoint, gradient, boost function, programmer settings, start-up function, and limit functions into account. Comparison with the effective process value leads to the control deviation, from which the necessary controller response is derived.
Diff	r	base 1dP 2dP 3dP	3171 11363 19555 27747	39110	Float	-1999...9999	☐	Difference between the effective setpoint and setpoint 2.

22 SEtP

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
SP	r/w	base	3180	39128	Float	-1999...9999	☐	Setpoint for the interface (without the additional function 'Controller off'). SetpInterface acts on the internal setpoint before the setpoint processing stage. Note: The value in RAM is always updated. To protect the EEPROM, storage of the value in the EEPROM is timed (at least one value per half hour).
		1dP	11372					
		2dP	19564					
		3dP	27756					
SP.d	r/w	base	3181	39130	Float	-1999...9999	☐	The effective setpoint is shifted by this value. In this way, the setpoints of several controllers can be shifted together, regardless of the individually adjusted effective setpoints.
		1dP	11373					
		2dP	19565					
		3dP	27757					

23 Tool

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
U.LinT	r/w	base	634	34036	Enum	Enum_Unit	Engineering unit of linearization table (temperature).
		1dP	8826				
		2dP	17018				
		3dP	25210				

0	without unit
1	°C
2	°F

Code Table

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1 Cntr

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP.Fn	r/w	base	3150	39068	Enum	Enum_SPFN	Basic configuration for setpoint processing, e.g. 'setpoint controller switchable to external setpoint'. Configuration of special, controller-dependent setpoint functions.
		1dP	11342				
		2dP	19534				
		3dP	27726				

0		set-point controller can be switched over to external set-point (->LOGI/SP.E)
1		Program controller for setpoint profile. The program profile is definable by the user.
8		Setpoint controller switchable to setpoint controller with external setpoint shift (switchable -> LOGI/SP.E).
9		Program controller switchable to program controller with external setpoint shift. (program controller for setpoint profile, the profile can be defined by the user, switchable -> LOGI/SP.E)

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
C.tYP	r/w	base	5062	42892	Enum	Enum_CtYP	The process value can be assigned directly to an input value, but it can also be computed from the comparison of two input values. For this, various formulas are provided for the user, e.g. the difference or the ratio of the two input values.
		1dP	13254				
		2dP	21446				
		3dP	29638				

0		Standard controller (process value = x1)
1		Ratio controller (x1+oFFS)/x2. An offset is added to the input value x1, and then the ratio is calculated from the result and the input value x2. This ratio is used as process value.
2		The process value is calculated as the difference of the two values (x1 - x2).
3		Maximum value of x1 and x2. The higher value is used for control. In case of a sensor fault, control is continued with the remaining process value.
4		Minimum value of x1 and x2. The lower value is used for control. In case of a sensor fault, control is continued with the remaining process value.
5		Mean value (x1 + x2) / 2. In case of a sensor fault, control is continued with the remaining process value.
6		Switchover between the input values: process value = x1 or process value = x2.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
C.Fnc	r/w	base	5050	42868	Enum	Enum_CFnc	Control behaviour (algorithm) referred to output value: e.g. 2- or 3-point controller, signaller, 3-point stepping control.
		1dP	13242				
		2dP	21434				
		3dP	29626				

0		on/off controller or signaller with one output. The on/off controller or signaller switches if the process value drifts from the setpoint more than the hysteresis.
1		PID control, e.g. heating, with one output: Switched as a digital output (2-point) or used as an analog output (continuous). PID controllers respond quickly to changes of the control deviation, and typically do not exhibit any permanent control offset.
2		D / Y / Off, or 2-point controller with partial/full load switch-over. 2 digital outputs: Y1 is the switching output and Y2 is the changeover contact for D/Y.
3		2 x PID control, e.g. heating/cooling. Two outputs: Switched as a digital output (3-point) or used as an analog output (continuous). PID controllers respond quickly to changes of the control deviation, and typically do not exhibit any permanent control offset.
4		3-point stepping controller, e.g. for motor actuators. Two digital outputs. No actuating pulses are generated when the process is lined out.
5		3-point stepping controller with position feedback signal Yp, e.g. for motorized valves. Two digital outputs. No output signals are generated when the process is lined out. The position feedback signal Yp serves for displaying the actuator position, but also for monitoring the actuator if the DAC function (Digital Actuator Control) is provided.
6		continuous controller with integrated positioner. This is basically a cascade. A tracking controller with three-point stepping behaviour which operates with Yp as process value is used with the continuous controller.

1 Cntr

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
mAn	r/w	base	5051	42870	Enum	Enum_mAn		Enables the output value to be adjusted in manual operation. If adjustment is not enabled, the output value cannot be changed in manual operation, neither with the front keys nor via the interface.Note: This setting does not affect the auto/manual switchover function.
		1dP	13243					
		2dP	21435					
		3dP	29627					
						0		The output value cannot be changed in manual operation, neither with the front keys nor via the interface.
						1		The output value is to be adjusted in manual operation (see also LOGI/mAn).
C.Act	r/w	base	5052	42872	Enum	Enum_CAct		Operating sense of the controller. Inverse operation (e.g. heating) means increased heat input when the process value falls. Direct operation (e.g. cooling) means increased heat input when the process value increases.
		1dP	13244					
		2dP	21436					
		3dP	29628					
						0		Inverse or opposed-sense response, e.g. heating. The controller output is increased with a falling process value, and decreased with a rising process value.
						1		Direct or same-sense response, e.g. cooling. The controller output is increased with a rising process value, and decreased with a falling process value.
FAIL	r/w	base	5053	42874	Enum	Enum_FAIL		With the sensor break response, the operator determines the instrument's reaction to a sensor break, thus ensuring a safe process condition.
		1dP	13245					
		2dP	21437					
		3dP	29629					
						0		controller outputs switched off
						1		y = parameter Y2 (Caution: fixed parameter Y2, not controller output Y2!). Note for three-point stepping controller: With Y2 < 0.01 CLOSED is set (DY= -100%), with 0.01 =< Y2 =< 99.9 no output is set (DY=0%), with Y2 > 99.9 OPEN is set (DY= +100%). Note for signallers: With Y2 < 0.01 OFF is set, with 0.01 =< Y2 =< 99.9 status keeps unchanged, with Y2 > 99.9 ON is set.
						2		y = mean output. The maximum permissible output can be adjusted with parameter Ym.H. To prevent determination of inadmissible values, mean value formation is only if the control deviation is lower than parameter L.Ym.
rnG.L	r/w	base	5059	42886	Float	-1999...9999 ☐		Lower limit for the controller's operating range. The control range is independent of the measurement range. Reducing the control range will increase the sensitivity of the self-tuning process.
		1dP	13251					
		2dP	21443					
		3dP	29635					
rnG.H	r/w	base	5060	42888	Float	-1999...9999 ☐		Upper limit for the controller's operating range. The control range is independent of the measurement range. Reducing the control range will increase the sensitivity of the self-tuning process.
		1dP	13252					
		2dP	21444					
		3dP	29636					
CYCL	r/w	base	5055	42878	Enum	Enum_CYCL		Duty cycle for 2-point and 3-point controllers. Internally, the controller calculates a continuous output value, which is converted into switching pulses for digital outputs. The user can adapt the setting to calculate various duty cycles (on/off ratio).
		1dP	13247					
		2dP	21439					
		3dP	29631					
						0		Standard. 'Bathtub curve'. The adjusted duty cycles t1 and t2 are valid for ± 50% control output. With very small and very large control outputs, the effective duty cycle is increased sufficiently to prevent nonsensically short operating pulses. The shortest pulses are limited to ¼ of t1 and ¼ of t2.
						3		With constant pulses for heating and cooling. The adjusted duty cycles t1 and t2 are maintained over the entire output range. The parameter tp is used to adjust the minimum pulse duration. Shorter pulses are added internally until a pulse of length tp can be generated.

1 Cntr

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
tunE	r/w	base	5056	42880	Enum	Enum_tune	Self-tuning procedure / sequence. Choice between:step response tuning during start-up and pulse response tuning at setpoint; or pulse response tuning during start-up and at setpoint; or only step response tuning during start-up, and no tuning at setpoint (no pulse).
		1dP	13248				
		2dP	21440				
		3dP	29632				

0	At start-up with step function, impulse function at setpoint. The step function at start up requires a control deviation of more than 10% of the control range. At setpoint, with control deviation less than 10% of the control range, tuning is done with the impulse function.
1	At start-up with impulse function. Setting for fast controlled systems (e.g. hot runner control). Always tuning with impulse function. At start up, with a control deviation of more than 10% of the control range, the control loop is optimized for a wide control range. At set-point the control deviation during self-tuning is small.
2	At start up and at set-point always tune step function at start up. Tuning is done with step function at start up, regardless of the control deviation.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Strt	r/w	base	5057	42882	Enum	Enum_Strt	Start of self-tuning. Self-tuning can always be started manually at the request of the operator. Here, it is possible to determine that self-tuning is started automatically under the following conditions: On power-up or when an oscillation of the process value is detected.
		1dP	13249				
		2dP	21441				
		3dP	29633				

0	no automatic start (manual start via front interface)
1	Manual or automatic start of auto-tuning at power on or when oscillating is detected (oscillating of process value by more than ± 0.5% of the control range, and simultaneously the output value by more than 20%.) Note: Though the process is unchanged, at power on always the (time-consuming) auto-tuning is started.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Adt0	r/w	base	5061	42890	Enum	Enum_Adt0	Optimization of the switching cycles t1 and t2 for the DED conversion can be disabled here. In order to fine-tune the positioning action, the switching periods are changed by the self-tuning function, if automatic tuning is configured.
		1dP	13253				
		2dP	21445				
		3dP	29637				

0	The cycle duration is determinated by auto-tuning. Thereby the best controlling results are obtained.
1	The cycle duration is not determinated by auto-tuning. An oversized cycle duration causes bad control behavior. An undersized cycle duration causes a more frequent switching, which can raise the wearout of mechanical actuators (relay, contactor).

● PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Pb1	r/w	base	5000	42768	Float	1...9999	☐	Proportional band 1 (heating) in engineering unit, e.g. °C. Pb defines the relationship between controller output and control deviation. The smaller Pb is, the stronger is the control action for a given control deviation. If Pb is too large or too small, the control loop will oscillate (hunting).
		1dP	13192					
		2dP	21384					
		3dP	29576					
Pb2	r/w	base	5001	42770	Float	1...9999	☐	Proportional band 2 (cooling) in engineering units, e.g. °C. Pb defines the relationship between controller output and control deviation. The smaller Pb is, the stronger is the control action for a given control deviation. If Pb is too large or too small, the control loop will oscillate (hunting).
		1dP	13193					
		2dP	21385					
		3dP	29577					

1 Cntr

• PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
ti1	r/w	base	5002	42772	Float	1...9999	☑	Integral action time 1 (heating) [s]. Ti is the time constant of the integral portion. The smaller Ti is, faster is the response of the integral action. Ti too small: Control tends to oscillate. Ti too large: Control is sluggish and needs a long time to line out.
		1dP	13194					
		2dP	21386					
		3dP	29578					
ti2	r/w	base	5003	42774	Float	1...9999	☑	Integral action time 2 (cooling) [s]. Ti is the time constant of the integral portion. The smaller Ti is, faster is the response of the integral action. Ti too small: Control tends to oscillate. Ti too large: Control is sluggish and needs a long time to line out.
		1dP	13195					
		2dP	21387					
		3dP	29579					
td1	r/w	base	5004	42776	Float	1...9999	☑	Derivative action time 1 (heating) [s], second parameter set. Td is the time constant of the derivative portion. The faster the process value changes, and the larger the value of Td is, the stronger will be the derivative action. Td too small: Very little derivative action. Td too large: Control tends to oscillate.
		1dP	13196					
		2dP	21388					
		3dP	29580					
td2	r/w	base	5005	42778	Float	1...9999	☑	Derivative action time 2 (cooling) [s], second parameter set. Td is the time constant of the derivative portion. The faster the process value changes, and the larger the value of Td is, the stronger will be the derivative action. Td too small: Very little derivative action. Td too large: Control tends to oscillate.
		1dP	13197					
		2dP	21389					
		3dP	29581					
t1	r/w	base	5006	42780	Float	0,4...9999	☐	Minimum duty cycle 1 (heating) [s]. With the standard duty cycle converter, the shortest pulse duration is 1/4 x t1. If the duty cycle is not to be optimized, this must be entered in the configuration. (Default: Optimization of the duty cycle during self-tuning, but also if the output value is less than 5%).
		1dP	13198					
		2dP	21390					
		3dP	29582					
t2	r/w	base	5007	42782	Float	0,4...9999	☐	Minimum duty cycle 2 (cooling) [s]. With the standard duty cycle converter, the shortest pulse duration is 1/4 x t1. If the duty cycle is not to be optimized, this must be entered in the configuration. (Default: Optimization of the duty cycle during self-tuning, but also if the output value is less than 5%).
		1dP	13199					
		2dP	21391					
		3dP	29583					
SH	r/w	base	5014	42796	Float	0...9999	☐	Neutral zone, or switching difference of the signaller [engineering unit].Too small: unnecessarily high switching frequency.Too large: reduced controller sensitivity.With 3-point controllers this slows down the direct transition from heating to cooling. With 3-point stepping controllers, it reduces the switching operations of the actuator around setpoint.
		1dP	13206					
		2dP	21398					
		3dP	29590					
d.SP	r/w	base	5016	42800	Float	-1999...9999	☐	Separation of the D / Y switch-over point from the setpoint [engineering unit]. With a significant control deviation heating start is in delta connection. When the control deviation increases, the instrument switches over to reduced power (Y connection) for line-out to the set-point.
		1dP	13208					
		2dP	21400					
		3dP	29592					
tP	r/w	base	5009	42786	Float	0,1...9999	☑	Minimum pulse duration [s]. Used for switching with constant periods. For positioning values that require a shorter pulse than adjusted for 'tp', the output is suppressed, but 'remembered'. The controller continues adding the internal short pulses until a value equal to 'tp' can be output.
		1dP	13201					
		2dP	21393					
		3dP	29585					

1 Cntr

● PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
tt	r/w	base 1dP 2dP 3dP	5015 13207 21399 29591	42798	Float	3...9999	☐	Travel time of the actuator motor [s]. If no feedback signal is available, the controller calculates the actuator position by means of an integrator and the adjusted motor travel time. For this reason, a precise definition of the motor travel time between min and max (0% and 100%) is important.
Y.Lo	r/w	base 1dP 2dP 3dP	5018 13210 21402 29594	42804	Float	-105...105	☐	Lower output limit [%] The range is depedant of the type of controller: 2 point controller: 0...ymax+1 3 point controller: -105 ymax-1
Y.Hi	r/w	base 1dP 2dP 3dP	5019 13211 21403 29595	42806	Float	-105...105	☐	Upper output limit [%] The range is ymin+1 105
Y2	r/w	base 1dP 2dP 3dP	5017 13209 21401 29593	42802	Float	-100...100	☐	Second positioning value [%]. Activated Y2 = positioner control. Caution: The parameter 'positioning output Y2' must not be confused with the controller output Y2!
Y.0	r/w	base 1dP 2dP 3dP	5020 13212 21404 29596	42808	Float	-105...105	☐	Offset for die positioning value [%]. This is added to the controller output, and has the most effect with P and PD controllers. (With PID controllers, the effect is compensated by the integral action.) With a control deviation = 0, the P controller generates a control output Y0.
Ym.H	r/w	base 1dP 2dP 3dP	5021 13213 21405 29597	42810	Float	-105...105	☐	Limit for the mean control output value Ym in case of sensor break [%]. The mean control output value is configurable as the response to sensor break. The maximum mean output value = YmH.
L.Ym	r/w	base 1dP 2dP 3dP	5022 13214 21406 29598	42812	Float	1...9999	☐	Max. control deviation (xw), at the start of mean value calculation [engineering unit]. When calculating the mean value, data are only taken into account if the control deviation is small enough. 'Lym' is a preset value that determines how precisely the calculated output value is matched to the setpoint.
oFFS	r/w	base 1dP 2dP 3dP	5024 13216 21408 29600	42816	Float	-120...120	☐	Zero point for ratio control. For a given value of X2 (e.g. airflow quantity) the ratio controller changes the corresponding value of X1 (e.g. gas flow quantity), until the required ratio is reached.
HYS.L	r/w	base 1dP 2dP 3dP	5028 13220 21412 29604	42824	Float	0...9999	☐	Switching hysteresis below the setpoint of the signaller [engineering unit].
HYS.H	r/w	base 1dP 2dP 3dP	5029 13221 21413 29605	42826	Float	0...9999	☐	Switching hysteresis above the setpoint of the signaller [engineering unit].

1 Cntr

● Signal

Name	r/w	Adr. Integer	real	Typ	Value/off		Description
C.InP	r	base 5102 1dP 13294 2dP 21486 3dP 29678	42972	Float	-1999...9999	☐	process value
Tu2	r	base 5145 1dP 13337 2dP 21529 3dP 29721	43058	Float	0...9999	☐	'Cooling' delay time of the loop. Tu is calculated by the self-tuning function: It is the time delay before the process reacts significantly. In effect, Tu is a dead time that is determined by the reaction of the process to a change of the control output. It is used for defining controller action.
Vmax2	r	base 5146 1dP 13338 2dP 21530 3dP 29722	43060	Float	0...9999	☐	Max. rate of change for 'cooling', i.e. the fastest process value increase during self-tuning. Vmax is calculated by the self-tuning function, and is determined by the reaction of the process to a change of the control output. It is used for defining controller action.
Kp2	r	base 5147 1dP 13339 2dP 21531 3dP 29723	43062	Float	0...9999	☐	Process gain for 'cooling'. For control loops with self-regulation, process gain is the ratio determined by the change of the control output and the resulting permanent change of the process value. Kp is calculated by the self-tuning function, and is used for defining controller action.

1 Cntr

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
St.Cntr	r	base 1dP 2dP 3dP	5100 13292 21484 29676	42968	Int	0...65535	☐	Status informations of the controller.f.e. switching signals, controller off or informations about selftuning. The controller sratus shows the actual adjustments of the controller.

Bit 0: Switching signal heating: 0: off 1: on
Bit 1: Switching signal cooling: 0: off 1: on
Bit 2: Sensor error 0: ok 1: error
Bit 3: Controlsignal: Manual/automatic
     0: automatic 1: manual
Bit 4: Controlsignal: Y2
     0: Y2 not activ 1: Y2 activ
Bit 5: Controlsignal: Ext. setting of outputsignal
     0: not activ 1: activ
Bit 6: Controlsignal: Controller off
     0: contr. on 1: contr. off
Bit 7: Controlsignal:The activ parameter set
     0: parameterset 1
     1: parameterset 2
Bit 8: Loopalarm
     0: no alarm
     1: alarm
Bit 9: Soft start function
     0: not activ
     1: activ
Bit 10: Rate to setpoint
     0: not activ
     1: activ
Bit 11: Not used
Bit 12-15: Internal functional statuses (operating state)
0 0 0 0 Automatic
0 0 0 1 Selftuning is running
0 0 1 0 Selftuning faulty
     (Waiting for operator signal)
0 0 1 1 Sensor error
0 1 0 0 Not used
0 1 0 1 Manual
0 1 1 1 Not used
1 0 0 0 Manual, with external presetting of the outputsignal
1 0 0 1 Outputs switched off (neutral)
1 0 1 0 Abortion of the selftuning (by control- or error-signal)

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
diFF	r	base 1dP 2dP 3dP	5104 13296 21488 29680	42976	Float	-1999...9999	☐	Control deviation, is defined as process value minus setpoint. Positive Xw means that the process value is above the setpoint. A small control deviation indicates precise control.
POS	r	base 1dP 2dP 3dP	5105 13297 21489 29681	42978	Float	0...100	☐	The position feedback Yp shows the actuator position with 3-point stepping controllers. If Yp is outside the limits Ymin and Ymax, the output of positioning pulses is suppressed.
Tu1	r	base 1dP 2dP 3dP	5141 13333 21525 29717	43050	Float	0...9999	☐	'Heating' delay time of the loop. Tu is calculated by the self-tuning function: It is the time delay before the process reacts significantly. In effect, Tu is a dead time that is determined by the reaction of the process to a change of the control output. It is used for defining controller action.

1 Cntr

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Ypid	r	base 1dP 2dP 3dP	5103 13295 21487 29679	42974	Float	-120...120 ☐	Output value Ypid is the output signal determined by the controller, and from which the switching pulses for the digital and analog control outputs are calculated. Ypid is also available as an analog signal. e.g. for visualization.
Ada.St	r/w	base 1dP 2dP 3dP	5150 13342 21534 29726	43068	Enum	Enum_AdaStart	Starting / stopping the self-tuning function.After the start signal, the controller waits until the process reaches a stable condition (PIR) before it starts the self-tuning process. Self-tuning can be aborted manually at any time. After a successful self-tuning attempt, the controller automatically resumes normal operation.
						0	'Stop' will abort the self-tuning process, and the controller returns to normal operation with the previous parameter settings.
						1	Start of the self-tuning process is possible during manual or automatic controller operation.
Yman	r/w	base 1dP 2dP 3dP	5151 13343 21535 29727	43070	Float	-110...110 ☐	Absolute preset output value, which is used as output value during manual operation. Caution: With 3-point stepping controllers, Yman (evaluated the same as Dyman) is added to the actual output value as a relative shift.
dYman	r/w	base 1dP 2dP 3dP	5152 13344 21536 29728	43072	Float	-220...220 ☐	Differential preset output value, which is added to the actual output value during manual operation. Negative values reduce the output.
Yinc	r/w	base 1dP 2dP 3dP	5153 13345 21537 29729	43074	Enum	Enum_YInc	Increasing the output value. There are two speeds: 40 s or 10 s for the change from 0 % to 100 %. Note: The 3-point stepping controller translates the increments as UP.
						0	Not active
						1	increment output
Ydec	r/w	base 1dP 2dP 3dP	5154 13346 21538 29730	43076	Enum	Enum_YDec	Decreasing the output value. There are two speeds: 40 s or 10 s for the change from 0 % to 100 %. Note: The 3-point stepping controller translates the increments as DOWN.
						0	Not active
						1	decrement output
SP.EF	r	base 1dP 2dP 3dP	5101 13293 21485 29677	42970	Float	-1999...9999 ☐	Effective setpoint. The value reached at the end of setpoint processing, after taking W2, external setpoint, gradient, boost function, programmer settings, start-up function, and limit functions into account. Comparison with the effective process value leads to the control deviation, from which the necessary controller response is derived.

1 Cntr

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
St.Tune	r	base	5140	43048	Int	0...65535	☐	Status information during self-tuning, e.g. the actual condition, and possible results, warnings, and error messages.
		1dP	13332					
		2dP	21524					
		3dP	29716					

<div style="background-color: #ffffcc">

Bit 0 Process lined out; 0 = No; 1 = Yes
Bit 1 Operating mode 'Self-tuning controller; 0 = Off; 1 = On
Bit 2 Result of controller self-tuning; 0 = OK; 1 = Fault
Bit 3 - 7 Not used
Bit 8 - 11 Result of the 'heating' attempt
0 0 0 0 No message / Attempt still running
0 0 0 1 Successful
0 0 1 0 Successful, with risk of exceeded setpoint
0 0 1 1 Error: Wrong operating sense
0 1 0 0 Error: No response from process
0 1 0 1 Error: Turning point too low
0 1 1 0 Error: Risk of exceeded setpoint
0 1 1 1 Error: Step output too small
1 0 0 0 Error: Setpoint reserve too small
Bit 12 - 15 Result of 'cooling' attempt (same as heating attempt)

</div>

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Vmax1	r	base	5142	43052	Float	0...9999	☐	Max. rate of change for 'heating', i.e. the fastest process value increase during self-tuning. Vmax is calculated by the self-tuning function, and is determined by the reaction of the process to a change of the control output. It is used for defining controller action.
		1dP	13334					
		2dP	21526					
		3dP	29718					
Kp1	r	base	5143	43054	Float	0...9999	☐	Process gain for 'heating'. For control loops with self-regulation, process gain is the ratio determined by the change of the control output and the resulting permanent change of the process value. Kp is calculated by the self-tuning function, and is used for defining controller action.
		1dP	13335					
		2dP	21527					
		3dP	29719					

1 Cntr

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Msg2	r	base 1dP 2dP 3dP	5148 13340 21532 29724	43064	Enum	Enum_Msg	The result of self-tuning for 'cooling' indicates whether self-tuning was successful, and with what result.

0	No message / Tuning attempt still running
1	Self-tuning has been completed successfully. The new parameters are valid.
2	Self-tuning was successful, but with a warning. The new parameters are valid. Note: Self-tuning was aborted due to the risk of an exceeded setpoint, but useful parameters were determined. Possibly repeat the attempt with an increased setpoint reserve.
3	The process reacts in the wrong direction. Possible remedy: Reconfigure the controller (inverse <-> direct). Check the controller output sense (inverse <-> direct).
4	No response from the process. Perhaps the control loop is open. Possible remedy: Check sensor, connections, and process.
5	The process value turning point of the step response is too low. Possible remedy: Increase the permitted step output range, i.e. increase the parameter Y.Hi ('heating') or reduce the parameter Y.Lo ('cooling').
6	Self-tuning was aborted due to the risk of an exceeded setpoint. No useful parameters were determined. Possible remedy: Repeat the attempt with an increased setpoint reserve.
7	The step output change is not large enough (minimum change > 5 %). Possible remedy: Increase the permitted step output range, i.e. increase the parameter Y.Hi ('heating') or reduce the parameter Y.Lo ('cooling').
8	The controller is waiting. Setpoint reserve must be given before generating the step output change. Acknowledgment of this error message leads to switch-over to automatic mode. If self-tuning shall be continued, change set-point, change process value, or decrease set-point range.
9	Impulse tuning failed. No useful parameters were determined. The control loop is perhaps not closed: check sensor, connections and process.

● Signal

1 Cntr

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Msg1	r	base 1dP 2dP 3dP	5144 13336 21528 29720	43056	Enum	Enum_Msg	The result of self-tuning for 'heating' indicates whether self-tuning was successful, and with what result.

0	No message / Tuning attempt still running
1	Self-tuning has been completed successfully. The new parameters are valid.
2	Self-tuning was successful, but with a warning. The new parameters are valid. Note: Self-tuning was aborted due to the risk of an exceeded setpoint, but useful parameters were determined. Possibly repeat the attempt with an increased setpoint reserve.
3	The process reacts in the wrong direction. Possible remedy: Reconfigure the controller (inverse <-> direct). Check the controller output sense (inverse <-> direct).
4	No response from the process. Perhaps the control loop is open. Possible remedy: Check sensor, connections, and process.
5	The process value turning point of the step response is too low. Possible remedy: Increase the permitted step output range, i.e. increase the parameter Y.Hi ('heating') or reduce the parameter Y.Lo ('cooling').
6	Self-tuning was aborted due to the risk of an exceeded setpoint. No useful parameters were determined. Possible remedy: Repeat the attempt with an increased setpoint reserve.
7	The step output change is not large enough (minimum change > 5 %). Possible remedy: Increase the permitted step output range, i.e. increase the parameter Y.Hi ('heating') or reduce the parameter Y.Lo ('cooling').
8	The controller is waiting. Setpoint reserve must be given before generating the step output change. Acknowledgment of this error message leads to switch-over to automatic mode. If self-tuning shall be continued, change set-point, change process value, or decrease set-point range.
9	Impulse tuning failed. No useful parameters were determined. The control loop is perhaps not closed: check sensor, connections and process.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
YGrw	r/w	base 1dP 2dP 3dP	5155 13347 21539 29731	43078	Enum	Enum_YGrwLs	Gradient of Y-variation 'slow' or 'fast'. Changes the positioning output speed. There are two speeds for output variation: from 0% to 100% in 40s or in 10s.

0	Slow change of Y, from 0% to 100% in 40 seconds.
1	Fast change of Y, from 0% to 100% in 10 seconds.

2 InP.1

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
I.Fnc	r/w	base	167	33102	Enum	Enum_IFnc	Selection of the function assigned to the value at INP1, e.g. value at INP1 is the external setpoint.
		1dP	8359				
		2dP	16551				
		3dP	24743				

0	no function (subsequent input data are skipped)
1	Heating current input.
2	External setpoint SP.E or (depending on version) external setpoint shift SP.E. (Switchover is done via -> LOGI/SP.E).
3	Position feedback signal Yp.
4	Second process value X2. For process value functions such as ratio, min, max, mean. Adjustment via Cntr/C.tYP.
5	Preset for external positioning value Y.E (switchover via -> LOGI/Y.E)
6	No controller input (replaced e.g. by limit value signalling).
7	Process value X1.

2 InP.1

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
S.tYP	r/w	base 1dP 2dP 3dP	1150 9342 17534 25726	35068	Enum	Enum_StYP	Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted

0	thermocouple type L (-100...900°C), Fe-CuNi DIN Fahrenheit: -148...1652°F	
1	thermocouple type J (-100...1200°C), Fe-CuNi Fahrenheit: -148...2192°F	
2	thermocouple type K (-100...1350°C), NiCr-Ni Fahrenheit: -148...2462°F	
3	thermocouple type N (-100...1300°C), Nicrosil-Nisil Fahrenheit: -148...2372°F	
4	thermocouple type S (0...1760°C), PtRh-Pt10% Fahrenheit: 32...3200°F	
5	thermocouple type R (0...1760°C), PtRh-Pt13% Fahrenheit: 32...3200°F	
6	thermocouple type T (-200...400°C), Cu-CuNi Fahrenheit: -328...752°F	
7	thermocouple type C (0...2315°C), W5%Re-W26%Re Fahrenheit: 32...4199°F	
8	thermocouple type D (0...2315°C), W3%Re-W25%Re Fahrenheit: 32...4199°F	
9	thermocouple type E (-100...1000°C), NiCr-CuNi Fahrenheit: -148...1832°F	
10	thermocouple type B (0/400...1820°C), PtRh-Pt6% Fahrenheit: 32/752...3308°F	
18	Special thermocouple with a linearization characteristic selectable by the user. This enables non-linear signals to be simulated or linearized.	
20	Pt100 (-200.0 ... 100.0(150.0)°C) Measuring range up to 150°C at reduced lead resistance. Fahrenheit: -328...212(302) °F	
21	Pt100 (-200.0 ... 850,0 °C) Fahrenheit: -328...1562 °F	
22	Pt 1000 (-200.0...850.0 °C) Fahrenheit: -328...1562 °F	
23	Special : 0...4500 Ohms. For KTY 11-6 with preset special linearization (-50...150 °C or -58...302 °F).	
24	Special 0...450 Ohm	
30	Current : 0...20 mA / 4...20 mA	
40	0...10V / 2...10V	
41	Special -2.5...115 mV	
42	Special : -25...1150 mV	
50	potentiometer 0...160 Ohm	
51	potentiometer 0...450 Ohm	
52	potentiometer 0...1600 Ohm	
53	potentiometer 0...4500 Ohm	

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
S.Lin	r/w	base 1dP 2dP 3dP	1151 9343 17535 25727	35070	Enum	Enum_SLin	Linearization (not adjustable for all sensor types S.tYP). Special linearization. The linearization table can be created with the Engineering Tool. The default characteristic is for KTY 11-6 temperature sensors.

0	No special linearization.	
1	Special linearization. Definition of the linearization table is possible with the Engineering Tool. The default setting is the characteristic of the KTY 11-6 temperature sensor.	

2 InP.1

● ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Corr	r/w	base	160	33088	Enum	Enum_Corr3		Measured value correction / scaling
		1dP	8352					
		2dP	16544					
		3dP	24736					

0	Without scaling	
1	The offset correction (in the CAL Level) can be done on-line in the process. If InL shows the lower input value of the scaling point, then OuL must be adjusted to the corresponding display value. Adjustments are made via the front panel keys of the device only.	
2	Two-point correction (in CAL-Level) ist possible offline via process value transmitter or on-line in the process. Set process value for the upper and lower scaling point and confirm as input value InL or InH, then set the belonging displayed value OuL and OuH. The settings are done via the front of the device.	
3	Scaling (at PArA-level). The input values for the upper (InL, OuL) and lower scaling point (InH. OuH) are visible at the parameter level. Adjustment is made via front operation or the engineering tool.	

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.F	r/w	base	1152	35072	Float	-1999...9999	☑	Substitute value in case of a fault. This value is used for calculations, if there is a fault at the input (e.g. FAIL).
		1dP	9344					
		2dP	17536					
		3dP	25728					

● PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
InL.1	r/w	base	1100	34968	Float	-1999...9999	☐	Input value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the lower scaling point (e.g. 4 mA) is done using the corresponding electrical value.
		1dP	9292					
		2dP	17484					
		3dP	25676					
OuL.1	r/w	base	1101	34970	Float	-1999...9999	☐	Display value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the lower scaling point, e.g. 4 mA is displayed as 2 [pH].
		1dP	9293					
		2dP	17485					
		3dP	25677					
InH.1	r/w	base	1102	34972	Float	-1999...9999	☐	Input value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the upper scaling point (e.g. 20 mA) is done using the corresponding electrical value.
		1dP	9294					
		2dP	17486					
		3dP	25678					
OuH.1	r/w	base	1103	34974	Float	-1999...9999	☐	Display value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the upper scaling point, e.g. 20 mA is displayed as 12 [pH].
		1dP	9295					
		2dP	17487					
		3dP	25679					
t.F1	r/w	base	1104	34976	Float	0...100	☐	Filter time constant [s]. Every input is fitted with a digital (software) low-pass filter for suppressing process-related disturbances on the input leads. Higher filter settings improve the suppression, but increase the delay of the input signals.
		1dP	9296					
		2dP	17488					
		3dP	25680					
E.tc1	r/w	base	1105	34978	Float	0...100	☑	External temperature compensation (temperature at the junction of thermocouple/copper lead with external temperature compensation).
		1dP	9297					
		2dP	17489					
		3dP	25681					

- ## Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.1r	r	base 1dP 2dP 3dP	1170 9362 17554 25746	35108	Float	-1999...9999	☐	Measurement value before the measurement value correction (unprocessed).
Fail	r	base 1dP 2dP 3dP	1171 9363 17555 25747	35110	Enum	Enum_InpFail		Input circuit fault: faulty or incorrectly connected sensor.

0	no error
1	sensor break
2	Incorrect polarity at input.
4	Short circuit at input.

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.1	r	base 1dP 2dP 3dP	1172 9364 17556 25748	35112	Float	-1999...9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
F.Inp	r/w	base 1dP 2dP 3dP	1180 9372 17564 25756	35128	Float	-1999...9999	☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)

3 InP.2

- ## ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
I.Fnc	r/w	base 1dP 2dP 3dP	161 8353 16545 24737	33090	Enum	Enum_IFnc	Selection of the function assigned to the value at INP2, e.g. value at INP2 is the external setpoint.

0	no function (subsequent input data are skipped)
1	Heating current input.
2	External setpoint SP.E or (depending on version) external setpoint shift SP.E. (Switchover is done via -> LOGI/SP.E).
3	Position feedback signal Yp.
4	Second process value X2. For process value functions such as ratio, min, max, mean. Adjustment via Cntr/C.tYP.
5	Preset for external positioning value Y.E (switchover via -> LOGI/Y.E)
6	No controller input (replaced e.g. by limit value signalling).
7	Process value X1.

3 | InP.2

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
S.tYP	r/w	base 1dP 2dP 3dP	1250 9442 17634 25826	35268	Enum	Enum_StYP2		Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted.
						30	Current : 0...20 mA / 4...20 mA	
						31	0...50 mA current (AC)	
						50	Potentiometer 0...160 Ohm	
						51	Potentiometer 0...450 Ohm	
						52	Potentiometer 0...1600 Ohm	
						53	Potentiometer 0...4500 Ohm	
Corr	r/w	base 1dP 2dP 3dP	162 8354 16546 24738	33092	Enum	Enum_Corr		Measured value correction / scaling
						0	Without scaling	
						1	The offset correction (in the CAL Level) can be done on-line in the process. If InL shows the lower input value of the scaling point, then OuL must be adjusted to the corresponding display value. Adjustments are made via the front panel keys of the device only.	
						2	2-point correction (in CAL-Level) ist possible offline via process value transmitter or on-line in the process. Set process value for the upper and lower scaling point and confirm as input value InL or InH, then set the belonging displayed value OuL and OuH. The settings are done via the front of the device.	
						3	Scaling (at PArA-level). The input values for the upper (InL, OuL) and lower scaling point (InH. OuH) are visible at the parameter level. Adjustment is made via front operation or the engineering tool.	
In.F	r/w	base 1dP 2dP 3dP	1252 9444 17636 25828	35272	Float	-1999...9999	☑	Substitute value in case of a fault. This value is used for calculations, if there is a fault at the input (e.g. FAIL).

• PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
InL.2	r/w	base 1dP 2dP 3dP	1200 9392 17584 25776	35168	Float	-1999...9999	☐	Input value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the lower scaling point (e.g. 4 mA) is done using the corresponding electrical value.
OuL.2	r/w	base 1dP 2dP 3dP	1201 9393 17585 25777	35170	Float	-1999...9999	☐	Display value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the lower scaling point, e.g. 4 mA is displayed as 2 [pH].
InH.2	r/w	base 1dP 2dP 3dP	1202 9394 17586 25778	35172	Float	-1999...9999	☐	Input value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the upper scaling point (e.g. 20 mA) is done using the corresponding electrical value.

3 InP.2

● PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
OuH.2	r/w	base 1dP 2dP 3dP	1203 9395 17587 25779	35174	Float	-1999...9999	☐	Display value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the upper scaling point, e.g. 20 mA is displayed as 12 [pH].
t.F2	r/w	base 1dP 2dP 3dP	1204 9396 17588 25780	35176	Float	0...100	☐	Filter time constant [s]. Every input is fitted with a digital (software) low-pass filter for suppressing process-related disturbances on the input leads. Higher filter settings improve the suppression, but increase the delay of the input signals.

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.2	r	base 1dP 2dP 3dP	1270 9462 17654 25846	35308	Float	-1999...9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
Fail	r	base 1dP 2dP 3dP	1271 9463 17655 25847	35310	Enum	Enum_InpFail		Input circuit fault: faulty or incorrectly connected sensor.

0	no error
1	sensor break
2	Incorrect polarity at input.
4	Short circuit at input.

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.2r	r	base 1dP 2dP 3dP	1272 9464 17656 25848	35312	Float	-1999...9999	☐	Measurement value before the measurement value correction (unprocessed).
F.Inp	r/w	base 1dP 2dP 3dP	1280 9472 17664 25856	35328	Float	-1999...9999	☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)

4 InP.3

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
I.Fnc	r/w	base	166	33100	Enum	Enum_IFnc	Selection of the function assigned to the value at INP3, e.g. value at INP3 is the external setpoint.
		1dP	8358				
		2dP	16550				
		3dP	24742				

0	no function (subsequent input data are skipped)
1	Heating current input.
2	External setpoint SP.E or (depending on version) external setpoint shift SP.E. (Switchover is done via -> LOGI/SP.E).
3	Position feedback signal Yp.
4	Second process value X2. For process value functions such as ratio, min, max, mean. Adjustment via Cntr/C.tYP.
5	Preset for external positioning value Y.E (switchover via -> LOGI/Y.E)
6	No controller input (replaced e.g. by limit value signalling).
7	Process value X1.

4 InP.3

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
S.tYP	r/w	base 1dP 2dP 3dP	1350 9542 17734 25926	35468	Enum	Enum_StYP3	Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted.

0	thermocouple type L (-100...900°C), Fe-CuNi DIN Fahrenheit: -148...1652°F
1	thermocouple type J (-100...1200°C), Fe-CuNi Fahrenheit: -148...2192°F
2	thermocouple type K (-100...1350°C), NiCr-Ni Fahrenheit: -148...2462°F
3	thermocouple type N (-100...1300°C), Nicrosil-Nisil Fahrenheit: -148...2372°F
4	thermocouple type S (0...1760°C), PtRh-Pt10% Fahrenheit: 32...3200°F
5	thermocouple type R (0...1760°C), PtRh-Pt13% Fahrenheit: 32...3200°F
6	thermocouple type T (-200...400°C), Cu-CuNi Fahrenheit: -328...752°F
7	thermocouple type C (0...2315°C), W5%Re-W26%Re Fahrenheit: 32...4199°F
8	thermocouple type D (0...2315°C), W3%Re-W25%Re Fahrenheit: 32...4199°F
9	thermocouple type E (-100...1000°C), NiCr-CuNi Fahrenheit: -148...1832°F
10	thermocouple type B (0/100...1820°C), PtRh-Pt6% Fahrenheit: 32(212)...3308°F
18	Special thermocouple with a linearization characteristic selectable by the user. This enables non-linear signals to be simulated or linearized.
20	Pt100 (-200.0 ... 100.0(150.0)°C) Measuring range at reduced lead resistance up to 150°C. Fahrenheit: -328...212(302)°F
21	Pt100 (-200.0 ... 850,0 °C) Fahrenheit: -328...1562 °F
22	Pt 1000 (-200.0...850.0 °C) Fahrenheit: -328...1562 °F
23	Special : 0...4500 Ohms. For KTY 11-6 with preset special linearization (-50...150 °C or -58...302 °F).
24	Special : 0...450 Ohms
30	Current : 0...20 mA / 4...20 mA
41	Special : -2,5...115 mV
42	Special : -25...1150 mV
50	Potentiometer :0...160 Ohms
51	Potentiometer :0...450 Ohms
52	Potentiometer :0...1600 Ohms
53	Potentiometer :0...4500 Ohms

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
S.Lin	r/w	base 1dP 2dP 3dP	1351 9543 17735 25927	35470	Enum	Enum_SLin	Linearization (not adjustable for all sensor types S.tYP). Special linearization. The linearization table can be created with the Engineering Tool. The default characteristic is for KTY 11-6 temperature sensors.

0	No special linearization.
1	Special linearization. Definition of the linearization table is possible with the Engineering Tool. The default setting is the characteristic of the KTY 11-6 temperature sensor.

4 InP.3

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Corr	r/w	base	165	33098	Enum	Enum_Corr3		Measured value correction / scaling
		1dP	8357					
		2dP	16549					
		3dP	24741					

0	Without scaling	
1	The offset correction (in the CAL Level) can be done on-line in the process. If InL shows the lower input value of the scaling point, then OuL must be adjusted to the corresponding display value. Adjustments are made via the front panel keys of the device only.	
2	Two-point correction (in CAL-Level) ist possible offline via process value transmitter or on-line in the process. Set process value for the upper and lower scaling point and confirm as input value InL or InH, then set the belonging displayed value OuL and OuH. The settings are done via the front of the device.	
3	Scaling (at PArA-level). The input values for the upper (InL, OuL) and lower scaling point (InH. OuH) are visible at the parameter level. Adjustment is made via front operation or the engineering tool.	

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.F	r/w	base	1352	35472	Float	-1999...9999	☑	Substitute value in case of a fault. This value is used for calculations, if there is a fault at the input (e.g. FAIL).
		1dP	9544					
		2dP	17736					
		3dP	25928					

● PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
InL.3	r/w	base	1300	35368	Float	-1999...9999	☐	Input value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the lower scaling point (e.g. 4 mA) is done using the corresponding electrical value.
		1dP	9492					
		2dP	17684					
		3dP	25876					
OuL.3	r/w	base	1301	35370	Float	-1999...9999	☐	Display value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the lower scaling point, e.g. 4 mA is displayed as 2 [pH].
		1dP	9493					
		2dP	17685					
		3dP	25877					
InH.3	r/w	base	1302	35372	Float	-1999...9999	☐	Input value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the upper scaling point (e.g. 20 mA) is done using the corresponding electrical value.
		1dP	9494					
		2dP	17686					
		3dP	25878					
OuH.3	r/w	base	1303	35374	Float	-1999...9999	☐	Display value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the upper scaling point, e.g. 20 mA is displayed as 12 [pH].
		1dP	9495					
		2dP	17687					
		3dP	25879					
t.F3	r/w	base	1304	35376	Float	0...999,9	☐	Filter time constant [s]. Every input is fitted with a digital (software) low-pass filter for suppressing process-related disturbances on the input leads. Higher filter settings improve the suppression, but increase the delay of the input signals.
		1dP	9496					
		2dP	17688					
		3dP	25880					
E.tc3	r/w	base	1305	35378	Float	0...100	☑	External temperature compensation (temperature at the junction of thermocouple/copper lead with external temperature compensation).
		1dP	9497					
		2dP	17689					
		3dP	25881					

- ## Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
In.3	r	base 1dP 2dP 3dP	1370 9562 17754 25946	35508	Float	-1999...9999 ☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
Fail	r	base 1dP 2dP 3dP	1371 9563 17755 25947	35510	Enum	Enum_InpFail	Input circuit fault: faulty or incorrectly connected sensor.

0	no error
1	sensor break
2	Incorrect polarity at input.
4	Short circuit at input.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
In.3r	r	base 1dP 2dP 3dP	1372 9564 17756 25948	35512	Float	-1999...9999 ☐	Measurement value before the measurement value correction (unprocessed).
F.Inp	r/w	base 1dP 2dP 3dP	1380 9572 17764 25956	35528	Float	-1999...9999 ☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)

5 Lim

- ## ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Fnc.1	r/w	base 1dP 2dP 3dP	2150 10342 18534 26726	37068	Enum	Enum_Fcn	Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.

0	No limit value monitoring.
1	measured value monitoring. The alarm signal is generated, if the limit is exceeded. If the measured value is within the limits (including hysteresis) again, this alarm signal is resetted.
2	Measured value monitoring + alarm status latch. An alarm signal is generated, if the limit is exceeded. A latched alarm signal remains latched until it is manually resetted.
3	Signal monitoring for rate of change (per minute).
4	Signal monitoring for rate of change (per minute) + storage of the alarm status.

5 Lim

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Src.1	r/w	base 1dP 2dP 3dP	2151 10343 18535 26727	37070	Enum	Enum_Src	Source for limit value. Selection of which value is to be monitored.

			Value				
0	Process value = absolute alarm
1	control deviation xw (process value - set-point) = relative alarm Note: Monitoring with the effective set-point Weff. For example using a ramp it is the changing set-point, not the target set-point of the ramp.
2	Control deviation Xw (= relative alarm) with suppression during start-up and setpoint changes. Limit value monitoring is continued as soon as the control deviation comes within the alarm limits again, at the latest after 10 * Tn.
3	Measured value of the analog input INP1.
4	Measured value of the analog input INP2.
5	Measured value of the analog input INP3.
6	effective set-point Weff. For example the ramp-function changes the effective set-point untill it matches the internal (target) set-point.
7	correcting variable y (controller output)
8	control variable deviation xw (actual value - internal set-point) = deviation alarm to internal set-point Note: Monitoring with the internal set-point Wint. For example using a ramp it is the target setpoint, not the changing set-point of the ramp.
9	Difference x1 - x2 (e.g. in combination with the process value function "Mean value", applicable for detecting aged thermocouples), difference between first and second process value.
11	Control deviation Xw (= relative alarm) with suppression during start-up and setpoint change. Limit value monitoring is continued as soon as the control deviation comes within the alarm limits again.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
HC.AL	r/w	base 1dP 2dP 3dP	2050 10242 18434 26626	36868	Enum	Enum_HCAL	Activation of alarm heat current function. Either overload or break can be monitored, overload = current I > heat current limit, or break = current I < heat current limit. Short circuit is monitored in both cases.

0	No heating current alarm.
1	Overload and short circuit monitoring. Overload = current I > heat current limit.
2	Break and short circuit monitoring. Break = current I < heat current limit.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
LP.AL	r/w	base 1dP 2dP 3dP	5058 13250 21442 29634	42884	Enum	Enum_LPAL	Monitoring of control loop interruption (not possible with 3-point stepping controller, not possible with signaller)

0	switched off / inactive
1	LOOP alarm is generated, if with Y=100% there is no corresponding reaction of the process variable within the time of 2 x ti. Possible remedial action: Check heating or cooling circuit, check sensor and replace it, if necessary, check controller and switching device.

5 Lim

• PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L.1	r/w	base 1dP 2dP 3dP	2100 10292 18484 26676	36968	Float	-1999...9999	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
H.1	r/w	base 1dP 2dP 3dP	2101 10293 18485 26677	36970	Float	-1999...9999	☑	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.
HYS.1	r/w	base 1dP 2dP 3dP	2102 10294 18486 26678	36972	Float	0...9999	☐	Hysteresis of the limit value. Switching difference for upper and lower limit value. The limit value must change by this amount (rise above upper limit or fall below lower limit) before the limit value alarm is reset.
dEL.1	r/w	base 1dP 2dP 3dP	2103 10295 18487 26679	36974	Float	0...9999	☐	Delayed alarm of a limit value. The alarm is only triggered after the defined delay time. It is only indicated, and possibly stored, if it is still present after the delay time has elapsed.
HC.A	r/w	base 1dP 2dP 3dP	2000 10192 18384 26576	36768	Float	-1999...9999	☐	Heating current monitoring limit [A]. Depending on configuration, and apart from short-circuit monitoring, an overload test checks whether the heating current is above the adjusted current limit, or below the limit when the heating is switched off. The heating current is measured by means of a current transformer (accessory), and the current range can be adapted.

• Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
St.HC	r	base 1dP 2dP 3dP	2070 10262 18454 26646	36908	Int	0...3	☐	Status of the heating current alarm. Displayable are heating current short-circuit and/or heating current alarm. Depending on configuration, the heating current alarm is either an interruption of heating current (I < limit value) or heating current overload (I > limit value).
HC	r	base 1dP 2dP 3dP	2071 10263 18455 26647	36910	Float	-1999...9999	☐	Measured heating current [A]. Apart from the short circuit test, and depending on configuration, an overcurrent test (current I > heating current limit) and an open circuit test (current I < heating current limit) is executed. The heating current is measured by means of a (separate) current transformer, whereby the input range can be scaled.
SSr	r	base 1dP 2dP 3dP	2072 10264 18456 26648	36912	Float	-1999...9999	☐	Measured current with SSr [A]. The heating current (SSR) is short circuited, if there is a current flow even though the controller output is switched off.Suggested remedy: check heating current circuit, replace solid-state relay if necessary.
St.Lim	r	base 1dP 2dP 3dP	2170 10362 18554 26746	37108	Enum	Enum_LimStatus		Limit value status: No alarm present or stored.

0	no alarm
1	latched alarm
2	A limit value has been exceeded.

6 Lim2

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Fnc.2	r/w	base 1dP 2dP 3dP	2250 10442 18634 26826	37268	Enum	Enum_Fcn	Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.

0	No limit value monitoring.	
1	measured value monitoring. The alarm signal is generated, if the limit is exceeded. If the measured value is within the limits (including hysteresis) again, this alarm signal is resetted.	
2	Measured value monitoring + alarm status latch. An alarm signal is generated, if the limit is exceeded. A latched alarm signal remains latched until it is manually resetted.	
3	Signal monitoring for rate of change (per minute).	
4	Signal monitoring for rate of change (per minute) + storage of the alarm status.	

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Src.2	r/w	base 1dP 2dP 3dP	2251 10443 18635 26827	37270	Enum	Enum_Src	Source for limit value. Selection of which value is to be monitored.

0	Process value = absolute alarm
1	control deviation xw (process value - set-point) = relative alarm Note: Monitoring with the effective set-point Weff. For example using a ramp it is the changing set-point, not the target set-point of the ramp.
2	Control deviation Xw (= relative alarm) with suppression during start-up and setpoint changes. Limit value monitoring is continued as soon as the control deviation comes within the alarm limits again, at the latest after 10 * Tn.
3	Measured value of the analog input INP1.
4	Measured value of the analog input INP2.
5	Measured value of the analog input INP3.
6	effective set-point Weff. For example the ramp-function changes the effective set-point untill it matches the internal (target) set-point.
7	correcting variable y (controller output)
8	control variable deviation xw (actual value - internal set-point) = deviation alarm to internal set-point Note: Monitoring with the internal set-point Wint. For example using a ramp it is the target setpoint, not the changing set-point of the ramp.
9	Difference x1 - x2 (e.g. in combination with the process value function "Mean value", applicable for detecting aged thermocouples), difference between first and second process value.
11	Control deviation Xw (= relative alarm) with suppression during start-up and setpoint change. Limit value monitoring is continued as soon as the control deviation comes within the alarm limits again.

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
L.2	r/w	base 1dP 2dP 3dP	2200 10392 18584 26776	37168	Float	-1999...9999	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.

6 Lim2

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
H.2	r/w	base 1dP 2dP 3dP	2201 10393 18585 26777	37170	Float	-1999...9999	☑	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.
HYS.2	r/w	base 1dP 2dP 3dP	2202 10394 18586 26778	37172	Float	0...9999	☐	Hysteresis of the limit value. Switching difference for upper and lower limit value. The limit value must change by this amount (rise above upper limit or fall below lower limit) before the limit value alarm is reset.
dEL.2	r/w	base 1dP 2dP 3dP	2203 10395 18587 26779	37174	Float	0...9999	☐	Delayed alarm of a limit value. The alarm is only triggered after the defined delay time. It is only indicated, and possibly stored, if it is still present after the delay time has elapsed.

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
St.Lim	r	base 1dP 2dP 3dP	2270 10462 18654 26846	37308	Enum	Enum_LimStatus	Limit value status: No alarm present or stored.

0	no alarm
1	latched alarm
2	A limit value has been exceeded.

7 Lim3

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Fnc.3	r/w	base 1dP 2dP 3dP	2350 10542 18734 26926	37468	Enum	Enum_Fcn	Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.

0	No limit value monitoring.
1	measured value monitoring. The alarm signal is generated, if the limit is exceeded. If the measured value is within the limits (including hysteresis) again, this alarm signal is resetted.
2	Measured value monitoring + alarm status latch. An alarm signal is generated, if the limit is exceeded. A latched alarm signal remains latched until it is manually resetted.
3	Signal monitoring for rate of change (per minute).
4	Signal monitoring for rate of change (per minute) + storage of the alarm status.

7 Lim3

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Src.3	r/w	base 1dP 2dP 3dP	2351 10543 18735 26927	37470	Enum	Enum_Src	Source for limit value. Selection of which value is to be monitored.

0		Process value = absolute alarm
1		control deviation xw (process value - set-point) = relative alarm Note: Monitoring with the effective set-point Weff. For example using a ramp it is the changing set-point, not the target set-point of the ramp.
2		Control deviation Xw (= relative alarm) with suppression during start-up and setpoint changes. Limit value monitoring is continued as soon as the control deviation comes within the alarm limits again, at the latest after 10 * Tn.
3		Measured value of the analog input INP1.
4		Measured value of the analog input INP2.
5		Measured value of the analog input INP3.
6		effective set-point Weff. For example the ramp-function changes the effective set-point untill it matches the internal (target) set-point.
7		correcting variable y (controller output)
8		control variable deviation xw (actual value - internal set-point) = deviation alarm to internal set-point Note: Monitoring with the internal set-point Wint. For example using a ramp it is the target setpoint, not the changing set-point of the ramp.
9		Difference x1 - x2 (e.g. in combination with the process value function "Mean value", applicable for detecting aged thermocouples), difference between first and second process value.
11		Control deviation Xw (= relative alarm) with suppression during start-up and setpoint change. Limit value monitoring is continued as soon as the control deviation comes within the alarm limits again.

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
L.3	r/w	base 1dP 2dP 3dP	2300 10492 18684 26876	37368	Float	-1999...9999	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
H.3	r/w	base 1dP 2dP 3dP	2301 10493 18685 26877	37370	Float	-1999...9999	☑	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.
HYS.3	r/w	base 1dP 2dP 3dP	2302 10494 18686 26878	37372	Float	0...9999	☐	Hysteresis of the limit value. Switching difference for upper and lower limit value. The limit value must change by this amount (rise above upper limit or fall below lower limit) before the limit value alarm is reset.
dEL.3	r/w	base 1dP 2dP 3dP	2303 10495 18687 26879	37374	Float	0...9999	☐	Delayed alarm of a limit value. The alarm is only triggered after the defined delay time. It is only indicated, and possibly stored, if it is still present after the delay time has elapsed.

7 Lim3

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
St.Lim	r	base 1dP 2dP 3dP	2370 10562 18754 26946	37508	Enum	Enum_LimStatus	Limit value status: No alarm present or stored.

0	no alarm
1	latched alarm
2	A limit value has been exceeded.

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● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
L_r	r/w	base 1dP 2dP 3dP	1051 9243 17435 25627	34870	Enum	Enum_dInP1	Local / remote switchover (Remote: Adjustment of all values via the front panel is blocked).

0	no function (switch-over via interface is possible)
1	always active
2	Digital Input DI1 switches
3	DI2 switches (only visible with OPTION)
4	DI3 switches (only visible with OPTION)
5	F-key switches.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP.2	r/w	base 1dP 2dP 3dP	1052 9244 17436 25628	34872	Enum	Enum_dInP4	Source of the control signal for activating the second (safety) setpoint (SP.2=) W2. Note: W2 is not restricted by the setpoint limits.

0	no function (switch-over via interface is possible)
2	Digital Input DI1 switches
3	DI2 switches (only visible with OPTION)
4	DI3 switches (only visible with OPTION)
5	F-key switches.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP.E	r/w	base 1dP 2dP 3dP	1053 9245 17437 25629	34874	Enum	Enum_dInP1	Switching between internal set-point an external setpoint SP.E. The external SP.E is either the absolute set-point Wext or the offset to the set-point (dependent on instrument and configuration).

0	no function (switch-over via interface is possible)
1	always active
2	Digital Input DI1 switches
3	DI2 switches (only visible with OPTION)
4	DI3 switches (only visible with OPTION)
5	F-key switches.

8 LOGI

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Y2	r/w	base 1dP 2dP 3dP	1054 9246 17438 25630	34876	Enum	Enum_dInP3	Source of the control signal for activating the second positioning output Y2. Activated Y2 = positioner control. Caution: The parameter 'positioning output Y2' must not be confused with the controller output Y2!

						0	no function (switch-over via interface is possible)
						2	Digital Input DI1 switches
						3	DI2 switches (only visible with OPTION)
						4	DI3 switches (only visible with OPTION)
						5	F-key switches.
						6	Auto/manual key switches (A/M key)

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Y.E	r/w	base 1dP 2dP 3dP	1055 9247 17439 25631	34878	Enum	Enum_dInP2	Signal for activating the external output value. The internal output value Ypid is the controllers reaction on the process, with external output value Y.E the controller output is controlled.

						0	no function (switch-over via interface is possible)
						1	always activated (manual station)
						2	Digital Input DI1 switches
						3	DI2 switches (only visible with OPTION)
						4	DI3 switches (only visible with OPTION)
						5	F-key switches.
						6	Auto/manual key switches (A/M key)

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
mAn	r/w	base 1dP 2dP 3dP	1056 9248 17440 25632	34880	Enum	Enum_dInp2	Source of the control signal for auto/manual switchover. In the automatic mode, the controller is in charge. In the manual mode, the outputs can be varied independently of the process.

						0	no function (switch-over via interface is possible)
						1	always activated (manual station)
						2	Digital Input DI1 switches
						3	DI2 switches (only visible with OPTION)
						4	DI3 switches (only visible with OPTION)
						5	F-key switches.
						6	Auto/manual key switches (A/M key)

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
C.oFF	r/w	base 1dP 2dP 3dP	1057 9249 17441 25633	34882	Enum	Enum_dInP3	Source of the control signal for disabling all the controller outputs.Note: Forcing has priority, and remains active; alarm processing also remains active.

						0	no function (switch-over via interface is possible)
						2	Digital Input DI1 switches
						3	DI2 switches (only visible with OPTION)
						4	DI3 switches (only visible with OPTION)
						5	F-key switches.
						6	Auto/manual key switches (A/M key)

8 LOGI

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
m.Loc	r/w	base 1dP 2dP 3dP	1058 9250 17442 25634	34884	Enum	Enum_dInp4	Source of the control signal to disable the auto/manual key. If the A/M key is disabled, switchover to manual operation is not possible.

						0	no function (switch-over via interface is possible)
						2	Digital Input DI1 switches
						3	DI2 switches (only visible with OPTION)
						4	DI3 switches (only visible with OPTION)
						5	F-key switches.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Err.r	r/w	base 1dP 2dP 3dP	1059 9251 17443 25635	34886	Enum	Enum_dInP3	Source of the control signal for resetting all stored entries in the error list (the list contains all error messages and alarms). If an alarm is still present, i.e. the source of trouble has not been remedied, stored alarms cannot be acknowledged (reset).

						0	no function (switch-over via interface is possible)
						2	Digital Input DI1 switches
						3	DI2 switches (only visible with OPTION)
						4	DI3 switches (only visible with OPTION)
						5	F-key switches.
						6	Auto/manual key switches (A/M key)

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Pid.2	r/w	base 1dP 2dP 3dP	1061 9253 17445 25637	34890	Enum	Enum_dInP4	Source of the control signal for switchover between the two parameter sets. The second parameter set is complete, and comprises Pb (= proportional band), ti (= integral action time), and td (= derivative action time) for heating and for cooling. All other control parameters, e.g. the switching duty cycles, are valid for both parameter sets.

						0	no function (switch-over via interface is possible)
						2	Digital Input DI1 switches
						3	DI2 switches (only visible with OPTION)
						4	DI3 switches (only visible with OPTION)
						5	F-key switches.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
P.run	r/w	base 1dP 2dP 3dP	1062 9254 17446 25638	34892	Enum	Enum_dInP6	Source of the control signal for switching the programmer between Run and Stop. On units with a simple programmer (only 1 program), a stop immediately causes a reset, followed by a new start. With units that have been defined as program controllers (several programs), the program is stopped, and then continued.

						0	no function
						2	Digital Input DI1 switches
						3	DI2 switches (only visible with OPTION)
						4	DI3 switches (only visible with OPTION)

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
P.oFF	r/w	base 1dP 2dP 3dP	1063 9255 17447 25639	34894	Enum	Enum_dInP5	Source of the control signal for switching off the programmer (if the programmer is switched off, the internal setpoint becomes effective).

						0	no function
						2	Digital Input DI1 switches
						3	DI2 switches (only visible with OPTION)
						4	DI3 switches (only visible with OPTION)

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ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
I.Chg	r/w	base	1064	34896	Enum	Enum_dInP4		Signal source for switching the effective process value between the first process value X1 and second process value X2.
		1dP	9256					
		2dP	17448					
		3dP	25640					

0		no function (switch-over via interface is possible)
2		Digital Input DI1 switches
3		DI2 switches (only visible with OPTION)
4		DI3 switches (only visible with OPTION)
5		F-key switches.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
di.Fn	r/w	base	1050	34868	Enum	Enum_diFn	Function of digital inputs (valid for all inputs)
		1dP	9242				
		2dP	17434				
		3dP	25626				

0	Basic setting 'Off': A permanent positive signal switches this function 'On', which is connected to the digital input. Removal of the signal switches the function 'Off' again.
1	Basic setting 'On': A permanent positive signal switches this function 'Off', which is connected to the digital input. Removal of the signal switches the function 'On' again.
2	Push-button function. Basic setting 'Off'. Only positive signals are effective. The first positive signal switches 'On'. Removal of the signal is necessary before the next positive signal can switch 'Off'.

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
St.Di	r	base	1070	34908	Int	0...7	☑	Status of the digital inputs or of push-buttons (binary coded).
		1dP	9262					
		2dP	17454					
		3dP	25646					

Bit 0 Input 1
Bit 1 Input 2
Bit 2 Input 3
Bit 8 Status of 'F' key
Bit 9 Status of 'A/M' key
Bit 10 Status of 'Sel' key
Bit 11 Status of 'Down' key
Bit 12 Status of 'Up' key
Bit 13 Status of 'Loc' key

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
L-R	r/w	base	1080	34928	Int	0...1	☐	Remote operation. Remote means that all values can only be adjusted via the interface. Adjustments via the front panel are blocked.
		1dP	9272					
		2dP	17464					
		3dP	25656					
W_W2	r/w	base	1081	34930	Int	0...1	☐	Signal for activating the second (safety) setpoint (SP.2=) W2. Note: Setpoint W2 is not restricted by the setpoint limits!
		1dP	9273					
		2dP	17465					
		3dP	25657					

8 LOGI

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Wi_We	r/w	base 1dP 2dP 3dP	1082 9274 17466 25658	34932	Int	0…1	☐	Signal for activating the external setpoint value. SP.E is the external setpoint, or dependent on the device and configuration of the setpoint shift.
Y_Y2	r/w	base 1dP 2dP 3dP	1083 9275 17467 25659	34934	Int	0…1	☐	Signal for activating the 2nd output value Y2. With selected Y2, the output is operated as a positioner.Caution: Do not confuse the parameter 'fixed output Y2' with the controller output Y2!
Y_Y.E	r/w	base 1dP 2dP 3dP	1084 9276 17468 25660	34936	Int	0…1	☐	Signal for activating the external positioning value. The controller is operated as positioner.
A-M	r/w	base 1dP 2dP 3dP	1085 9277 17469 25661	34938	Int	0…1	☐	Signal for activating manual operation. In the manual mode, the controller provides output signals independent of the process.
C.Off	r/w	base 1dP 2dP 3dP	1086 9278 17470 25662	34940	Int	0…1	☐	Signal for disabling all the controller outputs. Note: Forcing has priority; alarm processing remains active.
L.AM	r/w	base 1dP 2dP 3dP	1087 9279 17471 25663	34942	Int	0…1	☐	Signal for disabling manual operation. Triggers a forced switchover to automatic mode, and disables the front panel A/M key (also if other functions have been assigned to the key).
Err.r	r/w	base 1dP 2dP 3dP	1088 9280 17472 25664	34944	Int	0…1	☐	Signal for resetting the entire error list. The error list contains all errors that are reported, e.g. device faults and limit values. It also contains queued as well as stored errors after their correction. The reset acknowledges all errors, whereby queued errors will reappear after the next error detection (measurement).
SSR.Res	r/w	base 1dP 2dP 3dP	1089 9281 17473 25665	34946	Int	0…1	☐	Reset of the alarm triggered by a solid-state relay (SSR). SSRs are mostly used for frequent switching of heating elements, because they have no mechanical contacts that can wear out. However, an unnoticed short circuit could lead to overheating of the machine.
Set1.2	r/w	base 1dP 2dP 3dP	1091 9283 17475 25667	34950	Int	0…1	☐	Switch-over of parameter set. The 2nd parameter set contains one complete set each of Pb (= proportional band), ti (= integral action time), and td (= derivative action time) for heating and for cooling. All other control parameters, such as switching duty cycles, are valid for both parameter sets.
Prg.R.S	r/w	base 1dP 2dP 3dP	1092 9284 17476 25668	34952	Int	0…1	☐	Signal for starting the programmer. On units with a simple programmer (only 1 program), a stop immediately causes a reset, followed by a new start. With units that have been defined as program controllers (several programs), the program is stopped, and then continued.
Prg.Res	r/w	base 1dP 2dP 3dP	1093 9285 17477 25669	34954	Int	0…1	☐	Programmer reset switches the programmer off, and sets it back to the starting condition. Reset stops the currently active program, and activates the internal setpoint. A newly selected program becomes the active program.

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• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
F.Di	r/w	base 1dP 2dP 3dP	1094 9286 17478 25670	34956	Int	0...7	☐	Forcing of digital inputs. Forcing involves the external operation of at least one input. The instrument takes over this input value (preset value for inputs from a superordinate system, e.g. for a function test.)
						Bit 0 Forcing of digital input 1 Bit 1 Forcing of digital input 2 Bit 2 Forcing of digital input 3 Bit 3 Forcing of digital input 4 Bit 4 Forcing of digital input 5		
I.Chg	r/w	base 1dP 2dP 3dP	1095 9287 17479 25671	34958	Int	0...1	☐	Signal for switching the effective process value between the first process value X1 and second process value X2.

9 | ohnE

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
CDis3	r/w	base 1dP 2dP 3dP	126 8318 16510 24702	33020	Enum	Enum_ContrDis3		Display 3 of controller Operating Level (only visible with Engineering Tool), e.g. text only, value display or bargraph. If text only is selected, this is fixed in the display. With the other settings, entering a text causes the display to switch cyclically from one to the other.
						0	No value / only a fixed text.	
						1	value display	
						2	Output value as a bargraph.	
						3	Control deviation as a bargraph.	
						4	Process value as a bargraph.	
ContStdS	r/w	base 1dP 2dP 3dP	120 8312 16504 24696	33008	Float	1...9999999	☑	This address consists of 2 float data transferred always together: 1st data defines the number of operating hours after reaching InF.1 will be set. 2nd data defines the number of duty cycles after reaching InF.2 will be set.

9	ohnE

•	ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
DigForc	r/w	base 1dP 2dP 3dP	121 8313 16505 24697	33010	Int	0...255	☑	This address consists of 2 bytes, which can only be transmitted together: 1st datum defines which inputs are to be forced. Bit 0 = analog Input 1 Bit 1 = analog Input 2 Bit 2 = analog Input 3 Bit 3 = not used Bit 4 = digital Input 1 Bit 5 = digital Input 2 Bit 6 = digital Input 3 Bit 7 = not used 2nd datum defines which outputs are to be forced. Bit 0 = Output 1 Bit 1 = Output 2 Bit 2 = Output 3 Bit 3 = Output 4 Bit 4 = Output 5 Bit 5 = Output 6
ErwBedie	r/w	base 1dP 2dP 3dP	124 8316 16508 24700	33016	Int	0...8000	☐	This address consists of 9 words. The words can only be transmitted together. The first 8 words describe the data to be displayed in the extended Operating Level. The 9th word defines the datum to be shown in the 2nd display value (instead of the setpoint). The basic address is to be entered as the value.
Lin	r/w	base 1dP 2dP 3dP	139 8331 16523 24715	33046	Float	-9999...9999	☑	16 float values for linearization table with 16 entries structure: input1, output1 input2, output2 ... Input values must be strictly monotonous rising. Starting from input3 a switching off value can be given.
LocBedie	r/w	base 1dP 2dP 3dP	123 8315 16507 24699	33014	Int	0...255	☐	This address consists of 2 rsp. 3 bytes defining the release of operating levels. They can olny be transferred together. byte 1 blocking of operating level standard device: byte 2 blocking of operating level programmer: byte 2 blocking of programmer level byte 3 blocking of operating level (content on request)
Pass	r/w	base 1dP 2dP 3dP	125 8317 16509 24701	33018	Int	0...9999	☑	Password. 4-digit number for the password-protected access to blocked operating functions such as e.g. the Calibrating Level.
PDis3	r/w	base 1dP 2dP 3dP	130 8322 16514 24706	33028	Int	0...5	☐	Display 3 of the programmer Operating Level. Selection from a combination of important (time) counters for displaying the program status, e.g. segment number or remaining program time.
T.dis3	r/w	base 1dP 2dP 3dP	900 9092 17284 25476	34568	Text	0...255	☐	This address contains 8 bytes for the text that is to appear in Display 3.No text: 1st byte 0x00.

9 ohnE

● ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
T.Inf	r/w	base 1dP 2dP 3dP	901 9093 17285 25477	34570	Text	0...255	☐	This address contains 16 bytes. Bytes 1 – 8: user-defined text for message Inf.1 Bytes 9 – 16: user-defined text for message Inf.2 No text: 1st byte 0x00
T.Prog	r/w	base 1dP 2dP 3dP	902 9094 17286 25478	34572	Text	0...255	☐	This address contains 128 bytes.These data contain the user-defined texts for the programs. Bytes 1 - 8 user-defined text for program 1 Bytes 9 - 16 user-defined text for program 2 Bytes 17 - 24 user-defined text for program 3 Bytes 25 - 32 user-defined text for program 4 Bytes 33 - 40 user-defined text for program 5 Bytes 41 - 48 user-defined text for program 6 Bytes 49 - 56 user-defined text for program 7 Bytes 57 - 64 user-defined text for program 8 Bytes 65 - 72 user-defined text for program 9 Bytes 73 - 80 user-defined text for program 10 Bytes 81 - 88 user-defined text for program 11 Bytes 89 - 96 user-defined text for program 12 Bytes 97 - 104 user-defined text for program 13 Bytes 105 - 112 user-defined text for program 14 Bytes 113 - 120 user-defined text for program 15 Bytes 121 - 128 user-defined text for program 16
Tdis3	r/w	base 1dP 2dP 3dP	128 8320 16512 24704	33024	Int	2...60	☐	Display cycle for Display 3 in seconds. If a value or a bargraph is shown in Display 3, an additional text can be selected. The text is displayed briefly after every cycle time instead of the value or bargraph.
ValuDis3	r/w	base 1dP 2dP 3dP	127 8319 16511 24703	33022	Int	0...8000	☐	Address, which defines the display value in Display 3.
VisibelM	r/w	base 1dP 2dP 3dP	903 9095 17287 25479	34574	Int	0...255	☑	This address consists of 55 bytes, which define the visibility mask. They can be transferred only together. The mask defines the configurations and parameter represented in the operation (contents on request).

● PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Conf	r/w	base 1dP 2dP 3dP	1 8193 16385 24577	32770	Int	0...2	☐	Start/Stop and abortion of the configuration mode 0 = End of configuration 1 = Start of configuration 2 = Abort configuration

9 ohnE

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
UPD	r/w	base 1dP 2dP 3dP	95 8287 16479 24671	32958	Enum	Enum_Aenderungsflag		Status message indicating that parameter / configuration have been changed via the front panel.

0	No change via the front panel keys.
1	A change has been made via the front panel keys, which must be processed.

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Hw.Opt	r	base 1dP 2dP 3dP	200 8392 16584 24776	33168	Int	0...65535	☑	
Sw.Op	r	base 1dP 2dP 3dP	201 8393 16585 24777	33170	Int	0...255	☐	Software version XY Major and Minor Release (e.g. 21 = Version 2.1). The software version specifies the firmware in the unit. For the correct interaction of E-Tool and device, it must match the operating version (OpVersion) in the E-Tool.
Bed.V	r	base 1dP 2dP 3dP	202 8394 16586 24778	33172	Int	0...255	☐	Operating version (numeric value). For the correct interaction of E-Tool and device, the software version and operating version must match.
Unit	r	base 1dP 2dP 3dP	203 8395 16587 24779	33174	Int	0...255	☐	Identification of the device.
S.Vers	r	base 1dP 2dP 3dP	204 8396 16588 24780	33176	Int	100...255	☐	The sub-version number is given as an additional index for precise definition of software version.
Uident	r	base 1dP 2dP 3dP	910 9102 17294 25486	34588	Text	...	☐	Device identification. Via this Modbus address, up to 14 data units (28 bytes) can be defined. Bytes 1 - 15 order number of the device Bytes 16 - 19 Ident number 1 Bytes 20 + 21 Ident number 2 Bytes 22 - 25 OEM number Bytes 26 - 28 Software order number
IntUnitD	r	base 1dP 2dP 3dP	911 9103 17295 25487	34590	Text	...	☐	Internal device data

9 ohnE

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
St.Ala	r	base	250	33268	Int	0...31	☐	Alarm status: Bit-wise coded status of the individual alarms, e.g. exceeded limit value or Loop.
		1dP	8442					
		2dP	16634					
		3dP	24826					

Bit 0 Existing/stored exceeded limit 1
Bit 1 Existing/stored exceeded limit 2
Bit 2 Existing/stored exceeded limit 3
Bit 3 Not used
Bit 4 Existing/stored loop alarm
Bit 5 Existing/stored heating current alarm
Bit 6 Existing/stored SSR alarm
Bit 7 Not used
Bit 8 Existing exceeded limit 1
Bit 9 Existing exceeded limit 2
Bit 10 Existing exceeded limit 3
Bit 11 Not used
Bit 12 Existing loop alarm
Bit 13 Existing heating current alarm
Bit 14 Existing SSR alarm
Bit 15 Not used

St.Do	r	base	251	33270	Int	0...31	☐	Status of the digital outputs
		1dP	8443					Bit 0 digital output 1
		2dP	16635					Bit 1 digital output 2
		3dP	24827					Bit 2 digital output 3
								Bit 3 digital output 4
								Bit 4 digital output 5
								Bit 5 digital output 6

St.Ain	r	base	252	33272	Int	0...7	☐	Bit-coded status of the analog input (fault, e.g. short circuit)
		1dP	8444					
		2dP	16636					
		3dP	24828					

Bit 0 Break at Input 1
Bit 1 Reversed polarity at Input 1
Bit 2 Short circuit at Input 1
Bit 3 Not used
Bit 4 Break at Input 2
Bit 5 Reversed polarity at Input 2
Bit 6 Short-circuit at Input 2
Bit 7 Not used
Bit 8 Break at Input 3 (only KS 90)
Bit 9 Reversed polarity at Input 3 (only KS 90)
Bit 10 Short-circuit at Input 3 (only KS 90)
Bit 11 Not used

9 ohnE

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
St.Di	r	base	253	33274	Int	0...7	☐	Status of the digital inputs or of push-buttons (binary coded).
		1dP	8445					
		2dP	16637					
		3dP	24829					

						Bit 0 Input 1	
						Bit 1 Input 2	
						Bit 2 Input 3	
						Bit 8 Status of 'F' key	
						Bit 9 Status of 'A/M' key	
						Bit 10 Status of 'Sel' key	
						Bit 11 Status of 'Down' key	
						Bit 12 Status of 'Up' key	
						Bit 13 Status of 'Loc' key	

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
F.Di	r/w	base	303	33374	Int	0...1	☐	Forcing of digital inputs. Forcing involves the external operation of at least one input. The instrument takes over this input value (preset value for inputs from a superordinate system, e.g. for a function test.)
		1dP	8495					
		2dP	16687					
		3dP	24879					

						Bit 0 Forcing of digital input 1	
						Bit 1 Forcing of digital input 2	
						Bit 2 Forcing of digital input 3	
						Bit 3 Forcing of digital input 4	
						Bit 4 Forcing of digital input 5	

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
F.Do	r/w	base	304	33376	Int	0...15	☐	Forcing of digital outputs. Forcing involves the external operation of at least one output. The instrument has no influence on this output (use of free outputs by superordinate system).
		1dP	8496					
		2dP	16688					
		3dP	24880					

10 ohnE1

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.1	r	base	232	33232	Float	-1999...9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
		1dP	8424					
		2dP	16616					
		3dP	24808					
In.1r	r	base	240	33248	Float	-1999...9999	☐	Measurement value before the measurement value correction (unprocessed).
		1dP	8432					
		2dP	16624					
		3dP	24816					
F.Inp	r/w	base	300	33368	Float	-1999...9999	☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)
		1dP	8492					
		2dP	16684					
		3dP	24876					

11 ohnE2

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.2	r	base 1dP 2dP 3dP	233 8425 16617 24809	33234	Float	-1999...9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
In.2r	r	base 1dP 2dP 3dP	241 8433 16625 24817	33250	Float	-1999...9999	☐	Measurement value before the measurement value correction (unprocessed).
F.Inp	r/w	base 1dP 2dP 3dP	301 8493 16685 24877	33370	Float	-1999...9999	☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)

12 ohnE3

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.3	r	base 1dP 2dP 3dP	234 8426 16618 24810	33236	Float	-1999...9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
In.3r	r	base 1dP 2dP 3dP	242 8434 16626 24818	33252	Float	-1999...9999	☐	Measurement value before the measurement value correction (unprocessed).
F.Inp	r/w	base 1dP 2dP 3dP	302 8494 16686 24878	33372	Float	-1999...9999	☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)
F.Out1	r/w	base 1dP 2dP 3dP	305 8497 16689 24881	33378	Float	0...120	☐	Forcing value of the analog output. Forcing involves the external operation of an output, i.e. the instrument has no influence on this output. (Used for the operation of free outputs e.g. by a supervisory PLC.)

13 ohnE4

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
F.Out2	r/w	base 1dP 2dP 3dP	306 8498 16690 24882	33380	Float	0...120	☐	Forcing value of the analog output. Forcing involves the external operation of an output, i.e. the instrument has no influence on this output. (Used for the operation of free outputs e.g. by a supervisory PLC.)

14 othr

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
bAud	r/w	base 1dP 2dP 3dP	180 8372 16564 24756	33128	Enum	Enum_Baud	Bit rate of the interface (only visible with OPTION). The bit rate determines the transmission speed.
						0 2400 Baud	
						1 4800 Baud	
						2 9600 Baud	
						3 19200 Baud	
Addr	r/w	base 1dP 2dP 3dP	181 8373 16565 24757	33130	Int	1...247 ☐	Address on the interface (only visible with OPTION)
PrtY	r/w	base 1dP 2dP 3dP	182 8374 16566 24758	33132	Enum	Enum_Parity	Parity of data on the interface (only visible with OPTION). Simple possibility of checking that transferred data is correct.
						0 No parity, with 2 stop bits.	
						1 even parity	
						2 odd parity	
						3 no parity (1 stop bit)	
dELY	r/w	base 1dP 2dP 3dP	183 8375 16567 24759	33134	Int	0...200 ☐	Response delay [ms] (only visible with OPTION). Additional delay time before the received message may be answered on the Modbus. (Might be necessary, if the same line is used for transmit/receive.)
dp.Ad	r/w	base 1dP 2dP 3dP	195 8387 16579 24771	33158	Int	0...126 ☐	Address of the device on the PROFIBUS. The address identifies the device clearly.
bc.uP	r/w	base 1dP 2dP 3dP	196 8388 16580 24772	33160	Enum	Enum_BackupControl	behaviour as backup controller. The control function is done by the master. The instrument provides the display, reads the measured values and outputs the correcting variable. If bus communication (or the master) fails, the controller changes to normal operation.
						0 The backup function is not active.	
						1 With backup function. Operates in the positioner mode as long as bus communication is functional. If bus communication (or the master) fails, the controller changes to normal operation.	
Unit	r/w	base 1dP 2dP 3dP	170 8362 16554 24746	33108	Enum	Enum_Unit	Physical unit (temperature), f.e.°C
						0 without unit	
						1 °C	
						2 °F	

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● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
dP	r/w	base	171	33110	Enum	Enum_dP	Decimal point (max. no of decimals). Format of the measured value display.
		1dP	8363				
		2dP	16555				
		3dP	24747				

0	no digit behind the decimal point	
1	Display has one decimal.	
2	Display has two decimals.	
3	Display has three decimals.	

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
LEd	r/w	base	190	33148	Enum	Enum_Led	Meaning of the signalling LEDs. Selection of a combination of the displayable signals.
		1dP	8382				
		2dP	16574				
		3dP	24766				

10	The digital outputs OUT1, OUT2, OUT3, and OUT4 are displayed.
11	Display of controller output y1 (heating / open), alarm1, alarm2, alarm3
12	Display of controller output y1 (heating / open), controller output y2 (cooling / close), alarm1, alarm2
13	Display of controller output y2 (cooling / close), controller output y1 (heating / open), alarm1, alarm2
20	Display of controller output y1 (heating / open), controller output y2 (cooling / close), and the programmer outputs Track, Track2.
21	Display of controller output y2 (cooling / close), controller output y1 (heating / open), and the programmer outputs Track1, Track2.
22	Display of the programmer outputs Track1, Track2, Track3, and Track4.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
dISP	r/w	base	172	33112	Int	0...10 ☐	Brightness of the display.
		1dP	8364				
		2dP	16556				
		3dP	24748				
C.dEL	r/w	base	184	33136	Int	0...200 ☐	For both interfaces, Modbus only. Additional acceptable delay time between 2 received bytes, before "end of message" is assumed. This time is needed if data is not transmitted continousely by the modem.
		1dP	8376				
		2dP	16568				
		3dP	24760				
FrEq	r/w	base	150	33068	Enum	Enum_FrEq	Switchover of the applied mains frequency 50 / 60 Hz, thereby better adaptation of the input filter for hum suppression.
		1dP	8342				
		2dP	16534				
		3dP	24726				

0	Mains frequency is 50 Hz.
1	Mains frequency is 60 Hz.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
MASt	r/w	base	185	33138	Enum	Enum_MASt	Device works as Modbus master. The communication is executed according to the master/slave principle, whereby the device can be operated as master or as slave. Operation as master must be configured here.
		1dP	8377				
		2dP	16569				
		3dP	24761				

0	No, the unit is operated as a Modbus slave.
1	Yes, the unit is operated as a Modbus master.

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● ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Cycl	r/w	base 1dP 2dP 3dP	186 8378 16570 24762	33140	Int	0...200	☐	Cycle time (in seconds) during which the Modbus master transmits its message on the bus.
AdrO	r/w	base 1dP 2dP 3dP	187 8379 16571 24763	33142	Int	1...65535	☐	Target address to which the data specified with AdrU are output on the bus.
AdrU	r/w	base 1dP 2dP 3dP	188 8380 16572 24764	33144	Int	1...65535	☐	Modbus address of the data output on the bus by the Modbus master.
Numb	r/w	base 1dP 2dP 3dP	189 8381 16573 24765	33146	Int	0...100	☐	Quantity of data that are to be transmitted from the Modbus master.
dp.ra	r/w	base 1dP 2dP 3dP	197 8389 16581 24773	33162	Int	0...8191	☐	Addresses of the data that are to be read out of the device via the PROFIBUS (57 values).
dp.wr	r/w	base 1dP 2dP 3dP	198 8390 16582 24774	33164	Int	0...8191	☐	Addresses of the data that are to be written into the device via the PROFIBUS (57 values).

● Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
E.1	r/w	base 1dP 2dP 3dP	210 8402 16594 24786	33188	Enum	Defect	Err 1 (internal error) Contact Service.

0	No fault exists (Reset).
2	The device is defective.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
E.2	r/w	base 1dP 2dP 3dP	211 8403 16595 24787	33190	Enum	Problem	Err 2 (internal error, resettable) (As a process value via fieldbus interface not writable!)

0	No fault, resetting possible (Reset).
1	A fault has occurred and has been stored.

14 othr

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
FbF.1	r/w	base	212	33192	Enum	Break		Sensor break at input INP1. Typical causes and suggested remedies: Sensor fault: replace INP1 sensor. Wiring fault: check connections of INP1. (As a process value via fieldbus interface not writable!)
		1dP	8404					
		2dP	16596					
		3dP	24788					
						0	No fault,	resetting of the sensor break alarm possible (Reset).
						1		The sensor fault alarm has been triggered and stored; the fault is no longer present. The operator must acknowledge the error message in order to delete it from the error list.
						2		Sensor break: The sensor is defective or there is a wiring fault.
Sht.1	r/w	base	213	33194	Enum	Short		Short circuit at input INP1. Typical causes and suggested remedies: Sensor fault: replace INP1 sensor. Wiring fault: check connections of INP1. (As a process value via fieldbus interface not writable!)
		1dP	8405					
		2dP	16597					
		3dP	24789					
						0	No fault,	resetting of the short-circuit alarm possible (Reset).
						1		A short-circuit fault has occurred and has been stored.
						2		A short-circuit fault has occurred.
POL.1	r/w	base	214	33196	Enum	Polarity		Incorrect polarity at input INP1. Suggested remedy: reverse the polarity at INP1. (As a process value via fieldbus interface not writable!)
		1dP	8406					
		2dP	16598					
		3dP	24790					
						0		No fault, resetting of the incorrect polarity alarm possible (Reset).
						1		An incorrect polarity fault has occurred and has been stored.
						2		Incorrect polarity. The wiring of the input circuit is not correct.
FbF.2	r/w	base	215	33198	Enum	Break		Sensor break at input INP2. Typical causes and suggested remedies: Sensor fault: replace INP2 sensor. Wiring fault: check connections of INP2. (As a process value via fieldbus interface not writable!)
		1dP	8407					
		2dP	16599					
		3dP	24791					
						0	No fault,	resetting of the sensor break alarm possible (Reset).
						1		The sensor fault alarm has been triggered and stored; the fault is no longer present. The operator must acknowledge the error message in order to delete it from the error list.
						2		Sensor break: The sensor is defective or there is a wiring fault.
Sht.2	r/w	base	216	33200	Enum	Short		Short circuit at input INP2. Typical causes and suggested remedies: Sensor fault: replace INP2 sensor. Wiring fault: check connections of INP2. (As a process value via fieldbus interface not writable!)
		1dP	8408					
		2dP	16600					
		3dP	24792					
						0	No fault,	resetting of the short-circuit alarm possible (Reset).
						1		A short-circuit fault has occurred and has been stored.
						2		A short-circuit fault has occurred.
POL.2	r/w	base	217	33202	Enum	Polarity		Incorrect polarity at input INP2. Suggested remedy: reverse the polarity at INP2. (As a process value via fieldbus interface not writable!)
		1dP	8409					
		2dP	16601					
		3dP	24793					
						0		No fault, resetting of the incorrect polarity alarm possible (Reset).
						1		An incorrect polarity fault has occurred and has been stored.
						2		Incorrect polarity. The wiring of the input circuit is not correct.

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● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
HCA	r/w	base 1dP 2dP 3dP	218 8410 16602 24794	33204	Enum	HeatCurr	Heating current alarm.Possible fault s are an open heating current circuit with current I < heating current limit, or current I > heating current limit (depending on configuration), or defective heater band.Suggested remedy: check heating current circuit, replace heater band if necessary. (As a process value via fieldbus interface not writable!)

		0	No fault, resetting of the heating current alarm possible (Reset).
		1	A heating current fault has occurred and has been stored.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SSr	r/w	base 1dP 2dP 3dP	219 8411 16603 24795	33206	Enum	Short	Alarm message: SSr Possible causes: a current flow in the heating circuit although controller is 'off', or the SSR is defective. Suggested remedy: check heating current circuit, replace the solid-state relay, if necessary. (As a process value via fieldbus interface not writable!)

		0	No fault, resetting of the short-circuit alarm possible (Reset).
		1	A short-circuit fault has occurred and has been stored.
		2	A short-circuit fault has occurred.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
LooP	r/w	base 1dP 2dP 3dP	220 8412 16604 24796	33208	Enum	LoopAlarm	Alarm message: LooP Possible causes: faulty or incorrectly connected input circuit, or output not connected correctly. Suggested remedy: check heating or cooling circuit, check sensor function and replace if necessary, check controller and output switching actuator. (As a process value via fieldbus interface not writable!)

		0	No fault, resetting of the loop alarm possible (Reset).
		1	A control loop fault has occurred and has been stored.
		2	A control loop fault has occurred, there was no clear process response following a step change of the output.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
AdA.H	r/w	base 1dP 2dP 3dP	221 8413 16605 24797	33210	Enum	Tune	Error message from "heating" self-tuning and reason for aborted tuning attempt. Hints for trouble-shooting: Check operating sense of actuator. Is the loop closed? Is there an output limit? Adapt the setpoint. Increase step output for Yopt. (As a process value via fieldbus interface not writable!)

		0	no error
		3	Process responds in the wrong direction. Possible remedy: Check the output signal sense (inverse <-> direct), and re-configure the controller if necessary (inverse <-> direct).
		4	No response from the process. Perhaps the control loop is open. Possible remedy: Check sensor, connections, and process.
		5	The process value turning point of the step response is too low. Possible remedy: Increase the permitted step output range, i.e. increase the parameter Y.Hi ('heating') or reduce the parameter Y.Lo ('cooling').
		6	Self-tuning was aborted due to the risk of an exceeded setpoint. Possible remedy: Repeat the attempt with an increased setpoint reserve.
		7	The step output change is not large enough (minimum change > 5 %). Possible remedy: Increase the permitted step output range, i.e. increase the parameter Y.Hi ('heating') or reduce the parameter Y.Lo ('cooling').
		8	Setpoint reserve must be given before generating the step output change. Possible remedy: decrease set-point range, change set-point, or change process value.
		9	The pulse response attempt has failed. No useful parameters were determined. Perhaps the control loop is open. Possible remedy: Check sensor, connections, and process.

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● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
AdA.C	r/w	base 1dP 2dP 3dP	222 8414 16606 24798	33212	Enum	Tune		Error message from "cooling" self-tuning and reason for aborted tuning attempt. Hints for trouble-shooting: Check operating sense of actuator. Is the loop closed? Is there an output limit? Adapt the setpoint. Increase step output for Yopt. (As a process value via fieldbus interface not writable!)
						0	no error	
						3	Process responds in the wrong direction. Possible remedy: Check the output signal sense (inverse <-> direct), and re-configure the controller if necessary (inverse <-> direct).	
						4	No response from the process. Perhaps the control loop is open. Possible remedy: Check sensor, connections, and process.	
						5	The process value turning point of the step response is too low. Possible remedy: Increase the permitted step output range, i.e. increase the parameter Y.Hi ('heating') or reduce the parameter Y.Lo ('cooling').	
						6	Self-tuning was aborted due to the risk of an exceeded setpoint. Possible remedy: Repeat the attempt with an increased setpoint reserve.	
						7	The step output change is not large enough (minimum change > 5 %). Possible remedy: Increase the permitted step output range, i.e. increase the parameter Y.Hi ('heating') or reduce the parameter Y.Lo ('cooling').	
						8	Setpoint reserve must be given before generating the step output change. Possible remedy: decrease set-point range, change set-point, or change process value.	
						9	The pulse response attempt has failed. No useful parameters were determined. Perhaps the control loop is open. Possible remedy: Check sensor, connections, and process.	
Lim.1	r/w	base 1dP 2dP 3dP	223 8415 16607 24799	33214	Enum	Limit		Limit value 1 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting of the limit value alarm possible (Reset).	
						1	The limit value has been exceeded, and the fault has been stored.	
						2	The limit value has been exceeded; the monitored (measurement) value is outside the set limits.	
Lim.2	r/w	base 1dP 2dP 3dP	224 8416 16608 24800	33216	Enum	Limit		Limit value 2 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting of the limit value alarm possible (Reset).	
						1	The limit value has been exceeded, and the fault has been stored.	
						2	The limit value has been exceeded; the monitored (measurement) value is outside the set limits.	
Lim.3	r/w	base 1dP 2dP 3dP	225 8417 16609 24801	33218	Enum	Limit		Limit value 3 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting of the limit value alarm possible (Reset).	
						1	The limit value has been exceeded, and the fault has been stored.	
						2	The limit value has been exceeded; the monitored (measurement) value is outside the set limits.	

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Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
InF.1	r/w	base	226	33220	Enum	Time		Message from the operating hours counter that the preset no. of hours for this maintenance period has been reached. The op-hours counter for the maintenance period is reset when this message is acknowledged. Counting the operating hours is used for preventive maintenance. - Acknowledge the error to reset it. (As a process value via fieldbus interface not writable!)
		1dP	8418					
		2dP	16610					
		3dP	24802					
						0	No signal,	resetting of the time limit signal possible (Reset).
						1	Operating hours - limit value (maintenance period) reached: please acknowledge.	
InF.2	r/w	base	227	33222	Enum	Switch		Message from the switching cycle counter that the preset no. of switch cycles for this maintenance period has been reached. The cycle counter for the maintenance period is reset when this message is acknowledged. Counting the switching cycles is used for preventive maintenance. - Acknowledge the error to reset it. (As a process value via fieldbus interface not writable!)
		1dP	8419					
		2dP	16611					
		3dP	24803					
						0	No error message, resetting of the switching cycle counter possible (Reset).	
						1	Set limit of the switching cycle counter (maintenance period) has been reached: please acknowledge.	
E.4	r/w	base	228	33224	Enum	Problem		Hardware fault.Cause: Code number and hardware are not identical. Remedy: Contact Service. (As a process value via fieldbus interface not writable!)
		1dP	8420					
		2dP	16612					
		3dP	24804					
						0	No fault,	resetting possible (Reset).
						1	A fault has occurred and has been stored.	
FbF.3	r/w	base	400	33568	Enum	Break3		Sensor break at input INP3. Typical causes and suggested remedies: Sensor fault: replace INP3 sensor. Wiring fault: check connections of INP3. (As a process value via fieldbus interface not writable!)
		1dP	8592					
		2dP	16784					
		3dP	24976					
						0	No fault, resetting of the sensor break alarm possible (Reset).	
						1	The sensor fault alarm has been triggered and stored; the fault is no longer present. The operator must acknowledge the error message in order to delete it from the error list.	
						2	Sensor break: The sensor is defective or there is a wiring fault.	
Sht.3	r/w	base	401	33570	Enum	Short3		Short circuit at input INP3. Typical causes and suggested remedies: Sensor fault: replace INP3 sensor. Wiring fault: check connections of INP3. (As a process value via fieldbus interface not writable!)
		1dP	8593					
		2dP	16785					
		3dP	24977					
						0	No fault,	resetting of the short-circuit alarm possible (Reset).
						1	A short-circuit fault has occurred and has been stored.	
						2	A short-circuit fault has occurred.	
POL.3	r/w	base	402	33572	Enum	Polarity3		Incorrect polarity at input INP3. Suggested remedy: reverse the polarity at INP3. (As a process value via fieldbus interface not writable!)
		1dP	8594					
		2dP	16786					
		3dP	24978					
						0	No fault, resetting of the incorrect polarity alarm possible (Reset).	
						1	An incorrect polarity fault has occurred and has been stored.	
						2	Incorrect polarity. The wiring of the input circuit is not correct.	

Signal

14 othr

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
E.3	r/w	base 1dP 2dP 3dP	403 8595 16787 24979	33574	Enum	ConfErr	configuration fault. Typical causes and suggested remedies: Missing or faulty configuration: check interactions in the configuration and parameter settings. (As a process value via fieldbus interface not writable!)
						0	No configuration error
						2	There is a configuration error. The configuration is missing or wrong, or it does not match the parameter settings.
dAc	r/w	base 1dP 2dP 3dP	404 8596 16788 24980	33576	Enum	Enum_DacAlarm	DAC alarm, possibly with cause. On all controllers with position feedback Yp, the actuator can be monitored for incorrect operation, e.g. defective motor or excessive play due to wear. In all cases, the controller changes into manual operation and switches the outputs off. (As a process value via fieldbus interface not writable!)
						0	no error
						3	Output is blocked - check the drive for blockage After solving the technical problem the DAC errror can be acknowledged in the error list. Thereafter the controller works again in normal operation mode.
						4	Wrong method of operation - rong phasing, defect motor capacitor After solving the technical problem the DAC errror can be acknowledged in the error list. Thereafter the controller works again in normal operation mode.
						5	Fail at Yp measurement - check the connection to the Yp input After solving the technical problem the DAC errror can be acknowledged in the error list. Thereafter the controller works again in normal operation mode.
						6	Calibration error - manual calibration necessary After solving the technical problem the DAC errror can be acknowledged in the error list. Thereafter the controller works again in normal operation mode.
E.5	r/w	base 1dP 2dP 3dP	410 8602 16794 24986	33588	Enum	E5	PROFIBUS fault. Problem (1): The fault occurrence has been stored. The fault is no longer present, but has not yet been acknowledged. Defect (2): The PROFIBUS communication is faulty. Please contact Service. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting possible (Reset).
						1	A Profibus error has occurred and has been stored.
						2	Please contact Service.
dP.1	r/w	base 1dP 2dP 3dP	411 8603 16795 24987	33590	Enum	Problem_dp	PROFIBUS access fault. Possible causes: bus fault, connector problem or no connection to bus. Possible remedies: Check bus cable, check connector & leads. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting possible (Reset).
						2	A Profibus fault has occurred, there is no communication.
dP.2	r/w	base 1dP 2dP 3dP	412 8604 16796 24988	33592	Enum	Problem_dp	PROFIBUS configuration fault. Possible cause: incorrectly configured DP telegram. Suggested remedy: check DP telegram configuration in the master. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting possible (Reset).
						2	A Profibus fault has occurred, there is no communication.

14 othr

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
dP.3	r/w	base 1dP 2dP 3dP	413 8605 16797 24989	33594	Enum	Problem_dp	PROFIBUS parameter fault. Possible cause: incorrect parameters in DP telegram. Suggested remedy: check DP telegram parameters in the master (As a process value via fieldbus interface not writable!)
						0 No fault, resetting possible (Reset).	
						2 A Profibus fault has occurred, there is no communication.	
dP.4	r/w	base 1dP 2dP 3dP	414 8606 16798 24990	33596	Enum	Problem_dp	PROFIBUS data exchange fault. No exchange of user data. Possible causes: bus fault, address fault, master stopped. Suggested remedy: check cable connections, check address, check master setting. (As a process value via fieldbus interface not writable!)
						0 No fault, resetting possible (Reset).	
						2 A Profibus fault has occurred, there is no communication.	

15 Out.1

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.Act	r/w	base 1dP 2dP 3dP	4150 12342 20534 28726	41068	Enum	Enum_OAct	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.
						0 direct / normally open	
						1 inverse / normally closed	
Y.1	r/w	base 1dP 2dP 3dP	4151 12343 20535 28727	41070	Enum	Enum_Y1	Output function: Controller output Y1
						0 not active	
						1 This output provides the controller output Y1.	
Y.2	r/w	base 1dP 2dP 3dP	4152 12344 20536 28728	41072	Enum	Enum_Y2	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
						0 not active	
						1 This output provides the controller output Y2.	
Lim.1	r/w	base 1dP 2dP 3dP	4153 12345 20537 28729	41074	Enum	Enum_Lim1	Output function: Signal limit 1
						0 not active	
						1 The output is activated by an alarm from limit value 1.	

15 Out.1

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Lim.2	r/w	base	4154	41076	Enum	Enum_Lim2	Output function: Signal limit 2
		1dP	12346				
		2dP	20538				
		3dP	28730				
						0 not active	
						1	The output is activated by an alarm from limit value 2.
Lim.3	r/w	base	4155	41078	Enum	Enum_Lim3	Output function: Signal limit 3
		1dP	12347				
		2dP	20539				
		3dP	28731				
						0 not active	
						1	The output is activated by an alarm from limit value 3.
LP.AL	r/w	base	4157	41082	Enum	Enum_OUT_LPAL	Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value has to change with an output signal of maximum value, else loop alarm is generated.
		1dP	12349				
		2dP	20541				
		3dP	28733				
						0 not active	
						1	The loop alarm (= open loop alarm) is assigned to this output.
HC.AL	r/w	base	4158	41084	Enum	Enum_OUT_HCAL	Output function: Signal Heat current alarm. Either break (= current I < heating current limit) can be monitored or overload (= current I > heating current limit), dependent on configuration.
		1dP	12350				
		2dP	20542				
		3dP	28734				
						0 not active	
						1	The heating current alarm is assigned to this output.
HC.SC	r/w	base	4159	41086	Enum	Enum_HCSC	Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output is switched off.
		1dP	12351				
		2dP	20543				
		3dP	28735				
						0 not active	
						1	Output activated by an SSR fault.
P.End	r/w	base	4161	41090	Enum	Enum_PEnd	Output function: Signal Program end. This message is available when the program has been completed (only when configured as a program controller).
		1dP	12353				
		2dP	20545				
		3dP	28737				
						0 not active	
						1	This output is activated by the message 'Program end'.
FAi.1	r/w	base	4162	41092	Enum	Enum_FAi1	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
		1dP	12354				
		2dP	20546				
		3dP	28738				
						0 not active	
						1	The output sends the error message 'INP1 fault'.

15 Out.1

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
FAi.2	r/w	base 1dP 2dP 3dP	4163 12355 20547 28739	41094	Enum	Enum_FAi2	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
						0 not active	
						1 The output sends the error message 'INP2 fault'.	
FAi.3	r/w	base 1dP 2dP 3dP	4164 12356 20548 28740	41096	Enum	Enum_FAi3	Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.
						0 not active	
						1 The output sends the error message 'INP3 fault'.	
PrG.1	r/w	base 1dP 2dP 3dP	4165 12357 20549 28741	41098	Enum	Enum_PrG1	Output function: Signal programmer's control output no. 1. A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	
						1 Control output 1 is assigned to this output.	
PrG.2	r/w	base 1dP 2dP 3dP	4166 12358 20550 28742	41100	Enum	Enum_PrG2	Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	
						1 Control output 2 is assigned to this output.	
PrG.3	r/w	base 1dP 2dP 3dP	4167 12359 20551 28743	41102	Enum	Enum_PrG3	Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	
						1 Control output 3 is assigned to this output.	
PrG.4	r/w	base 1dP 2dP 3dP	4168 12360 20552 28744	41104	Enum	Enum_PrG4	Output function: Signal programmer's control output no. 4. A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	
						1 Control output 4 is assigned to this output.	
CALL	r/w	base 1dP 2dP 3dP	4169 12361 20553 28745	41106	Enum	Enum_CALL	Output: Operator call. At the end of a program segment, a contact is set, e.g. for an acoustic signal. This indicates to the operator that a certain program status has been reached, and operator action is required. Operator calling is used, if the program may only be continued after a check or some kind of operator action.
						0 not active	
						1 The output is switched by an operator call.	

15 Out.1

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
dP.Er	r/w	base 1dP 2dP 3dP	4175 12367 20559 28751	41118	Enum	Enum_DP_ERR	Output function: Signal Fault in the Profibus communication. This output is set when a fault in the Profibus communication occurs. There is no more communication with this device.
			0				Not active
			1				This output sends the Profibus fault.

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Out1	r	base 1dP 2dP 3dP	4180 12372 20564 28756	41128	Enum	Enum_Ausgang	Status of the digital output
			0				off
			1				on
F.Do1	r/w	base 1dP 2dP 3dP	4181 12373 20565 28757	41130	Enum	Enum_Ausgang	Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
			0				off
			1				on

16 Out.2

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.Act	r/w	base 1dP 2dP 3dP	4250 12442 20634 28826	41268	Enum	Enum_OAct	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.
			0				direct / normally open
			1				inverse / normally closed
Y.1	r/w	base 1dP 2dP 3dP	4251 12443 20635 28827	41270	Enum	Enum_Y1	Output function: Controller output Y1
			0				not active
			1				This output provides the controller output Y1.

16 Out.2

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Y.2	r/w	base 1dP 2dP 3dP	4252 12444 20636 28828	41272	Enum	Enum_Y2		Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
						0	not active	
						1	This output provides the controller output Y2.	
Lim.1	r/w	base 1dP 2dP 3dP	4253 12445 20637 28829	41274	Enum	Enum_Lim1		Output function: Signal limit 1
						0	not active	
						1	The output is activated by an alarm from limit value 1.	
Lim.2	r/w	base 1dP 2dP 3dP	4254 12446 20638 28830	41276	Enum	Enum_Lim2		Output function: Signal limit 2
						0	not active	
						1	The output is activated by an alarm from limit value 2.	
Lim.3	r/w	base 1dP 2dP 3dP	4255 12447 20639 28831	41278	Enum	Enum_Lim3		Output function: Signal limit 3
						0	not active	
						1	The output is activated by an alarm from limit value 3.	
LP.AL	r/w	base 1dP 2dP 3dP	4257 12449 20641 28833	41282	Enum	Enum_OUT_LPAL		Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value has to change with an output signal of maximum value, else loop alarm is generated.
						0	not active	
						1	The loop alarm (= open loop alarm) is assigned to this output.	
HC.AL	r/w	base 1dP 2dP 3dP	4258 12450 20642 28834	41284	Enum	Enum_OUT_HCAL		Output function: Signal Heat current alarm. Either break (= current I < heating current limit) can be monitored or overload (= current I > heating current limit), dependent on configuration.
						0	not active	
						1	The heating current alarm is assigned to this output.	
HC.SC	r/w	base 1dP 2dP 3dP	4259 12451 20643 28835	41286	Enum	Enum_HCSC		Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output is switched off.
						0	not active	
						1	Output activated by an SSR fault.	

16 Out.2

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
P.End	r/w	base 1dP 2dP 3dP	4261 12453 20645 28837	41290	Enum	Enum_PEnd	Output function: Signal Program end. This message is available when the program has been completed (only when configured as a program controller).
						0	not active
						1	This output is activated by the message 'Program end'.
FAi.1	r/w	base 1dP 2dP 3dP	4262 12454 20646 28838	41292	Enum	Enum_FAi1	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
						0	not active
						1	The output sends the error message 'INP1 fault'.
FAi.2	r/w	base 1dP 2dP 3dP	4263 12455 20647 28839	41294	Enum	Enum_FAi2	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
						0	not active
						1	The output sends the error message 'INP2 fault'.
FAi.3	r/w	base 1dP 2dP 3dP	4264 12456 20648 28840	41296	Enum	Enum_FAi3	Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.
						0	not active
						1	The output sends the error message 'INP3 fault'.
PrG.1	r/w	base 1dP 2dP 3dP	4265 12457 20649 28841	41298	Enum	Enum_PrG1	Output function: Signal programmer's control output no. 1. A control output is one of the four digital signals that can be operated segment-wise by a program.
						0	not active
						1	Control output 1 is assigned to this output.
PrG.2	r/w	base 1dP 2dP 3dP	4266 12458 20650 28842	41300	Enum	Enum_PrG2	Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.
						0	not active
						1	Control output 2 is assigned to this output.
PrG.3	r/w	base 1dP 2dP 3dP	4267 12459 20651 28843	41302	Enum	Enum_PrG3	Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.
						0	not active
						1	Control output 3 is assigned to this output.

16 Out.2

• ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
PrG.4	r/w	base 1dP 2dP 3dP	4268 12460 20652 28844	41304	Enum	Enum_PrG4	Output function: Signal programmer's control output no. 4. A control output is one of the four digital signals that can be operated segment-wise by a program.
						0	not active
						1	Control output 4 is assigned to this output.
CALL	r/w	base 1dP 2dP 3dP	4269 12461 20653 28845	41306	Enum	Enum_CALL	Output: Operator call. At the end of a program segment, a contact is set, e.g. for an acoustic signal. This indicates to the operator that a certain program status has been reached, and operator action is required. Operator calling is used, if the program may only be continued after a check or some kind of operator action.
						0	not active
						1	The output is switched by an operator call.
dP.Er	r/w	base 1dP 2dP 3dP	4275 12467 20659 28851	41318	Enum	Enum_DP_ERR	Output function: Signal Fault in the Profibus communication. This output is set when a fault in the Profibus communication occurs. There is no more communication with this device.
						0	Not active
						1	This output sends the Profibus fault.

• Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Out2	r	base 1dP 2dP 3dP	4280 12472 20664 28856	41328	Enum	Enum_Ausgang	Status of the digital output
						0	off
						1	on
F.Do2	r/w	base 1dP 2dP 3dP	4281 12473 20665 28857	41330	Enum	Enum_Ausgang	Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
						0	off
						1	on

17 Out.3

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.tYP	r/w	base	4370	41508	Enum	Enum_OtYP	Signal type selection OUT
		1dP	12562				
		2dP	20754				
		3dP	28946				
						0	Relay / logic
						1	0 ... 20 mA continuous
						2	4 ... 20 mA continuous
						3	0...10 V continuous
						4	2...10 V continuous
						5	transmitter supply
O.Act	r/w	base	4350	41468	Enum	Enum_OAct	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.
		1dP	12542				
		2dP	20734				
		3dP	28926				
						0	direct / normally open
						1	inverse / normally closed
Y.1	r/w	base	4351	41470	Enum	Enum_Y1	Output function: Controller output Y1
		1dP	12543				
		2dP	20735				
		3dP	28927				
						0	not active
						1	This output provides the controller output Y1.
Y.2	r/w	base	4352	41472	Enum	Enum_Y2	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
		1dP	12544				
		2dP	20736				
		3dP	28928				
						0	not active
						1	This output provides the controller output Y2.
Lim.1	r/w	base	4353	41474	Enum	Enum_Lim1	Output function: Signal limit 1
		1dP	12545				
		2dP	20737				
		3dP	28929				
						0	not active
						1	The output is activated by an alarm from limit value 1.
Lim.2	r/w	base	4354	41476	Enum	Enum_Lim2	Output function: Signal limit 2
		1dP	12546				
		2dP	20738				
		3dP	28930				
						0	not active
						1	The output is activated by an alarm from limit value 2.

17 Out.3

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Lim.3	r/w	base	4355	41478	Enum	Enum_Lim3	Output function: Signal limit 3
		1dP	12547				
		2dP	20739				
		3dP	28931				
						0 not active	
						1 The output is activated by an alarm from limit value 3.	
LP.AL	r/w	base	4357	41482	Enum	Enum_OUT_LPAL	Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value has to change with an output signal of maximum value, else loop alarm is generated.
		1dP	12549				
		2dP	20741				
		3dP	28933				
						0 not active	
						1 The loop alarm (= open loop alarm) is assigned to this output.	
HC.AL	r/w	base	4358	41484	Enum	Enum_OUT_HCAL	Output function: Signal Heat current alarm. Either break (= current I < heating current limit) can be monitored or overload (= current I > heating current limit), dependent on configuration.
		1dP	12550				
		2dP	20742				
		3dP	28934				
						0 not active	
						1 The heating current alarm is assigned to this output.	
HC.SC	r/w	base	4359	41486	Enum	Enum_HCSC	Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output is switched off.
		1dP	12551				
		2dP	20743				
		3dP	28935				
						0 not active	
						1 Output activated by an SSR fault.	
P.End	r/w	base	4361	41490	Enum	Enum_PEnd	Output function: Signal Program end. This message is available when the program has been completed (only when configured as a program controller).
		1dP	12553				
		2dP	20745				
		3dP	28937				
						0 not active	
						1 This output is activated by the message 'Program end'.	
FAi.1	r/w	base	4362	41492	Enum	Enum_FAi1	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
		1dP	12554				
		2dP	20746				
		3dP	28938				
						0 not active	
						1 The output sends the error message 'INP1 fault'.	
FAi.2	r/w	base	4363	41494	Enum	Enum_FAi2	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
		1dP	12555				
		2dP	20747				
		3dP	28939				
						0 not active	
						1 The output sends the error message 'INP2 fault'.	

17 Out.3

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
FAi.3	r/w	base 1dP 2dP 3dP	4364 12556 20748 28940	41496	Enum	Enum_FAi3	Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.
						0 not active	
						1 The output sends the error message 'INP3 fault'.	
PrG.1	r/w	base 1dP 2dP 3dP	4365 12557 20749 28941	41498	Enum	Enum_PrG1	Output function: Signal programmer's control output no. 1. A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	
						1 Control output 1 is assigned to this output.	
PrG.2	r/w	base 1dP 2dP 3dP	4366 12558 20750 28942	41500	Enum	Enum_PrG2	Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	
						1 Control output 2 is assigned to this output.	
PrG.3	r/w	base 1dP 2dP 3dP	4367 12559 20751 28943	41502	Enum	Enum_PrG3	Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	
						1 Control output 3 is assigned to this output.	
PrG.4	r/w	base 1dP 2dP 3dP	4368 12560 20752 28944	41504	Enum	Enum_PrG4	Output function: Signal programmer's control output no. 4. A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	
						1 Control output 4 is assigned to this output.	
CALL	r/w	base 1dP 2dP 3dP	4369 12561 20753 28945	41506	Enum	Enum_CALL	Output: Operator call. At the end of a program segment, a contact is set, e.g. for an acoustic signal. This indicates to the operator that a certain program status has been reached, and operator action is required. Operator calling is used, if the program may only be continued after a check or some kind of operator action.
						0 not active	
						1 The output is switched by an operator call.	
dP.Er	r/w	base 1dP 2dP 3dP	4375 12567 20759 28951	41518	Enum	Enum_DP_ERR	Output function: Signal Fault in the Profibus communication. This output is set when a fault in the Profibus communication occurs. There is no more communication with this device.
						0 Not active	
						1 This output sends the Profibus fault.	

17 Out.3

• ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Out.0	r/w	base 1dP 2dP 3dP	4371 12563 20755 28947	41510	Float	-1999...9999	☐	Lower scaling limit of the analog output (corresponds to 0%). If current and voltage signals are used as output values, the display can be scaled to the output value in the Parameter Level. The output value of the lower scaling point is indicated in the respective electrical unit (mA / V).
Out.1	r/w	base 1dP 2dP 3dP	4372 12564 20756 28948	41512	Float	-1999...9999	☐	Upper scaling limit of the analog output (corresponds to 100%). If current and voltage signals are used as output values, the display can be scaled to the output value in the Parameter Level. The output value of the upper scaling point is indicated in the respective electrical unit (mA / V).
O.Src	r/w	base 1dP 2dP 3dP	4373 12565 20757 28949	41514	Enum	Enum_OSrc		Signal source of the analog output (visible not with all output signal types O.TYP).

0	not used
1	Controller output y1 (continuous)
2	Controller output y2 (continuous)
3	process value
4	The effective setpoint Weff, which is used for control. Example: The gradient changes the effective setpoint until it reaches the internal (target) setpoint.
5	control deviation xw (process value - set-point)= relative alarm Note: Monitoring with the effective set-point Weff. For example using a ramp it is the changing set-point, not the target set-point of the ramp.
6	Position feedback signal Yp.
7	measured value INP1
8	measured value INP2
9	measured value INP3

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
O.FAI	r/w	base 1dP 2dP 3dP	4374 12566 20758 28950	41516	Enum	Enum_OFail	fail behaviour

0	upscale
1	downscale

• Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Out1	r	base 1dP 2dP 3dP	4380 12572 20764 28956	41528	Enum	Enum_Ausgang	Status of the digital output

0	off
1	on

17 Out.3

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
F.Do1	r/w	base 1dP 2dP 3dP	4381 12573 20765 28957	41530	Enum	Enum_Ausgang	Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
						0 off	
						1 on	
F.Out1	r/w	base 1dP 2dP 3dP	4382 12574 20766 28958	41532	Float	0...120 ☐	Forcing value of the analog output. Forcing involves the external operation of an output, i.e. the instrument has no influence on this output. (Used for the operation of free outputs e.g. by a supervisory PLC.)

18 Out.4

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.tYP	r/w	base 1dP 2dP 3dP	4470 12662 20854 29046	41708	Enum	Enum_OtYP	Signal type selection OUT
						0 Relay / logic	
						1 0 ... 20 mA continuous	
						2 4 ... 20 mA continuous	
						3 0...10 V continuous	
						4 2...10 V continuous	
						5 transmitter supply	
O.Act	r/w	base 1dP 2dP 3dP	4450 12642 20834 29026	41668	Enum	Enum_OAct	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.
						0 direct / normally open	
						1 inverse / normally closed	
Y.1	r/w	base 1dP 2dP 3dP	4451 12643 20835 29027	41670	Enum	Enum_Y1	Output function: Controller output Y1
						0 not active	
						1 This output provides the controller output Y1.	
Y.2	r/w	base 1dP 2dP 3dP	4452 12644 20836 29028	41672	Enum	Enum_Y2	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
						0 not active	
						1 This output provides the controller output Y2.	

18 Out.4

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Lim.1	r/w	base	4453	41674	Enum	Enum_Lim1		Output function: Signal limit 1
		1dP	12645					
		2dP	20837					
		3dP	29029					
						0	not active	
						1	The output is activated by an alarm from limit value 1.	
Lim.2	r/w	base	4454	41676	Enum	Enum_Lim2		Output function: Signal limit 2
		1dP	12646					
		2dP	20838					
		3dP	29030					
						0	not active	
						1	The output is activated by an alarm from limit value 2.	
Lim.3	r/w	base	4455	41678	Enum	Enum_Lim3		Output function: Signal limit 3
		1dP	12647					
		2dP	20839					
		3dP	29031					
						0	not active	
						1	The output is activated by an alarm from limit value 3.	
LP.AL	r/w	base	4457	41682	Enum	Enum_OUT_LPAL		Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value has to change with an output signal of maximum value, else loop alarm is generated.
		1dP	12649					
		2dP	20841					
		3dP	29033					
						0	not active	
						1	The loop alarm (= open loop alarm) is assigned to this output.	
HC.AL	r/w	base	4458	41684	Enum	Enum_OUT_HCAL		Output function: Signal Heat current alarm. Either break (= current I < heating current limit) can be monitored or overload (= current I > heating current limit), dependent on configuration.
		1dP	12650					
		2dP	20842					
		3dP	29034					
						0	not active	
						1	The heating current alarm is assigned to this output.	
HC.SC	r/w	base	4459	41686	Enum	Enum_HCSC		Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output is switched off.
		1dP	12651					
		2dP	20843					
		3dP	29035					
						0	not active	
						1	Output activated by an SSR fault.	
P.End	r/w	base	4461	41690	Enum	Enum_PEnd		Output function: Signal Program end. This message is available when the program has been completed (only when configured as a program controller).
		1dP	12653					
		2dP	20845					
		3dP	29037					
						0	not active	
						1	This output is activated by the message 'Program end'.	

18 Out.4

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
FAi.1	r/w	base 1dP 2dP 3dP	4462 12654 20846 29038	41692	Enum	Enum_FAi1	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
						0 not active	
						1 The output sends the error message 'INP1 fault'.	
FAi.2	r/w	base 1dP 2dP 3dP	4463 12655 20847 29039	41694	Enum	Enum_FAi2	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
						0 not active	
						1 The output sends the error message 'INP2 fault'.	
FAi.3	r/w	base 1dP 2dP 3dP	4464 12656 20848 29040	41696	Enum	Enum_FAi3	Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.
						0 not active	
						1 The output sends the error message 'INP3 fault'.	
PrG.1	r/w	base 1dP 2dP 3dP	4465 12657 20849 29041	41698	Enum	Enum_PrG1	Output function: Signal programmer's control output no. 1. A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	
						1 Control output 1 is assigned to this output.	
PrG.2	r/w	base 1dP 2dP 3dP	4466 12658 20850 29042	41700	Enum	Enum_PrG2	Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	
						1 Control output 2 is assigned to this output.	
PrG.3	r/w	base 1dP 2dP 3dP	4467 12659 20851 29043	41702	Enum	Enum_PrG3	Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	
						1 Control output 3 is assigned to this output.	
PrG.4	r/w	base 1dP 2dP 3dP	4468 12660 20852 29044	41704	Enum	Enum_PrG4	Output function: Signal programmer's control output no. 4. A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	
						1 Control output 4 is assigned to this output.	

18 Out.4

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
CALL	r/w	base 1dP 2dP 3dP	4469 12661 20853 29045	41706	Enum	Enum_CALL	Output: Operator call. At the end of a program segment, a contact is set, e.g. for an acoustic signal. This indicates to the operator that a certain program status has been reached, and operator action is required. Operator calling is used, if the program may only be continued after a check or some kind of operator action.
			0				not active
			1				The output is switched by an operator call.
dP.Er	r/w	base 1dP 2dP 3dP	4475 12667 20859 29051	41718	Enum	Enum_DP_ERR	Output function: Signal Fault in the Profibus communication. This output is set when a fault in the Profibus communication occurs. There is no more communication with this device.
			0				Not active
			1				This output sends the Profibus fault.
Out.0	r/w	base 1dP 2dP 3dP	4471 12663 20855 29047	41710	Float	-1999...9999 ☐	Lower scaling limit of the analog output (corresponds to 0%). If current and voltage signals are used as output values, the display can be scaled to the output value in the Parameter Level. The output value of the lower scaling point is indicated in the respective electrical unit (mA / V).
Out.1	r/w	base 1dP 2dP 3dP	4472 12664 20856 29048	41712	Float	-1999...9999 ☐	Upper scaling limit of the analog output (corresponds to 100%). If current and voltage signals are used as output values, the display can be scaled to the output value in the Parameter Level. The output value of the upper scaling point is indicated in the respective electrical unit (mA / V).
O.Src	r/w	base 1dP 2dP 3dP	4473 12665 20857 29049	41714	Enum	Enum_OSrc	Signal source of the analog output (visible not with all output signal types O.TYP).

0	not used
1	Controller output y1 (continuous)
2	Controller output y2 (continuous)
3	process value
4	The effective setpoint Weff, which is used for control. Example: The gradient changes the effective setpoint until it reaches the internal (target) setpoint.
5	control deviation xw (process value - set-point)= relative alarm Note: Monitoring with the effective set-point Weff. For example using a ramp it is the changing set-point, not the target set-point of the ramp.
6	Position feedback signal Yp.
7	measured value INP1
8	measured value INP2
9	measured value INP3

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.FAI	r/w	base 1dP 2dP 3dP	4474 12666 20858 29050	41716	Enum	Enum_OFail	fail behaviour
			0				upscale
			1				downscale

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Out2	r	base 1dP 2dP 3dP	4480 12672 20864 29056	41728	Enum	Enum_Ausgang		Status of the digital output
						0	off	
						1	on	
F.Do2	r/w	base 1dP 2dP 3dP	4481 12673 20865 29057	41730	Enum	Enum_Ausgang		Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
						0	off	
						1	on	
F.Out2	r/w	base 1dP 2dP 3dP	4482 12674 20866 29058	41732	Float	0...120 ☐		Forcing value of the analog output. Forcing involves the external operation of an output, i.e. the instrument has no influence on this output. (Used for the operation of free outputs e.g. by a supervisory PLC.)

19 Out.5

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
O.Act	r/w	base 1dP 2dP 3dP	4550 12742 20934 29126	41868	Enum	Enum_OAct		Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.
						0	direct / normally open	
						1	inverse / normally closed	
Y.1	r/w	base 1dP 2dP 3dP	4551 12743 20935 29127	41870	Enum	Enum_Y1		Output function: Controller output Y1
						0	not active	
						1	This output provides the controller output Y1.	
Y.2	r/w	base 1dP 2dP 3dP	4552 12744 20936 29128	41872	Enum	Enum_Y2		Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
						0	not active	
						1	This output provides the controller output Y2.	

19 Out.5

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Lim.1	r/w	base	4553	41874	Enum	Enum_Lim1		Output function: Signal limit 1
		1dP	12745					
		2dP	20937					
		3dP	29129					
						0	not active	
						1	The output is activated by an alarm from limit value 1.	
Lim.2	r/w	base	4554	41876	Enum	Enum_Lim2		Output function: Signal limit 2
		1dP	12746					
		2dP	20938					
		3dP	29130					
						0	not active	
						1	The output is activated by an alarm from limit value 2.	
Lim.3	r/w	base	4555	41878	Enum	Enum_Lim3		Output function: Signal limit 3
		1dP	12747					
		2dP	20939					
		3dP	29131					
						0	not active	
						1	The output is activated by an alarm from limit value 3.	
LP.AL	r/w	base	4557	41882	Enum	Enum_OUT_LPAL		Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value has to change with an output signal of maximum value, else loop alarm is generated.
		1dP	12749					
		2dP	20941					
		3dP	29133					
						0	not active	
						1	The loop alarm (= open loop alarm) is assigned to this output.	
HC.AL	r/w	base	4558	41884	Enum	Enum_OUT_HCAL		Output function: Signal Heat current alarm. Either break (= current I < heating current limit) can be monitored or overload (= current I > heating current limit), dependent on configuration.
		1dP	12750					
		2dP	20942					
		3dP	29134					
						0	not active	
						1	The heating current alarm is assigned to this output.	
HC.SC	r/w	base	4559	41886	Enum	Enum_HCSC		Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output is switched off.
		1dP	12751					
		2dP	20943					
		3dP	29135					
						0	not active	
						1	Output activated by an SSR fault.	
P.End	r/w	base	4561	41890	Enum	Enum_PEnd		Output function: Signal Program end. This message is available when the program has been completed (only when configured as a program controller).
		1dP	12753					
		2dP	20945					
		3dP	29137					
						0	not active	
						1	This output is activated by the message 'Program end'.	

19 Out.5

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
FAi.1	r/w	base	4562	41892	Enum	Enum_FAi1	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
		1dP	12754				
		2dP	20946				
		3dP	29138				
						0 not active	
						1 The output sends the error message 'INP1 fault'.	
FAi.2	r/w	base	4563	41894	Enum	Enum_FAi2	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
		1dP	12755				
		2dP	20947				
		3dP	29139				
						0 not active	
						1 The output sends the error message 'INP2 fault'.	
FAi.3	r/w	base	4564	41896	Enum	Enum_FAi3	Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.
		1dP	12756				
		2dP	20948				
		3dP	29140				
						0 not active	
						1 The output sends the error message 'INP3 fault'.	
PrG.1	r/w	base	4565	41898	Enum	Enum_PrG1	Output function: Signal programmer's control output no. 1. A control output is one of the four digital signals that can be operated segment-wise by a program.
		1dP	12757				
		2dP	20949				
		3dP	29141				
						0 not active	
						1 Control output 1 is assigned to this output.	
PrG.2	r/w	base	4566	41900	Enum	Enum_PrG2	Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.
		1dP	12758				
		2dP	20950				
		3dP	29142				
						0 not active	
						1 Control output 2 is assigned to this output.	
PrG.3	r/w	base	4567	41902	Enum	Enum_PrG3	Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.
		1dP	12759				
		2dP	20951				
		3dP	29143				
						0 not active	
						1 Control output 3 is assigned to this output.	
PrG.4	r/w	base	4568	41904	Enum	Enum_PrG4	Output function: Signal programmer's control output no. 4. A control output is one of the four digital signals that can be operated segment-wise by a program.
		1dP	12760				
		2dP	20952				
		3dP	29144				
						0 not active	
						1 Control output 4 is assigned to this output.	

19 Out.5

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
CALL	r/w	base 1dP 2dP 3dP	4569 12761 20953 29145	41906	Enum	Enum_CALL	Output: Operator call. At the end of a program segment, a contact is set, e.g. for an acoustic signal. This indicates to the operator that a certain program status has been reached, and operator action is required. Operator calling is used, if the program may only be continued after a check or some kind of operator action.
						0 not active	
						1 The output is switched by an operator call.	
dP.Er	r/w	base 1dP 2dP 3dP	4575 12767 20959 29151	41918	Enum	Enum_DP_ERR	Output function: Signal Fault in the Profibus communication. This output is set when a fault in the Profibus communication occurs. There is no more communication with this device.
						0 Not active	
						1 This output sends the Profibus fault.	

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Out3	r	base 1dP 2dP 3dP	4580 12772 20964 29156	41928	Enum	Enum_Ausgang	Status of the digital output
						0 off	
						1 on	
F.Do3	r/w	base 1dP 2dP 3dP	4581 12773 20965 29157	41930	Enum	Enum_Ausgang	Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
						0 off	
						1 on	

20 Out.6

● ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.Act	r/w	base 1dP 2dP 3dP	4650 12842 21034 29226	42068	Enum	Enum_OAct	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.
						0 direct / normally open	
						1 inverse / normally closed	

20 Out.6

- ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Y.1	r/w	base 1dP 2dP 3dP	4651 12843 21035 29227	42070	Enum	Enum_Y1	Output function: Controller output Y1
						0 not active	
						1 This output provides the controller output Y1.	
Y.2	r/w	base 1dP 2dP 3dP	4652 12844 21036 29228	42072	Enum	Enum_Y2	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
						0 not active	
						1 This output provides the controller output Y2.	
Lim.1	r/w	base 1dP 2dP 3dP	4653 12845 21037 29229	42074	Enum	Enum_Lim1	Output function: Signal limit 1
						0 not active	
						1 The output is activated by an alarm from limit value 1.	
Lim.2	r/w	base 1dP 2dP 3dP	4654 12846 21038 29230	42076	Enum	Enum_Lim2	Output function: Signal limit 2
						0 not active	
						1 The output is activated by an alarm from limit value 2.	
Lim.3	r/w	base 1dP 2dP 3dP	4655 12847 21039 29231	42078	Enum	Enum_Lim3	Output function: Signal limit 3
						0 not active	
						1 The output is activated by an alarm from limit value 3.	
LP.AL	r/w	base 1dP 2dP 3dP	4657 12849 21041 29233	42082	Enum	Enum_OUT_LPAL	Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value has to change with an output signal of maximum value, else loop alarm is generated.
						0 not active	
						1 The loop alarm (= open loop alarm) is assigned to this output.	
HC.AL	r/w	base 1dP 2dP 3dP	4658 12850 21042 29234	42084	Enum	Enum_OUT_HCAL	Output function: Signal Heat current alarm. Either break (= current I < heating current limit) can be monitored or overload (= current I > heating current limit), dependent on configuration.
						0 not active	
						1 The heating current alarm is assigned to this output.	

20 Out.6

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
HC.SC	r/w	base	4659	42086	Enum	Enum_HCSC		Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output is switched off.
		1dP	12851					
		2dP	21043					
		3dP	29235					
						0	not active	
						1	Output activated by an SSR fault.	
P.End	r/w	base	4661	42090	Enum	Enum_PEnd		Output function: Signal Program end. This message is available when the program has been completed (only when configured as a program controller).
		1dP	12853					
		2dP	21045					
		3dP	29237					
						0	not active	
						1	This output is activated by the message 'Program end'.	
FAi.1	r/w	base	4662	42092	Enum	Enum_FAi1		Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
		1dP	12854					
		2dP	21046					
		3dP	29238					
						0	not active	
						1	The output sends the error message 'INP1 fault'.	
FAi.2	r/w	base	4663	42094	Enum	Enum_FAi2		Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
		1dP	12855					
		2dP	21047					
		3dP	29239					
						0	not active	
						1	The output sends the error message 'INP2 fault'.	
FAi.3	r/w	base	4664	42096	Enum	Enum_FAi3		Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.
		1dP	12856					
		2dP	21048					
		3dP	29240					
						0	not active	
						1	The output sends the error message 'INP3 fault'.	
PrG.1	r/w	base	4665	42098	Enum	Enum_PrG1		Output function: Signal programmer's control output no. 1. A control output is one of the four digital signals that can be operated segment-wise by a program.
		1dP	12857					
		2dP	21049					
		3dP	29241					
						0	not active	
						1	Control output 1 is assigned to this output.	
PrG.2	r/w	base	4666	42100	Enum	Enum_PrG2		Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.
		1dP	12858					
		2dP	21050					
		3dP	29242					
						0	not active	
						1	Control output 2 is assigned to this output.	

20 Out.6

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
PrG.3	r/w	base 1dP 2dP 3dP	4667 12859 21051 29243	42102	Enum	Enum_PrG3	Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	
						1 Control output 3 is assigned to this output.	
PrG.4	r/w	base 1dP 2dP 3dP	4668 12860 21052 29244	42104	Enum	Enum_PrG4	Output function: Signal programmer's control output no. 4. A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	
						1 Control output 4 is assigned to this output.	
CALL	r/w	base 1dP 2dP 3dP	4669 12861 21053 29245	42106	Enum	Enum_CALL	Output: Operator call. At the end of a program segment, a contact is set, e.g. for an acoustic signal. This indicates to the operator that a certain program status has been reached, and operator action is required. Operator calling is used, if the program may only be continued after a check or some kind of operator action.
						0 not active	
						1 The output is switched by an operator call.	
dP.Er	r/w	base 1dP 2dP 3dP	4675 12867 21059 29251	42118	Enum	Enum_DP_ERR	Output function: Signal Fault in the Profibus communication. This output is set when a fault in the Profibus communication occurs. There is no more communication with this device.
						0 Not active	
						1 This output sends the Profibus fault.	

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Out4	r	base 1dP 2dP 3dP	4680 12872 21064 29256	42128	Enum	Enum_Ausgang	Status of the digital output
						0 off	
						1 on	
F.Do4	r/w	base 1dP 2dP 3dP	4681 12873 21065 29257	42130	Enum	Enum_Ausgang	Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
						0 off	
						1 on	

21 PAr.2

• PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Pb12	r/w	base 1dP 2dP 3dP	5030 13222 21414 29606	42828	Float	0,1...9999	☐	Proportional band 1 (heating) in engineering unit (e.g. °C) of the 2nd parameter set. The Pb defines the ratio between output value and control deviation. The smaller the value of Pb is, the stronger is the control response for a specific control deviation. Too large and too small values for Pb lead to process oscillations (hunting).
Pb22	r/w	base 1dP 2dP 3dP	5031 13223 21415 29607	42830	Float	0,1...9999	☐	Proportional band 2 (cooling) in engineering unit (e.g. °C) of the 2nd parameter set. The Pb defines the ratio between output value and control deviation. The smaller the value of Pb is, the stronger is the control response for a specific control deviation. Too large and too small values for Pb lead to process oscillations (hunting).
ti22	r/w	base 1dP 2dP 3dP	5033 13225 21417 29609	42834	Float	0...9999	☑	Integral action time 2 (cooling) [s]. Second parameter set. Ti is the time constant of the integral portion. The smaller Ti is, the faster is the response of the integral action. Ti too small: Control tends to oscillate. Ti too large: Control is sluggish and needs a long time to line out.
ti12	r/w	base 1dP 2dP 3dP	5032 13224 21416 29608	42832	Float	0...9999	☑	Integral action time 1 (heating) [s]. Second parameter set. Ti is the time constant of the integral portion. The smaller Ti is, the faster is the response of the integral action. Ti too small: Control tends to oscillate. Ti too large: Control is sluggish and needs a long time to line out.
td12	r/w	base 1dP 2dP 3dP	5034 13226 21418 29610	42836	Float	0...9999	☑	Derivative action time 1 (heating) [s], second parameter set. Td is the time constant of the derivative portion. The faster the process value changes, and the larger the value of Td is, the stronger will be the derivative action. Td too small: Very little derivative action. Td too large: Control tends to oscillate.
td22	r/w	base 1dP 2dP 3dP	5035 13227 21419 29611	42838	Float	0...9999	☑	Derivative action time 2 (cooling) [s], second parameter set. Td is the time constant of the derivative portion. The faster the process value changes, and the larger the value of Td is, the stronger will be the derivative action. Td too small: Very little derivative action. Td too large: Control tends to oscillate.

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• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
t.bAS	r/w	base 1dP 2dP 3dP	6030 14222 22414 30606	44828	Enum	Enum_tbAS	Definition of the programmer's time base in hours using minutes, or in minutes using seconds.

0	Hours [hh] : Minutes [mm]
1	Minutes [mm] : Seconds [ss]

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PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Pr.no	r/w	base 1dP 2dP 3dP	6000 14192 22384 30576	44768	Enum	Enum_PrgNoPar		Program number (nominal). The program number (nominal) determines which program is to be started next. Running programs are not affected. The selected program is only started after a reset or restart.
						1	Prog. 01	
						2	Prog. 02	
						3	Prog. 03	
						4	Prog. 04	
						5	Prog. 05	
						6	Prog. 06	
						7	Prog. 07	
						8	Prog. 08	
						9	Prog. 09	
						10	Prog. 10	
						11	Prog. 11	
						12	Prog. 12	
						13	Prog. 13	
						14	Prog. 14	
						15	Prog. 15	
						16	Prog. 16	
b.Lo	r/w	base 1dP 2dP 3dP	6100 14292 22484 30676	44968	Float	0...9999 ☑		Lower bandwidth limit. The bandwidth monitor is valid for all segments of an individual program. If the bandwidth is exceeded, the programmer is stopped. The program continues, if the process value returns within the defined monitoring limits.
b.Hi	r/w	base 1dP 2dP 3dP	6101 14293 22485 30677	44970	Float	0...9999 ☑		Upper bandwidth limit. The bandwidth monitor is valid for all segments of an individual program. If the bandwidth is exceeded, the programmer is stopped. The program continues, if the process value returns within the defined monitoring limits.
d.00	r/w	base 1dP 2dP 3dP	6134 14326 22518 30710	45036	Enum	ENUM_Spuren		Reset value for control outputs 1...4. A program can control up to four digital signals: the control outputs 1...4. The reset value of the control output contains the combination of these signals, which are output together with the controller's internal setpoint, if the programmer is not active.
						0	0-0-0-0	
						1	1-0-0-0	
						2	0-1-0-0	
						3	1-1-0-0	
						4	0-0-1-0	
						5	1-0-1-0	
						6	0-1-1-0	
						7	1-1-1-0	
						8	0-0-0-1	
						9	1-0-0-1	
						10	0-1-0-1	
						11	1-1-0-1	
						12	0-0-1-1	
						13	1-0-1-1	
						14	0-1-1-1	
						15	1-1-1-1	

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• PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
tYPE	r/w	base 1dP 2dP 3dP	6135 14327 22519 30711	45038	Enum	Enum_SegTyp	Type of segment 1. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).Note: The 1st segment cannot be configured as the end segment.

						0	time to set-point
						1	rate to set-point
						2	The final setpoint of the previous segment is kept constant for the duration 'Pt'.
						3	step to set-point
						4	time to set-point and wait
						5	rate to set-point and wait
						6	The final setpoint of the previous segment is kept constant for the duration 'Pt'. At the end of a segment, the programmer enters the Stop mode (Run LED is off), and can be restarted by pressing the Start/Stop key (more than 3 s), via the interface, or a digital input.
						7	step to set-point and wait
						8	The last segment in a program is the end segment. When the end segment has been reached, the last setpoint is maintained.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP	r/w	base 1dP 2dP 3dP	6102 14294 22486 30678	44972	Float	-1999...9999 ☐	End setpoint of segment 1. This is the target setpoint that is reached at the end of the first segment. The target setpoint is approached from the previous valid setpoint (when starting the 1st segment, matching to process value!). When the program is completed, the controller continues with the last target setpoint reached.
Pt	r/w	base 1dP 2dP 3dP	6103 14295 22487 30679	44974	Float	0...9999 ☐	Segment time/gradient 1. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
d.Out	r/w	base 1dP 2dP 3dP	6136 14328 22520 30712	45040	Enum	ENUM_Spuren	Control outputs 1...4 - 1. A program can control up to four digital signals: the control outputs 1...4. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.

						0	0-0-0-0
						1	1-0-0-0
						2	0-1-0-0
						3	1-1-0-0
						4	0-0-1-0
						5	1-0-1-0
						6	0-1-1-0
						7	1-1-1-0
						8	0-0-0-1
						9	1-0-0-1
						10	0-1-0-1
						11	1-1-0-1
						12	0-0-1-1
						13	1-0-1-1
						14	0-1-1-1
						15	1-1-1-1

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PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
tYPE	r/w	base 1dP 2dP 3dP	6137 14329 22521 30713	45042	Enum	Enum_SegTyp	Segment type of segment 2. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).

0	time to set-point	
1	rate to set-point	
2	The final setpoint of the previous segment is kept constant for the duration 'Pt'.	
3	step to set-point	
4	time to set-point and wait	
5	rate to set-point and wait	
6	The final setpoint of the previous segment is kept constant for the duration 'Pt'. At the end of a segment, the programmer enters the Stop mode (Run LED is off), and can be restarted by pressing the Start/Stop key (more than 3 s), via the interface, or a digital input.	
7	step to set-point and wait	
8	The last segment in a program is the end segment. When the end segment has been reached, the last setpoint is maintained.	

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP	r/w	base 1dP 2dP 3dP	6104 14296 22488 30680	44976	Float	-1999...9999 ☐	End setpoint of segment 2. This is the target setpoint that is reached at the end of the second segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
Pt	r/w	base 1dP 2dP 3dP	6105 14297 22489 30681	44978	Float	0...9999 ☐	Segment time/gradient 2. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
d.Out	r/w	base 1dP 2dP 3dP	6138 14330 22522 30714	45044	Enum	ENUM_Spuren	Control outputs 1...4 - 2. A program can control up to four digital signals: the control outputs 1...4. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.

0	0-0-0-0
1	1-0-0-0
2	0-1-0-0
3	1-1-0-0
4	0-0-1-0
5	1-0-1-0
6	0-1-1-0
7	1-1-1-0
8	0-0-0-1
9	1-0-0-1
10	0-1-0-1
11	1-1-0-1
12	0-0-1-1
13	1-0-1-1
14	0-1-1-1
15	1-1-1-1

PArA

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• PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
tYPE	r/w	base	6139	45046	Enum	Enum_SegTyp	Segment type of segment 3. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).
		1dP	14331				
		2dP	22523				
		3dP	30715				

0	time to set-point
1	rate to set-point
2	The final setpoint of the previous segment is kept constant for the duration 'Pt'.
3	step to set-point
4	time to set-point and wait
5	rate to set-point and wait
6	The final setpoint of the previous segment is kept constant for the duration 'Pt'. At the end of a segment, the programmer enters the Stop mode (Run LED is off), and can be restarted by pressing the Start/Stop key (more than 3 s), via the interface, or a digital input.
7	step to set-point and wait
8	The last segment in a program is the end segment. When the end segment has been reached, the last setpoint is maintained.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP	r/w	base	6106	44980	Float	-1999...9999 ☐	End setpoint of segment 3. This is the target setpoint that is reached at the end of the third segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
		1dP	14298				
		2dP	22490				
		3dP	30682				
Pt	r/w	base	6107	44982	Float	0...9999 ☐	Segment time/gradient 3. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
		1dP	14299				
		2dP	22491				
		3dP	30683				
d.Out	r/w	base	6140	45048	Enum	ENUM_Spuren	Control outputs 1...4 - 3. A program can control up to four digital signals: the control outputs 1...4. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
		1dP	14332				
		2dP	22524				
		3dP	30716				

0	0-0-0-0
1	1-0-0-0
2	0-1-0-0
3	1-1-0-0
4	0-0-1-0
5	1-0-1-0
6	0-1-1-0
7	1-1-1-0
8	0-0-0-1
9	1-0-0-1
10	0-1-0-1
11	1-1-0-1
12	0-0-1-1
13	1-0-1-1
14	0-1-1-1
15	1-1-1-1

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• PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
tYPE	r/w	base 1dP 2dP 3dP	6141 14333 22525 30717	45050	Enum	Enum_SegTyp	Segment type of segment 4. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).

0	time to set-point	
1	rate to set-point	
2	The final setpoint of the previous segment is kept constant for the duration 'Pt'.	
3	step to set-point	
4	time to set-point and wait	
5	rate to set-point and wait	
6	The final setpoint of the previous segment is kept constant for the duration 'Pt'. At the end of a segment, the programmer enters the Stop mode (Run LED is off), and can be restarted by pressing the Start/Stop key (more than 3 s), via the interface, or a digital input.	
7	step to set-point and wait	
8	The last segment in a program is the end segment. When the end segment has been reached, the last setpoint is maintained.	

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP	r/w	base 1dP 2dP 3dP	6108 14300 22492 30684	44984	Float	-1999...9999 ☐	End setpoint of segment 4. This is the target setpoint that is reached at the end of the fourth segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
Pt	r/w	base 1dP 2dP 3dP	6109 14301 22493 30685	44986	Float	0...9999 ☐	Segment time/gradient 4. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
d.Out	r/w	base 1dP 2dP 3dP	6142 14334 22526 30718	45052	Enum	ENUM_Spuren	Control outputs 1...4 - 4. A program can control up to four digital signals: the control outputs 1...4. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.

0	0-0-0-0
1	1-0-0-0
2	0-1-0-0
3	1-1-0-0
4	0-0-1-0
5	1-0-1-0
6	0-1-1-0
7	1-1-1-0
8	0-0-0-1
9	1-0-0-1
10	0-1-0-1
11	1-1-0-1
12	0-0-1-1
13	1-0-1-1
14	0-1-1-1
15	1-1-1-1

• PArA

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● PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
tYPE	r/w	base	6143	45054	Enum	Enum_SegTyp	Segment type of segment 5. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).
		1dP	14335				
		2dP	22527				
		3dP	30719				

0	time to set-point
1	rate to set-point
2	The final setpoint of the previous segment is kept constant for the duration 'Pt'.
3	step to set-point
4	time to set-point and wait
5	rate to set-point and wait
6	The final setpoint of the previous segment is kept constant for the duration 'Pt'. At the end of a segment, the programmer enters the Stop mode (Run LED is off), and can be restarted by pressing the Start/Stop key (more than 3 s), via the interface, or a digital input.
7	step to set-point and wait
8	The last segment in a program is the end segment. When the end segment has been reached, the last setpoint is maintained.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP	r/w	base	6110	44988	Float	-1999...9999 ☐	End setpoint of segment 5. This is the target setpoint that is reached at the end of the fifth segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
		1dP	14302				
		2dP	22494				
		3dP	30686				
Pt	r/w	base	6111	44990	Float	0...9999 ☐	Segment time/gradient 5. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
		1dP	14303				
		2dP	22495				
		3dP	30687				
d.Out	r/w	base	6144	45056	Enum	ENUM_Spuren	Control outputs 1...4 - 5. A program can control up to four digital signals: the control outputs 1...4. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
		1dP	14336				
		2dP	22528				
		3dP	30720				

0	0-0-0-0
1	1-0-0-0
2	0-1-0-0
3	1-1-0-0
4	0-0-1-0
5	1-0-1-0
6	0-1-1-0
7	1-1-1-0
8	0-0-0-1
9	1-0-0-1
10	0-1-0-1
11	1-1-0-1
12	0-0-1-1
13	1-0-1-1
14	0-1-1-1
15	1-1-1-1

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PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
tYPE	r/w	base	6145	45058	Enum	Enum_SegTyp	Segment type of segment 6. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).
		1dP	14337				
		2dP	22529				
		3dP	30721				

0	time to set-point
1	rate to set-point
2	The final setpoint of the previous segment is kept constant for the duration 'Pt'.
3	step to set-point
4	time to set-point and wait
5	rate to set-point and wait
6	The final setpoint of the previous segment is kept constant for the duration 'Pt'. At the end of a segment, the programmer enters the Stop mode (Run LED is off), and can be restarted by pressing the Start/Stop key (more than 3 s), via the interface, or a digital input.
7	step to set-point and wait
8	The last segment in a program is the end segment. When the end segment has been reached, the last setpoint is maintained.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP	r/w	base	6112	44992	Float	-1999...9999 ☐	End setpoint of segment 6. This is the target setpoint that is reached at the end of the sixth segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
		1dP	14304				
		2dP	22496				
		3dP	30688				
Pt	r/w	base	6113	44994	Float	0...9999 ☐	Segment time/gradient 6. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
		1dP	14305				
		2dP	22497				
		3dP	30689				
d.Out	r/w	base	6146	45060	Enum	ENUM_Spuren	Control outputs 1...4 - 6. A program can control up to four digital signals: the control outputs 1...4. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
		1dP	14338				
		2dP	22530				
		3dP	30722				

0	0-0-0-0
1	1-0-0-0
2	0-1-0-0
3	1-1-0-0
4	0-0-1-0
5	1-0-1-0
6	0-1-1-0
7	1-1-1-0
8	0-0-0-1
9	1-0-0-1
10	0-1-0-1
11	1-1-0-1
12	0-0-1-1
13	1-0-1-1
14	0-1-1-1
15	1-1-1-1

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• PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
tYPE	r/w	base 1dP 2dP 3dP	6147 14339 22531 30723	45062	Enum	Enum_SegTyp	Segment type of segment 7. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).

0	time to set-point	
1	rate to set-point	
2	The final setpoint of the previous segment is kept constant for the duration 'Pt'.	
3	step to set-point	
4	time to set-point and wait	
5	rate to set-point and wait	
6	The final setpoint of the previous segment is kept constant for the duration 'Pt'. At the end of a segment, the programmer enters the Stop mode (Run LED is off), and can be restarted by pressing the Start/Stop key (more than 3 s), via the interface, or a digital input.	
7	step to set-point and wait	
8	The last segment in a program is the end segment. When the end segment has been reached, the last setpoint is maintained.	

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP	r/w	base 1dP 2dP 3dP	6114 14306 22498 30690	44996	Float	-1999...9999 ☐	End setpoint of segment 7. This is the target setpoint that is reached at the end of the seventh segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
Pt	r/w	base 1dP 2dP 3dP	6115 14307 22499 30691	44998	Float	0...9999 ☐	Segment time/gradient 7. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
d.Out	r/w	base 1dP 2dP 3dP	6148 14340 22532 30724	45064	Enum	ENUM_Spuren	Control outputs 1...4 - 7. A program can control up to four digital signals: the control outputs 1...4. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.

0	0-0-0-0
1	1-0-0-0
2	0-1-0-0
3	1-1-0-0
4	0-0-1-0
5	1-0-1-0
6	0-1-1-0
7	1-1-1-0
8	0-0-0-1
9	1-0-0-1
10	0-1-0-1
11	1-1-0-1
12	0-0-1-1
13	1-0-1-1
14	0-1-1-1
15	1-1-1-1

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PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
tYPE	r/w	base 1dP 2dP 3dP	6149 14341 22533 30725	45066	Enum	Enum_SegTyp	Segment type of segment 8. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).

0	time to set-point	
1	rate to set-point	
2	The final setpoint of the previous segment is kept constant for the duration 'Pt'.	
3	step to set-point	
4	time to set-point and wait	
5	rate to set-point and wait	
6	The final setpoint of the previous segment is kept constant for the duration 'Pt'. At the end of a segment, the programmer enters the Stop mode (Run LED is off), and can be restarted by pressing the Start/Stop key (more than 3 s), via the interface, or a digital input.	
7	step to set-point and wait	
8	The last segment in a program is the end segment. When the end segment has been reached, the last setpoint is maintained.	

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP	r/w	base 1dP 2dP 3dP	6116 14308 22500 30692	45000	Float	-1999...9999 ☐	End setpoint of segment 8. This is the target setpoint that is reached at the end of the eighth segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
Pt	r/w	base 1dP 2dP 3dP	6117 14309 22501 30693	45002	Float	0...9999 ☐	Segment time/gradient 8. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
d.Out	r/w	base 1dP 2dP 3dP	6150 14342 22534 30726	45068	Enum	ENUM_Spuren	Control outputs 1...4 - 8. A program can control up to four digital signals: the control outputs 1...4. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.

0	0-0-0-0
1	1-0-0-0
2	0-1-0-0
3	1-1-0-0
4	0-0-1-0
5	1-0-1-0
6	0-1-1-0
7	1-1-1-0
8	0-0-0-1
9	1-0-0-1
10	0-1-0-1
11	1-1-0-1
12	0-0-1-1
13	1-0-1-1
14	0-1-1-1
15	1-1-1-1

22 ProG

• PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
tYPE	r/w	base 1dP 2dP 3dP	6151 14343 22535 30727	45070	Enum	Enum_SegTyp	Segment type of segment 9. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).

0	time to set-point
1	rate to set-point
2	The final setpoint of the previous segment is kept constant for the duration 'Pt'.
3	step to set-point
4	time to set-point and wait
5	rate to set-point and wait
6	The final setpoint of the previous segment is kept constant for the duration 'Pt'. At the end of a segment, the programmer enters the Stop mode (Run LED is off), and can be restarted by pressing the Start/Stop key (more than 3 s), via the interface, or a digital input.
7	step to set-point and wait
8	The last segment in a program is the end segment. When the end segment has been reached, the last setpoint is maintained.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP	r/w	base 1dP 2dP 3dP	6118 14310 22502 30694	45004	Float	-1999...9999 ☐	End setpoint of segment 9. This is the target setpoint that is reached at the end of the ninth segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
Pt	r/w	base 1dP 2dP 3dP	6119 14311 22503 30695	45006	Float	0...9999 ☐	Segment time/gradient 9. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
d.Out	r/w	base 1dP 2dP 3dP	6152 14344 22536 30728	45072	Enum	ENUM_Spuren	Control outputs 1...4 - 9. A program can control up to four digital signals: the control outputs 1...4. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.

0	0-0-0-0
1	1-0-0-0
2	0-1-0-0
3	1-1-0-0
4	0-0-1-0
5	1-0-1-0
6	0-1-1-0
7	1-1-1-0
8	0-0-0-1
9	1-0-0-1
10	0-1-0-1
11	1-1-0-1
12	0-0-1-1
13	1-0-1-1
14	0-1-1-1
15	1-1-1-1

22 ProG

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
tYPE	r/w	base 1dP 2dP 3dP	6153 14345 22537 30729	45074	Enum	Enum_SegTyp	Segment type of segment 10. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).

0	time to set-point
1	rate to set-point
2	The final setpoint of the previous segment is kept constant for the duration 'Pt'.
3	step to set-point
4	time to set-point and wait
5	rate to set-point and wait
6	The final setpoint of the previous segment is kept constant for the duration 'Pt'. At the end of a segment, the programmer enters the Stop mode (Run LED is off), and can be restarted by pressing the Start/Stop key (more than 3 s), via the interface, or a digital input.
7	step to set-point and wait
8	The last segment in a program is the end segment. When the end segment has been reached, the last setpoint is maintained.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP	r/w	base 1dP 2dP 3dP	6120 14312 22504 30696	45008	Float	-1999...9999 ☐	End setpoint of segment 10. This is the target setpoint that is reached at the end of the tenth segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
Pt	r/w	base 1dP 2dP 3dP	6121 14313 22505 30697	45010	Float	0...9999 ☐	Segment time/gradient 10. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
d.Out	r/w	base 1dP 2dP 3dP	6154 14346 22538 30730	45076	Enum	ENUM_Spuren	Control outputs 1...4 - 10. A program can control up to four digital signals: the control outputs 1...4. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.

0	0-0-0-0
1	1-0-0-0
2	0-1-0-0
3	1-1-0-0
4	0-0-1-0
5	1-0-1-0
6	0-1-1-0
7	1-1-1-0
8	0-0-0-1
9	1-0-0-1
10	0-1-0-1
11	1-1-0-1
12	0-0-1-1
13	1-0-1-1
14	0-1-1-1
15	1-1-1-1

22 ProG

• PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
tYPE	r/w	base 1dP 2dP 3dP	6155 14347 22539 30731	45078	Enum	Enum_SegTyp		Segment type of segment 11. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).

0	time to set-point	
1	rate to set-point	
2	The final setpoint of the previous segment is kept constant for the duration 'Pt'.	
3	step to set-point	
4	time to set-point and wait	
5	rate to set-point and wait	
6	The final setpoint of the previous segment is kept constant for the duration 'Pt'. At the end of a segment, the programmer enters the Stop mode (Run LED is off), and can be restarted by pressing the Start/Stop key (more than 3 s), via the interface, or a digital input.	
7	step to set-point and wait	
8	The last segment in a program is the end segment. When the end segment has been reached, the last setpoint is maintained.	

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
SP	r/w	base 1dP 2dP 3dP	6122 14314 22506 30698	45012	Float	-1999...9999	☐	End setpoint of segment 11. This is the target setpoint that is reached at the end of the eleventh segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
Pt	r/w	base 1dP 2dP 3dP	6123 14315 22507 30699	45014	Float	0...9999	☐	Segment time/gradient 11. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
d.Out	r/w	base 1dP 2dP 3dP	6156 14348 22540 30732	45080	Enum	ENUM_Spuren		Control outputs 1...4 - 11. A program can control up to four digital signals: the control outputs 1...4. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.

0	0-0-0-0
1	1-0-0-0
2	0-1-0-0
3	1-1-0-0
4	0-0-1-0
5	1-0-1-0
6	0-1-1-0
7	1-1-1-0
8	0-0-0-1
9	1-0-0-1
10	0-1-0-1
11	1-1-0-1
12	0-0-1-1
13	1-0-1-1
14	0-1-1-1
15	1-1-1-1

22 ProG

• PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
tYPE	r/w	base	6157	45082	Enum	Enum_SegTyp		Segment type of segment 12. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).
		1dP	14349					
		2dP	22541					
		3dP	30733					

0	time to set-point	
1	rate to set-point	
2	The final setpoint of the previous segment is kept constant for the duration 'Pt'.	
3	step to set-point	
4	time to set-point and wait	
5	rate to set-point and wait	
6	The final setpoint of the previous segment is kept constant for the duration 'Pt'. At the end of a segment, the programmer enters the Stop mode (Run LED is off), and can be restarted by pressing the Start/Stop key (more than 3 s), via the interface, or a digital input.	
7	step to set-point and wait	
8	The last segment in a program is the end segment. When the end segment has been reached, the last setpoint is maintained.	

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
SP	r/w	base	6124	45016	Float	-1999...9999	☐	End setpoint of segment 12. This is the target setpoint that is reached at the end of the twelfth segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
		1dP	14316					
		2dP	22508					
		3dP	30700					
Pt	r/w	base	6125	45018	Float	0...9999	☐	Segment time/gradient 12. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
		1dP	14317					
		2dP	22509					
		3dP	30701					
d.Out	r/w	base	6158	45084	Enum	ENUM_Spuren		Control outputs 1...4 - 12. A program can control up to four digital signals: the control outputs 1...4. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
		1dP	14350					
		2dP	22542					
		3dP	30734					

0	0-0-0-0	
1	1-0-0-0	
2	0-1-0-0	
3	1-1-0-0	
4	0-0-1-0	
5	1-0-1-0	
6	0-1-1-0	
7	1-1-1-0	
8	0-0-0-1	
9	1-0-0-1	
10	0-1-0-1	
11	1-1-0-1	
12	0-0-1-1	
13	1-0-1-1	
14	0-1-1-1	
15	1-1-1-1	

22 ProG

• PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
tYPE	r/w	base	6159	45086	Enum	Enum_SegTyp	Segment type of segment 13. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).
		1dP	14351				
		2dP	22543				
		3dP	30735				

0	time to set-point
1	rate to set-point
2	The final setpoint of the previous segment is kept constant for the duration 'Pt'.
3	step to set-point
4	time to set-point and wait
5	rate to set-point and wait
6	The final setpoint of the previous segment is kept constant for the duration 'Pt'. At the end of a segment, the programmer enters the Stop mode (Run LED is off), and can be restarted by pressing the Start/Stop key (more than 3 s), via the interface, or a digital input.
7	step to set-point and wait
8	The last segment in a program is the end segment. When the end segment has been reached, the last setpoint is maintained.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP	r/w	base	6126	45020	Float	-1999...9999 ☐	End setpoint of segment 13. This is the target setpoint that is reached at the end of the 13th segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
		1dP	14318				
		2dP	22510				
		3dP	30702				
Pt	r/w	base	6127	45022	Float	0...9999 ☐	Segment time/gradient 13. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
		1dP	14319				
		2dP	22511				
		3dP	30703				
d.Out	r/w	base	6160	45088	Enum	ENUM_Spuren	Control outputs 1...4 - 13. A program can control up to four digital signals: the control outputs 1...4. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
		1dP	14352				
		2dP	22544				
		3dP	30736				

0	0-0-0-0
1	1-0-0-0
2	0-1-0-0
3	1-1-0-0
4	0-0-1-0
5	1-0-1-0
6	0-1-1-0
7	1-1-1-0
8	0-0-0-1
9	1-0-0-1
10	0-1-0-1
11	1-1-0-1
12	0-0-1-1
13	1-0-1-1
14	0-1-1-1
15	1-1-1-1

22 ProG

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
tYPE	r/w	base 1dP 2dP 3dP	6161 14353 22545 30737	45090	Enum	Enum_SegTyp	Segment type of segment 14. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).

0	time to set-point
1	rate to set-point
2	The final setpoint of the previous segment is kept constant for the duration 'Pt'.
3	step to set-point
4	time to set-point and wait
5	rate to set-point and wait
6	The final setpoint of the previous segment is kept constant for the duration 'Pt'. At the end of a segment, the programmer enters the Stop mode (Run LED is off), and can be restarted by pressing the Start/Stop key (more than 3 s), via the interface, or a digital input.
7	step to set-point and wait
8	The last segment in a program is the end segment. When the end segment has been reached, the last setpoint is maintained.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP	r/w	base 1dP 2dP 3dP	6128 14320 22512 30704	45024	Float	-1999...9999 ☐	End setpoint of segment 14. This is the target setpoint that is reached at the end of the 14th segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
Pt	r/w	base 1dP 2dP 3dP	6129 14321 22513 30705	45026	Float	0...9999 ☐	Segment time/gradient 14. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
d.Out	r/w	base 1dP 2dP 3dP	6162 14354 22546 30738	45092	Enum	ENUM_Spuren	Control outputs 1...4 - 14. A program can control up to four digital signals: the control outputs 1...4. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.

0	0-0-0-0
1	1-0-0-0
2	0-1-0-0
3	1-1-0-0
4	0-0-1-0
5	1-0-1-0
6	0-1-1-0
7	1-1-1-0
8	0-0-0-1
9	1-0-0-1
10	0-1-0-1
11	1-1-0-1
12	0-0-1-1
13	1-0-1-1
14	0-1-1-1
15	1-1-1-1

22 ProG

● PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
tYPE	r/w	base 1dP 2dP 3dP	6163 14355 22547 30739	45094	Enum	Enum_SegTyp		Segment type of segment 15. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).

0	time to set-point
1	rate to set-point
2	The final setpoint of the previous segment is kept constant for the duration 'Pt'.
3	step to set-point
4	time to set-point and wait
5	rate to set-point and wait
6	The final setpoint of the previous segment is kept constant for the duration 'Pt'. At the end of a segment, the programmer enters the Stop mode (Run LED is off), and can be restarted by pressing the Start/Stop key (more than 3 s), via the interface, or a digital input.
7	step to set-point and wait
8	The last segment in a program is the end segment. When the end segment has been reached, the last setpoint is maintained.

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
SP	r/w	base 1dP 2dP 3dP	6130 14322 22514 30706	45028	Float	-1999...9999	☐	End setpoint of segment 15. This is the target setpoint that is reached at the end of the 15th segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
Pt	r/w	base 1dP 2dP 3dP	6131 14323 22515 30707	45030	Float	0...9999	☐	Segment time/gradient 15. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
d.Out	r/w	base 1dP 2dP 3dP	6164 14356 22548 30740	45096	Enum	ENUM_Spuren		Control outputs 1...4 - 15. A program can control up to four digital signals: the control outputs 1...4. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.

0	0-0-0-0
1	1-0-0-0
2	0-1-0-0
3	1-1-0-0
4	0-0-1-0
5	1-0-1-0
6	0-1-1-0
7	1-1-1-0
8	0-0-0-1
9	1-0-0-1
10	0-1-0-1
11	1-1-0-1
12	0-0-1-1
13	1-0-1-1
14	0-1-1-1
15	1-1-1-1

22 ProG

● PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
tYPE	r/w	base	6165	45098	Enum	Enum_SegTyp	Segment type of segment 16. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).
		1dP	14357				
		2dP	22549				
		3dP	30741				

0	time to set-point
1	rate to set-point
2	The final setpoint of the previous segment is kept constant for the duration 'Pt'.
3	step to set-point
4	time to set-point and wait
5	rate to set-point and wait
6	The final setpoint of the previous segment is kept constant for the duration 'Pt'. At the end of a segment, the programmer enters the Stop mode (Run LED is off), and can be restarted by pressing the Start/Stop key (more than 3 s), via the interface, or a digital input.
7	step to set-point and wait
8	The last segment in a program is the end segment. When the end segment has been reached, the last setpoint is maintained.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP	r/w	base	6132	45032	Float	-1999...9999 ☐	End setpoint of segment 16. This is the target setpoint that is reached at the end of the 16th segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
		1dP	14324				
		2dP	22516				
		3dP	30708				
Pt	r/w	base	6133	45034	Float	0...9999 ☐	Segment time/gradient 16. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
		1dP	14325				
		2dP	22517				
		3dP	30709				
d.Out	r/w	base	6166	45100	Enum	ENUM_Spuren	Control outputs 1...4 - 16. A program can control up to four digital signals: the control outputs 1...4. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
		1dP	14358				
		2dP	22550				
		3dP	30742				

0	0-0-0-0
1	1-0-0-0
2	0-1-0-0
3	1-1-0-0
4	0-0-1-0
5	1-0-1-0
6	0-1-1-0
7	1-1-1-0
8	0-0-0-1
9	1-0-0-1
10	0-1-0-1
11	1-1-0-1
12	0-0-1-1
13	1-0-1-1
14	0-1-1-1
15	1-1-1-1

22 ProG

● Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
St.Prog	r	base	6050	44868	Int	0...255	☐	The programmer's status contains bit-wise coded data, e.g. which point of the program sequence the program has reached.
		1dP	14242					
		2dP	22434					
		3dP	30626					

Bit 0,1,2 Type of segment
0: rising
1: falling
2: hold (dwell)
Bit 3 Program 'Run'
Bit 4 Program 'End'
Bit 5 Program 'Reset'
Bit 6 Program 'StartFlankMissing'
Bit 7 Program 'BandHold + FailHold'
Bit 8 Program active

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
SP.Pr	r	base	6051	44870	Float	-1990...9999	☐	The programmer's setpoint is displayed as the effective setpoint while the program is running.
		1dP	14243					
		2dP	22435					
		3dP	30627					
T1.Pr	r	base	6052	44872	Float	0...9999	☐	Only with a running program. The net (elapsed) time of the programmer is shown in a simplified form as time elapsed since program start.Caution: Stop times are not counted! If the first segment is defined as a gradient, the program starts at the process value, whereby the offset is defined as the time that the controller would have needed with the gradient beginning at the setpoint valid at program start.
		1dP	14244					
		2dP	22436					
		3dP	30628					
T3.Pr	r	base	6053	44874	Float	0...9999	☐	Only with running program. The remaining programmer time is given by the sum of the currently running segment plus the times of the remaining program segments (without hold times).
		1dP	14245					
		2dP	22437					
		3dP	30629					
T2.Pr	r	base	6054	44876	Float	0...9999	☐	Only while program is running. The net segment time corresponds to the elapsed segment time.Caution: Stop times are not counted! If the first segment has been defined as a gradient, the start commences at process value, and the offset specified for the first segment corresponds to the time that the controller would have required with a gradient beginning at the actual process value when the program was started.
		1dP	14246					
		2dP	22438					
		3dP	30630					
T4.Pr	r	base	6055	44878	Float	0...9999	☐	Only with running program. The remaining time of the running program segment (without hold times).
		1dP	14247					
		2dP	22439					
		3dP	30631					
SG.Pr	r	base	6056	44880	Int	0...16	☐	A program consists of one or more segments which are arranged and defined by means of the segment numbers. By means of the segment number(s), the program can be changed quickly and specifically at the required point.
		1dP	14248					
		2dP	22440					
		3dP	30632					
Pr.SG	r/w	base	6060	44888	Int	1...16	☑	Segment number for Preset. Preset involves starting the selected program with a different segment than the normal (1st) start segment. The starting setpoint of the preset segment becomes effective immediately, i.e. the program is not started. To use the Preset function, the programmer must be in the Stop or Reset state.
		1dP	14252					
		2dP	22444					
		3dP	30636					

● Signal

22 ProG

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Pr.EF	r	base 1dP 2dP 3dP	6057 14249 22441 30633	44882	Int	0...16	☐	Number of the active program. The program remains active until a reset or a new start is triggered.
SP.En	r	base 1dP 2dP 3dP	6058 14250 22442 30634	44884	Float	-1999...9999	☐	

23 SEtP

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
SP.LO	r/w	base 1dP 2dP 3dP	3100 11292 19484 27676	38968	Float	-1999...9999	☐	Lower setpoint limit. The setpoint is raised to this value automatically, if a lower setpoint is adjusted. BUT: The (safety) setpoint W2 is not restricted by the setpoint limits! The setpoint reserve for the step function is 10% of SPHi - SPLo.
SP.Hi	r/w	base 1dP 2dP 3dP	3101 11293 19485 27677	38970	Float	-1999...9999	☐	Upper setpoint limit. The setpoint is reduced to this value automatically, if a higher setpoint is adjusted. BUT: The (safety) setpoint W2 is not restricted by the setpoint limits! The setpoint reserve for the step function is 10% of SPHi - SPLo.
SP.2	r/w	base 1dP 2dP 3dP	3102 11294 19486 27678	38972	Float	-1999...9999	☐	Second (safety) setpoint. Ramp function as with other setpoints (effective, external). However, SP2 is not restricted by the setpoint limits.
r.SP	r/w	base 1dP 2dP 3dP	3103 11295 19487 27679	38974	Float	0,01...9999	☑	Setpoint gradient [/min] or ramp. Max. rate of change in order to avoid step changes of the setpoint. The gradient acts in the positive and negative directions. Note for self-tuning: with activated gradient function, the setpoint gradient is started from the process value, so that there is no sufficient setpoint reserve.

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
SP.EF	r	base 1dP 2dP 3dP	3170 11362 19554 27746	39108	Float	-1999...9999	☐	Effective setpoint. The value reached at the end of setpoint processing, after taking W2, external setpoint, gradient, boost function, programmer settings, start-up function, and limit functions into account. Comparison with the effective process value leads to the control deviation, from which the necessary controller response is derived.
Diff	r	base 1dP 2dP 3dP	3171 11363 19555 27747	39110	Float	-1999...9999	☐	Difference between the effective setpoint and setpoint 2.

23 SEtP

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
SP	r/w	base 1dP 2dP 3dP	3180 11372 19564 27756	39128	Float	-1999...9999	☐	Setpoint for the interface (without the additional function 'Controller off'). SetpInterface acts on the internal setpoint before the setpoint processing stage. Note: The value in RAM is always updated. To protect the EEPROM, storage of the value in the EEPROM is timed (at least one value per half hour).
SP.d	r/w	base 1dP 2dP 3dP	3181 11373 19565 27757	39130	Float	-1999...9999	☐	The effective setpoint is shifted by this value. In this way, the setpoints of several controllers can be shifted together, regardless of the individually adjusted effective setpoints.

24 Tool

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
U.LinT	r/w	base 1dP 2dP 3dP	634 8826 17018 25210	34036	Enum	Enum_Unit		Engineering unit of linearization table (temperature).
						0	without unit	
						1	°C	
						2	°F	

A4, unibind, SW-Druck Normalpapier weiß 80g/m²