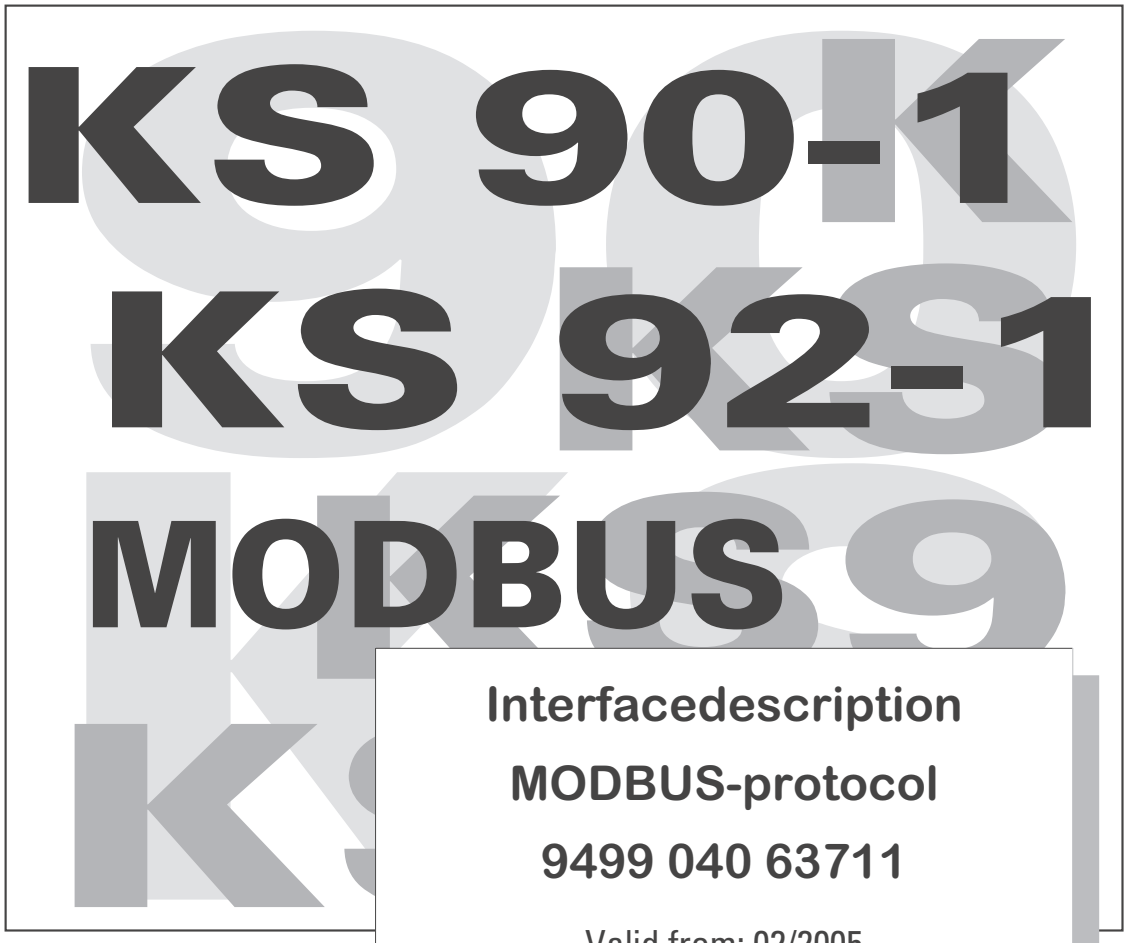
PMA Prozeß- und Maschinen-Automation GmbH

Universal process-controller and programmer KS 90-1 & KS 92-1



Interfacedescription

MODBUS-protocol

9499 040 63711

Valid from: 02/2005

Explanation of symbols:

General information

General warning

Caution: ESD-sensitive components

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Content

1 General

We thank you for purchasing a device from the *BluePort*® product range. This document describes the implementation and operation of the MODBUS interface used with the universal process- controller and programmer KS 90-1 which will be called 'device' in the rest of this document. This document is also valid for the KS 92-1 and the KS 92-1programmer.

Devices with a MODBUS interface permit the transmission of process data, parameters, and configuration data. Electrical connections are made at the base of the device in the channel of the top-hat DIN rail. The serial communication interface provides a simple link to superordinate PLCs, visualization tools, etc.

An additional interface that is always fitted in the device's front panel is the BluePort® (PC) interface. This interface is not bussable, and serves for a direct connection with the BlueControl® software package that runs on a PC or laptop. Communication is done according to the master/slave principle. The device is always operated as a slave.

The most important characteristics and physical/electrical properties of the bus connection are:

- **Network topology**
  linear bus, possible with bus termination at both ends (see below).
- **Transmission media**
  screened and twisted 2-wire copper leads
- **Lead lengths (without repeater)**
  A maximum lead length of 1000 m should not be exceeded.
- **Transmission speeds**
  The following transmission speeds are supported:
  2400 … 38400 bits/s
- **Physical interface**
  RS 485 with bus connections in the top-hat rail; connections made on site.
- **Address range**
  1 ... 247
  (32 devices in one segment. Expandable to 247 with repeaters.)

1.1 References

Further information on the MODBUS-Protokoll:

[1] MODBUS Specifications
- MODBUS application Protocol Specification V1,1
- MODBUS over serial line specification and implementation guide V1.1
- http://www.modbus.org

Further information on RS 485:

[2] ANSI/TIA/EIA-485-A

Additional documentation for KS 90-1 / KS 92-1 devices:

[3] Universal process-controller and programmer KS 90-1 / KS 92-1

– Data sheet KS 90-1 / 92-1	9498 737 40633
– Data sheet KS 90-1P / 92-1P	9498 737 40733
– Operating instructions KS 90-1 / 92-1	9499 040 62918
– Operating instructions KS 90-1P / 92-1P	9499 040 66118

2 Commissioning the interface

Instrument field bus connection is via the pins of connector B on the rear, via flat-pin connectors or via screw terminals dependent on version.
Construction of suitable cables must be done by the user.

2.1 Mounting hints

If possible, the place of installation should be exempt of vibration, aggressive media (e.g. acid, lye), liquid, dust or aerosol.

The unit may be operated only in environments for which it is suitable due to its protection type.

The housing ventilation slots must not be covered.

In plants where transient voltage peaks are susceptible to occur, the instruments must be equipped with additional protective filters or voltage limiters!

Caution! The instrument contains electrostatically sensitive components.

Please, follow the instructions given in the safety hints.

2.2 Electrical connections

The electrical connection of the interface can be done as two-wire RS 485, as well as four-wire RS 485 (often called RS 422).

2.2.1 RS 485 version (two-wire)

The bus is build as RS 485 - two-wire cable with common ground main.
All the participants of an RS 485 bus are connected in parallel to the signals 'Data A' and 'Data B'.

The meaning of the data line terms are defined in the unit as follows:

- for signal 1 (off) Data A is positive to Data B
- for signal 0 (on) Data A is negative to Data B

The terms Data A and Data B are reverse to A und B defined in [2] .

For the purpose of limiting ground current loops, signal ground (GND) can be grounded at one point via a resistor 'RGND' (100 ohms, ¼ watt).

Association of terms for the two-wire-MODBUS definition according to [1]:

Definition MODBUS	according to unit
D1	Data A
D0	Data B
Common	RGND

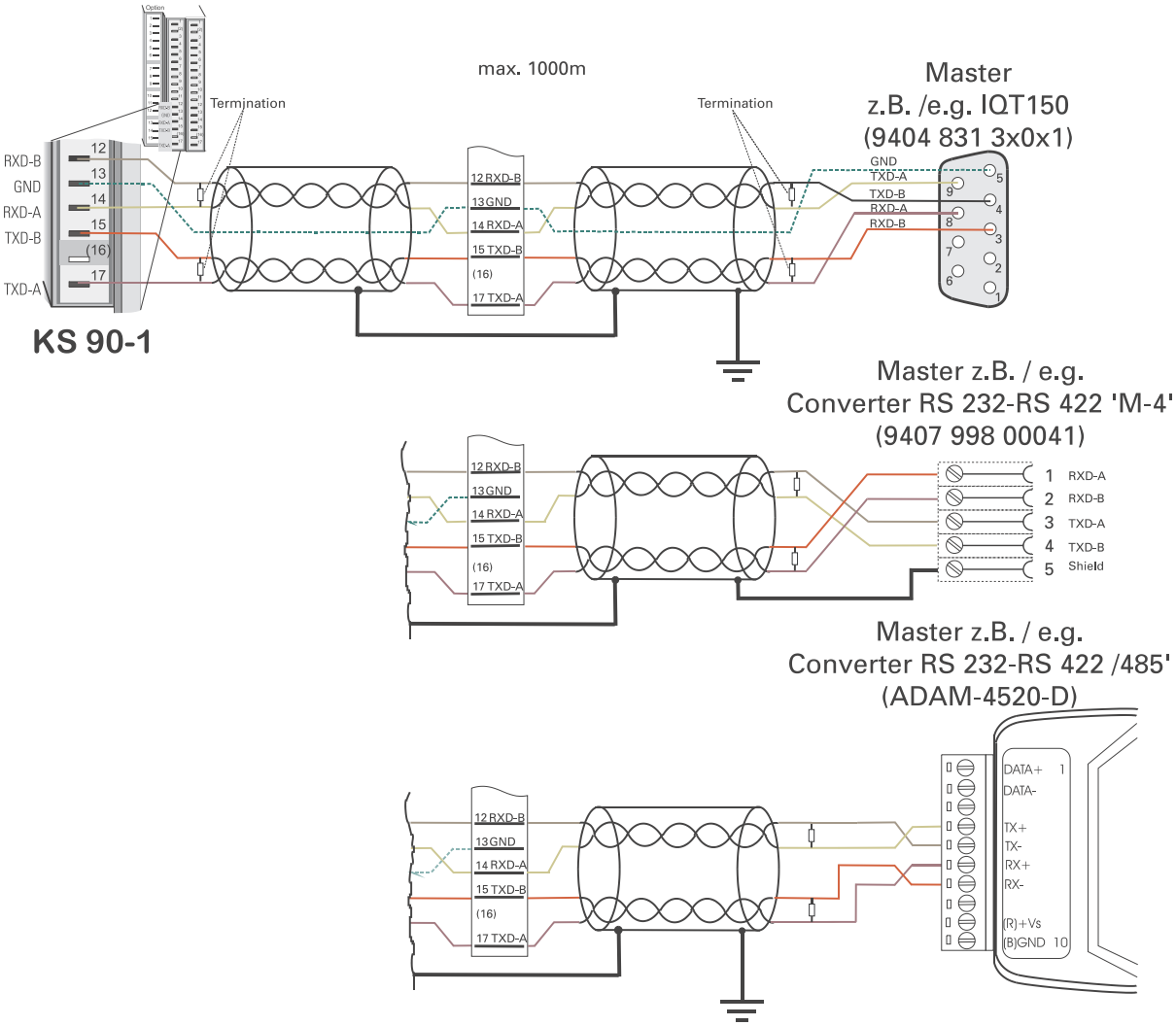
Notes:

❶ Terminating resistors between Data A and B at the cable ends (see 2.2.3 below)
❷ Screening (see 2.2.2 below)
❸ GND lead (see Fig. 6)

KS90-1		IQT 150		M-4		ADAM-4520-D	
Signal	Terminal	Signal	Terminal	Signal	Terminal	Signal	Terminal
TXD-B	15	DATA-B	3	TXD-A	3	DATA -	
TXD-A	17	DATA-A	8	TXD-B	4	DATA+	
GND	13	RGND	5	Shield	5		

There are various possibilities for cable entry of the RS 485.

Fig. 1 : connection example four-wire RS 485 (RS 422)



2.2.2 RS 422 version (four-wire - RS 485)

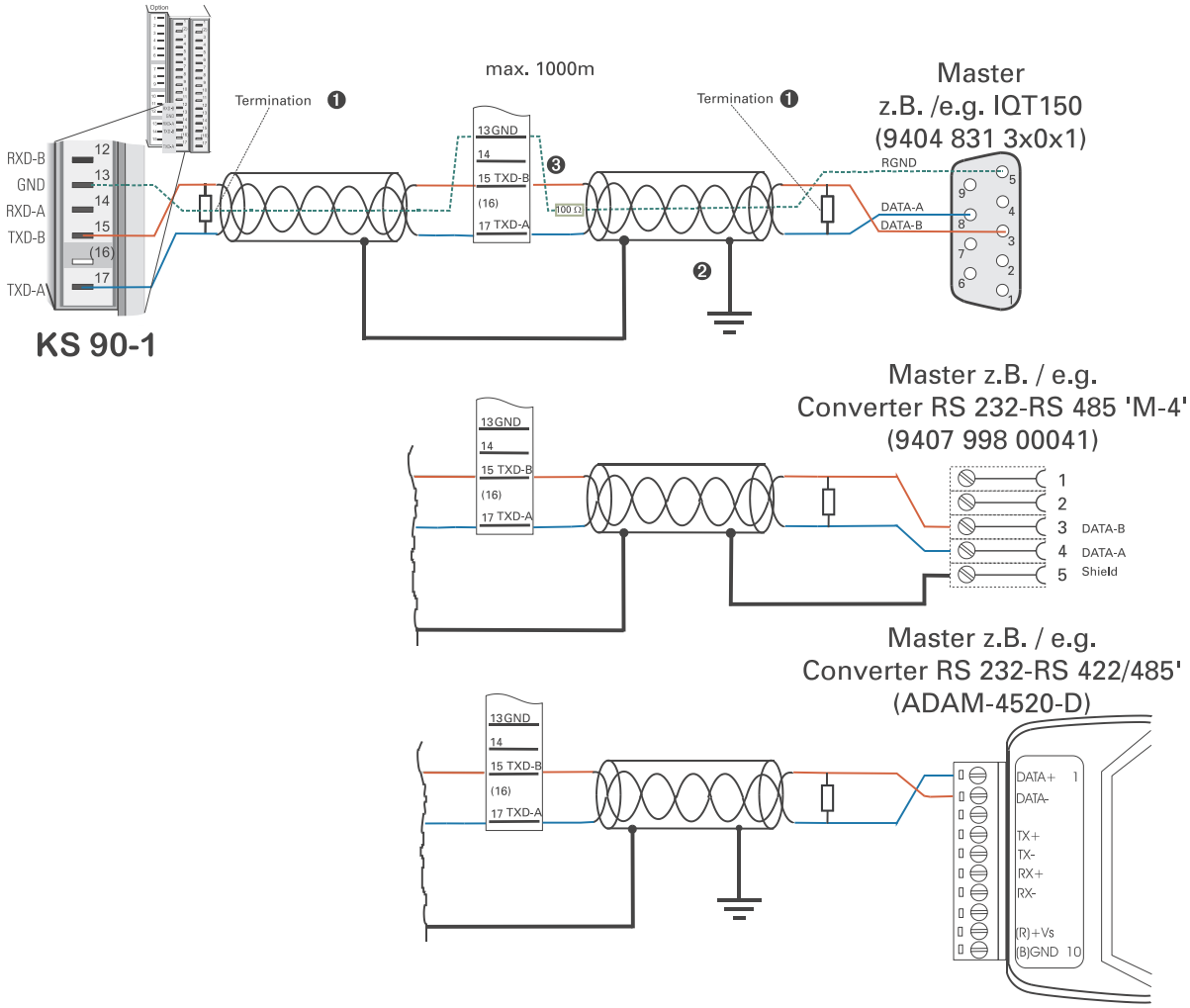
The RS 422 bus is of the RS 485 four-wire type with two pairs of conductors and a common ground.
The data on the master wire pair (RXD) are received only by the slaves. The data on the slave wire pair (TXD) are received only by the master.
Allocation of descriptions for the four-wire MODBUS definition according to [1]:

Description MODBUS	correspondence in the instrument
TXD1	RXD-A
TXD0	RXD-B
RXD1	TXD-A
RXD0	TXD-B
Common	GND

KS90-1		IQT 150		M-4		ADAM-4520-A	
Signal	Terminal	Signal	Terminal	Signal	Terminal	Signal	Terminal
TXD-B	15	RXD-B	3	RXD-A	1	RX-	
TXD-A	17	RXD-A	8	RXD-B	2	RX+	
RXD-B	12	TXD-B	4	TXD-A	3	TX-	
RXD-A	14	TXD-A	9	TXD-B	4	TX+	
GND	13	GND	5	Shield	5		

The following cable connection methods are possible.

Fig. 2 connection example RS 485



2.2.3 Cable installation

Depending on each application, suitable cables are to be used for the bus. When installing the cables, all relevant regulations and safety codes (e.g. VDE 0100) must be observed:

- Cable runs inside buildings (inside and outside of control cabinets)
- Cable runs outside buildings
- Potential balancing conductors
- Screening of cables
- Measures against electrical interference
- Length of spur lines

In particular, the following points must be considered:

- The RS 485 bus technology used here permits up to 32 devices in a segment to be connected to one bus cable. Several segments can be coupled by means of repeaters.
- The bus topology is to be designed as a line with up to 1000 m length per segment. Extensions by means of repeaters are permitted.
- The bus cable is to be taken from device to device (daisy chaining), i.e. not star connected**.**
- If possible, spur lines should be avoided, in order to prevent reflections and the associated disturbances in communication.
- The general notes on interference-free wiring of signal and bus leads are to be observed (see Operating notes "EMC – General information' (9407 047 09118)).
- To increase signal transmission reliability, we recommend using screened, twisted pairs for the bus leads.

2.2.4 Screening

The type of screening is determined primarily by the nature of the expected interference.

- For the suppression of electrical fields, one end of the screened cable must be grounded. This should always be done as the first measure.
- Interference due to alternating magnetic fields can only be suppressed, if the screened cable is grounded at both ends. However, this can lead to ground current earth loops: galvanic disturbance along the reference potential lead can interfere with the useful signal, and the screening effect is reduced.
- If several devices are linked to a single bus, the screen must be connected at each device, e.g. by means of screen clamps.
- The bus screen must be connected to a central PE point, using short, low-impedance connections with a large surface, e.g. by means of screen clamps.

2.2.5 Terminating resistors

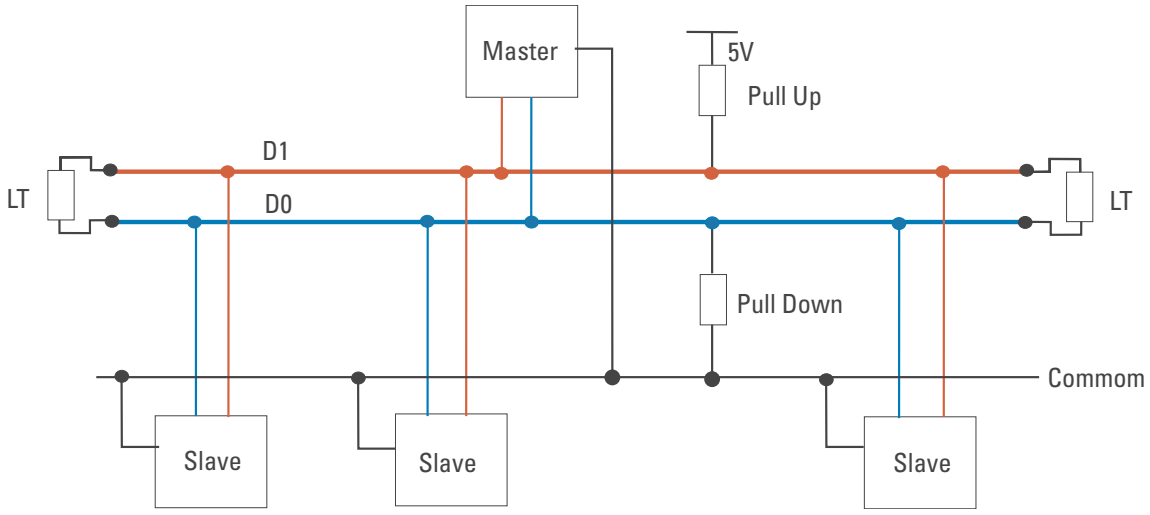
The widespread US Standard EIA RS 485 recommends fitting terminating resistors at each end of the bus cable. Terminating resistors usually have a value of approx. 120 ohms, and are connected in parallel between the data lines A and B (depending on the cable impedance; for details, see the cable manufacturer's data sheet). Their purpose is to eliminate reflections at the end of the leads, thus obtaining a good transmission quality. Termination becomes more important, the higher the transmission speed is, and the longer the bus leads are.

However, if no signals are applied to the bus, it must be ensured that the signal levels are clearly defined. This done by means of pull-up and pull-down resistors between +5V or GND, and the drivers. Together with the bus terminating resistor, this forms a voltage divider. Moreover, it must be ensured that there is a voltage difference of at least ±200mV between the data lines A and B, as seen by the receiver.

Normally, an external voltage source is provided.

Fig. 6 shows the device connections as recommended by the MODBUS User Organization [1].

Fig. 3 Recommended connections



With four-wire connection (RS 422), each wire pair corresponds to the drawing above.

If no external voltage source is available, and if there are only a few participants on the bus (e.g. only a master and a slave device), and the transmission speed is low (e.g. 9600 bits/s), the lead lengths are short, and terminating resistors have been fitted, it is possible that the minimum signal level cannot be reached. This will cause disturbances in signal transmission.

Therefore, if only a few PMA devices are connected, we recommend the following procedure before fitting terminating resistors:

Baudrate	Lead length	No. of PMA devices	Terminating resistor
≤ 9600 Bist/s	≤ 1000 m	< 8	no
19200 Bit/s	≤ 500 m	< 8	no
38400 Bit/s	≤ 250 m	< 8	no
beliebig		≥ 8	useful
			other cases: try out

If less than 8 PMA devices are connected to a bus with the above maximum lead lengths, no terminating resistors should be fitted.

Note: If additional devices from other manufacturers are connected to the bus, no general recommendations are possible – this means: trial and error!

2.2.6 Installation notes

- Measurement and data leads should be kept separate from control leads and power cables.
- Twisted and screened cables should be used to connect sensor. The screen must be grounded.
- Connected contactors, relays, motors, etc. should be fitted with RC snubber circuits in accordance with manufacturer specifications.
- The device must not be installed near powerful electrical or electromagnetic fields.

- The device is not certified for installation in explosion-hazarded areas.
- Incorrect electrical connections can result in severe damage to the device.
- Please observe all safety instructions.

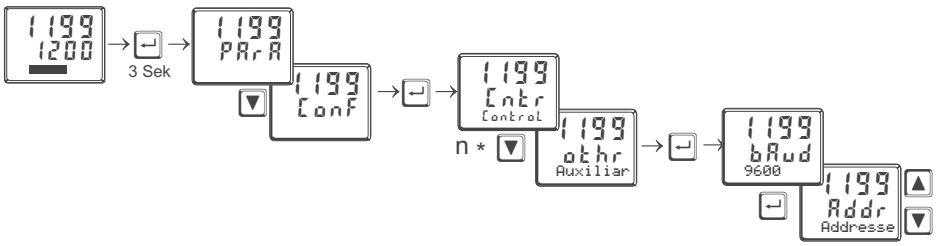
2.3 Bus settings

2.3.1 Bus address

The participant address of a device connected to a bus must be adjusted by one of the following means:

- the Engineering Tool BlueControl® using the menu item Othr/Addr
- or via the device's front panel (see below)

Fig. 4 Setting a bus address



Every device connected to a bus must have a different, unique address.

Please regard: When allocating the unit's addresses don't give the same address to two units. In this case a strange behaviour of the whole bus becomes possible and the busmaster will not be able to communicate with the connected slave-units.

2.3.2 Transmission parameters

The transmission parameters of all devices linked to a bus must have the same settings.

Baudrate (bAud)
The baudrate is the measure of data transmission speed. The devices support the following transmission speeds:

- 38000 bits/s
- 19200 bits/s
- 9600 bits/s
- 4800 bits/s
- 2400 bits/s

Parity / Stop bit (PrtY)
The parity bit is used to check whether an individual fault has occurred within a byte during transmission.

The device supports:

- **even parity**
- **odd parity**
- **no parity**

With even parity, the parity bit is adjusted so that the sum of the set bits in the 8 data bits and the parity bit result in an even number. Conversely, the same applies for uneven parity.

If a parity error is detected upon receipt of a message, the receiving device will not generate an answer.

Other parameters are:

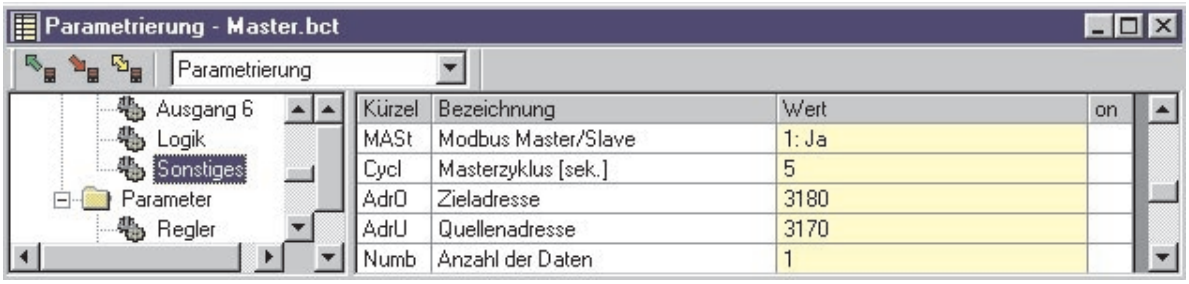
- 8 data bits
- 1 start bit
- 1 stop bit
  1 or 2 stop bits can be selected when adjusting 'no parity'.

The max. length of a message may not exceed 256 bytes.

2.4 Master operation (MASt)

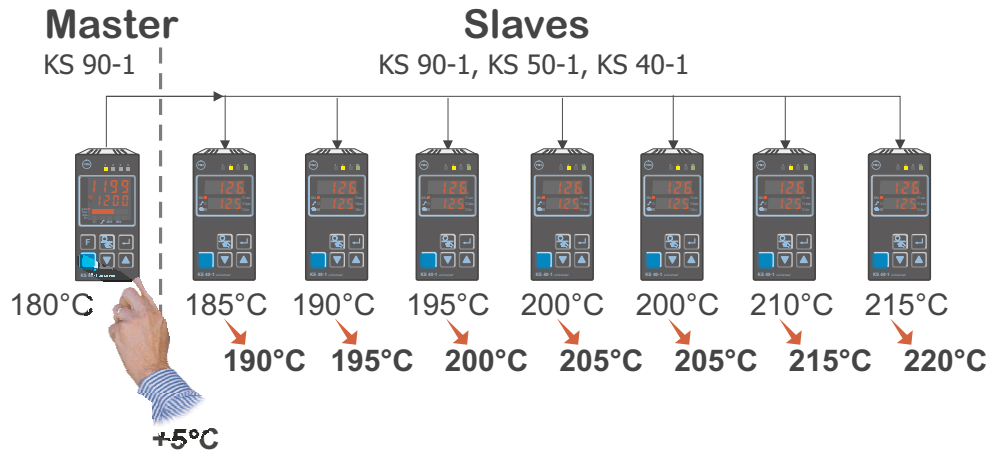
The KS 90-1 master function is limited to broadcast messages (data transmission to all connected slaves).
For operation as a master, the instrument must be configured accordingly by means of BlueControl® (engineering software for KS 90-1).

Fig. 5 : Master function parameter setting



A possible MODBUS master configuration is given in the drawing shown above. In this example, the actual master set-point (source address 3170) is transmitted to the slaves (target address 3180) at intervals of 5 seconds.

Fig. 6 : Example



2.5 System layout

Please observe the guidelines and notes provided by the manufacturer of the master device regarding the layout of a communication system.

2.5.1 Minimum configuration of a MODBUS installation

A MODBUS installation consists of not less than the following components:

- a bus master, which controls the data traffic
- one or more slave participants, which provide data upon demand by the master
- the transmission media, consisting of the bus cable and bus connectors to link the individual participants, plus a bus segment (or several, which are connected by means of repeaters).

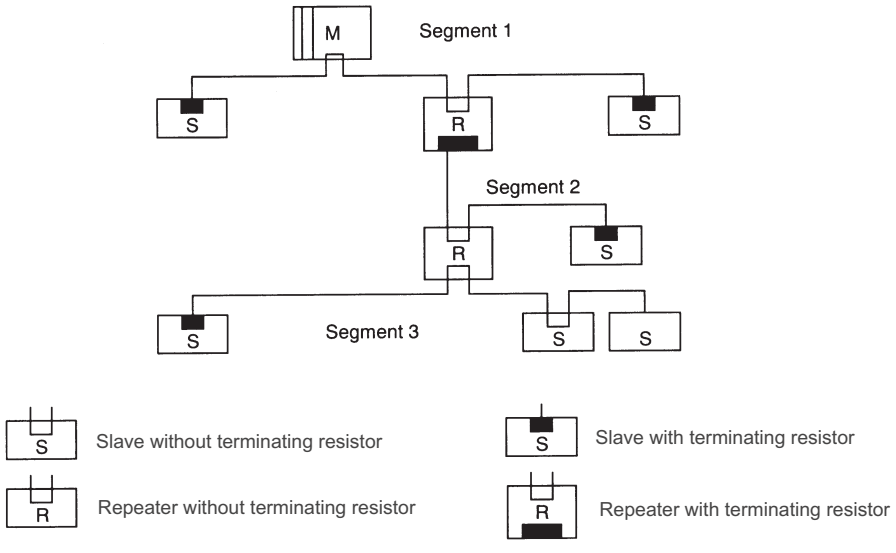
2.5.2 Maximum configuration of a MODBUS installation

A bus segment consists of max. 32 field units (active and passive). The greatest number of slave participants that can be operated by one MODBUS master via several segments, is determined by the internal memory structure of the master. Therefore, you should know the specifications of the master when planning a MODBUS installation.
The bus cable can be opened at any point in order to add another participant by means of a bus connector. At the end of a segment, the bus cable can be extended up to the total permissible length for a segment. The permissible length of a bus segment depends on the selected transmission speed, which in turn is determined mainly by plant layout (length of each segment, distributed inputs/outputs) and the required scan cycles for individual participants. All participants connected to the bus must be configured for the same transmission speed (bit rate).

MODBUS devices must be connected in a line structure.

If more than 32 participants are required, or larger distances than the permissible length of one segment are needed, the MODBUS installation can be extended by means of repeaters.

Fig. 7 structure



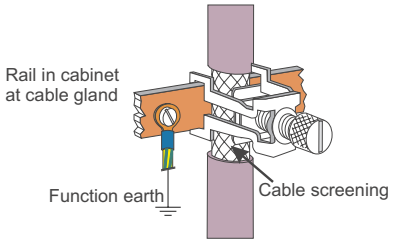
A fully configured MODBUS installation may contain max. 247 participants with the address range 1...247. Every installed repeater reduces the max. number of participants with a segment. Repeaters are passive participants and do not require a MODBUS address. However, its input circuit represents an additional load in the segment due to the current consumption of the bus driver. Nonetheless, a repeater has no influence on the total number of participants connected to the bus. The maximum number of series-connected repeaters can differ, depending on the manufacturer. Therefore, you should ask the manufacturer about possible limitations when planning a MODBUS installation.

2.5.3 Wiring inside buildings

The following wiring hints apply for twisted-pair cables with screen. The cable screen serves to improve overall electromagnetic compatibility.

Depending on requirements, the one or both ends of the cable screen must be connected to a central earth point (PE) by means of low-impedance connections with a large surface, e.g. screen clamps. When installing a repeater or field unit in a control cabinet, the cable screen should be connected to an earth rail mounted as close as possible to the cable entry into the cabinet.

Fig. 8 Screen connection



The screen must be taken right up to the field unit, where it is to be connected to the conductive housing and/or the metal connector. Hereby, it must be ensured that the device housing (and possibly the control cabinet in which the device is installed), are held at equal ground potential by means of low-impedance connections with a large surface. Connecting a screen to a lacquered or painted surface is useless. By observing these measures, high-frequency interference will be grounded reliably via the cable screens. Should external interference voltages still reach the data lines, the voltage potential will be raised symmetrically on both lines, so that in general, no destructive voltage differences can arise. Normally, a shift of the ground potential by several volts will not have an effect on reliable data transmission. If higher voltages are to be expected, a potential balancing conductor with a minimum cross-section of 10 mm^2 should be installed parallel to the bus cable, with connections to the reference ground of every field unit. In case of extreme interference, the bus cable can be installed in a metal conduit or channel. The conduit tube or the channel must be earthed at regular distances.

The bus cable must always be installed with a minimum separation of 20 cm from other cables carrying voltages above 60 V. Similarly, the bus cable must be run separately from telephone lines, as well as from cables leading into explosion-hazarded areas. In these cases, we recommend installing the bus cable in a separate cable tray or channel.

Cable trays or channels should always be made of conductive materials, and must be earthed at regular distances. Bus cables should not be subjected to any mechanical strains or obvious risks of damage. If this cannot be ensured, suitable measures must be undertaken, such as installation in conduit.

Floating installation:
If the installation must be floating (no earth connection) for certain reasons, the device reference ground must only have a high-impedance connection to earth (e.g. an RC combination). The system will then find its own earth potential. When connecting repeaters for the purpose of linking two bus segments, a floating installation is recommended, to prevent possible potential differences being transferred from one segment to the next.

3 Bus protocol

3.1 Composition of a transmission byte

Originally, the MODBUS protocol was defined for the communication between a supervisory system and the Modicon® PLC. It used a master/slave structure, in which only one device (master) is able to initiate data transactions (queries). The query message from the master is answered (response) by other devices (slaves), which supply the requested data. Moreover, the master can address a specific slave via its MODBUS address, or address all connected slaves by means of a general message (broadcast).
The MODBUS protocol determines the transmission formats for the query and the response. Function codes define the actions to be executed by the slaves.
Within the device, the MODBUS protocol uses the RTU (remote terminal unit) mode, i.e. every transmitted byte of a message contains two hexadecimal characters (0...9, A...F).

The composition of a byte in the RTU-protocol is as follows:

Start bit	8 data bits	Parity/Stop bit	Stop bit

3.2 General message frame

The message is read into a data buffer with a defined maximum length. Longer messages are not accepted, i.e. the device does not answer.

The message consist of the following elements:

Device address	Function code	Data field	CRC	End of frame detection
1 byte	1 byte	N * 1 bytes	2 bytes	

- Device address (Addr)
  The device address is used for identification. Device addresses can be assigned in the range of 1...127.
  The device address '0' is reserved for 'Broadcast' messages to all slaves. A broadcast message can be transmitted e.g. with a write instruction that is then executed by all the slaves on the bus. Because all the slaves execute the instruction, no response messages are generated.
- Function code
  The function code defines the transaction type in a message. The MODBUS specification defines more than 17 different function codes. Supported codes are described in Section 3.6. „Function codes".
- Data field
  The data field contains the detailed specifications of the transaction defined by the function code. The length of the data field depends on the function code.
- CRC
  As a further means of fault detection (in addition to parity bit detection) a 16-bit cyclical redundancy check (CRC) is performed. The CRC code ensures that communication errors are detected. For additional information, see Section 3.2.1. "CRC".
- End of frame detection
  The end of a message is defined by a period of 3,5 characters, during which no data transfer occurs. For additional information, see Section 3.2.2. „End of frame detection"

Further information is given in the documents named in **[1]** or under http://www.modbus.org.

3.2.1 CRC

The CRC is a 16-bit value that is attached to the message. It serves to determine whether a transmitted message has been received without errors. Together with the parity check, this should detect all possible communication errors.

If a parity fault is detected during reading, no response message will be generated.

The algorithm for generating a CRC is as follows:

① Load CRC register with FFFFhex.
② Exclusive OR the first transmit/receive byte with the low-order byte of the CRC register, putting the result into the CRC register, zero-filling the MSB.
③ Shift the CRC register one bit to the right.
④ If the expelled bit is a '0' repeat step 3.
If the expelled bit is a '1', exclusive OR the CRC register with value A001hex.
⑤ Repeat steps 3 and 4 for the other 7 data bits.
⑥ Repeat steps 2 to 5 for all further transmit/receive bytes.
⑦ Attach the result of the CRC register to the message (low-order byte first, then the high-order byte).
When checking a received message, the CRC register will return '0', when the message including the CRC is processed.

3.2.2 End of frame detection

The end of a message (frame) is defined as a silence period of 3.5 characters on the MODBUS.
A slave may not start its response, and a master may not start a new transmission before this time has elapsed.

However, the evaluation of a message may begin, if a silence period of more than 1.5 characters occurs on the MODBUS. But the response may not start before 3,5 characters of silence.

3.3 Transmission principles

Two transmission modes are used with MODBUS:

- **Unicast mode**
- **Broadcast mode**

In the Unicast mode, the master addresses an individual device, which processes the received message and generates a response. The device address can be 1...247. Messages always consist of a query (request) and an answer (response). If no response is read within a defined time, a timeout error is generated.

In the Broadcast mode, the master sends a write instruction (request) to all participants on the bus, but no responses are generated. The address '0' is reserved for broadcast messages.

3.4 Response delay (dELY)

Some devices require a certain period to switch from transmit to receive. The adjusted delay is added to the silent period of 3,5 characters at the end of a message, before a response is generated. The delay is set in ms.

3.5 Modem operation (C.dEL)

The end of frame detection of a received MODBUS message can be increased by the period 'C.del'. This time is needed e.g. for transmission via a modem, if messages cannot be transmitted continuously (synchronous operation). The delay is set in ms.

3.6 Function codes

Function codes serve to execute instructions. The device supports the following function codes:

Function code hex	Function code dez	Description	Explanation
0x03	3	Read Holding (Output) Register	Reading of process data, parameters, and configuration data
0x04	4	Read Input Register	Reading of process data, parameters, and configuration data
0x06	6	Preset Single Register (Output)	Wordwise writing of a value (process value, parameter, or configuration data)
0x08	8	Diagnostics	Reading the MODBUS diagnostic register
0x10	16	Preset Multiple Register (Output)	Wordwise writing of several values (process data, parameter or configuration data)

The behaviour of function codes 3 and 4 is identical.
The following sections show various examples of message composition.

3.6.1 Reading several values

Messages with function codes 3 or 4 are used for (wordwise) reading of process data, parameters or configuration data. For reading 'Float' type data, 2 values must be requested for each datum.

The composition of a read message is as follows:
Request:

Field name	Value (hex)	Explanation
Address	11	Address 17
Function	03 or 04	Reading process data, parameters or configuration data
Start address High Start address Low	02 8A	Starting address 650
No. of values	00 02	2 datums (2 words)
CRC	CRC-Byte1 CRC-Byte2	

Response:

Field name	Value (hex)	Explanation
Address	11	Address 17
Function	03 oder 04	Reading process data, parameters or configuration data
No. of bytes	04	4 data bytes are transmitted
Word 1	00 DE	Process data, parameters or configuration data. Address 650= 222
Word 2	01 4D	Process data, parameters or configuration data. Address 651= 333
CRC	CRC-byte1 CRC-byte2	

A broadcast message is <u>not possible</u> for function codes 3 and 4.

If the first addressed value is not defined, an error message "ILLEGAL DATA ADDRESS" is generated. If no further data are defined in the areas to be read following the first value, these areas will be entered with the value "NOT DEFINED VALUE". This enables areas with gaps to be to be read in a message.

3.6.2 Writing a single value

Messages with function code 6 are used for (wordwise) writing of process data, parameters or configuration data as integers. This function is not suitable for writing 'Float' type data.

The composition of a write message is as follows:
Request:

Field name	Value (hex)	Explanation
Address	11	Address 17
Function	06	Writing a single value (process data, parameter or configuration)
Write address High Write address Low	02 8A	Write address 650
Value	00 7B	Preset value = 123
CRC	CRC-byte1 CRC-byte2	

Response:

Field name	Value (hex)	Explanation
Address	11	Address 17
Function	06	Writing a single datum (process data, parameter or configuration)
Write address High Write address Low	02 8A	Write address 650
Value	00 7B	Preset value = 123
CRC	CRC-Byte1 CRC-Byte2	

If everything is correct, the response message corresponds exactly to the default.

The devices can also receive this message as a broadcast with the address '0'.

A default value in the 'Real' data format is not possible, as only 2 bytes can be transmitted as value.

If a value is outside the adjustable range, the error message "ILLEGAL DATA VALUE" is generated. The datum remains unchanged. Also if the datum cannot be written (e.g. configuration data, and the device is online), an error message "ILLEGAL DATA VALUE" is generated.

3.7 Writing several values

Messages with function code 16 are used for (wordwise) writing of process data, parameters or configuration data. For writing 'Float' type data, 2 values must be transmitted for each datum.

The composition of a write message is as follows:
Request:

Field name	Value (hex)	Explanation
Address	11	Address 17
Function	10	Writing several process values, parameters or configuration data
Start address High Start address Low	02 8A	Write address 650
No. of values	00 02	2 values
No. of bytes	04	4 data bytes are transmitted
Word 1	00 DE	Process value, parameters or configuration data. Address 650 = 222
Word 2	01 4D	Process value, parameters or configuration data. Address 651 = 333
CRC	CRC byte1 CRC byte2	

Response:

Field name	Value (hex)	Explanation
Address	11	Address 17
Function	10	Writing several process values, parameters or configuration data
Start address High Start address Low	02 8A	Write address 650
No. of values	00 02	2 process values, parameters or configuration data
CRC	CRC byte1 CRC byte2	

The devices can also receive this message as a broadcast with the address '0'.

If the first value is not defined, an error message "ILLEGAL DATA ADDRESS" is generated.
If the first value cannot be written (e.g. configuration data, and the device is online), an error message "ILLEGAL DATA VALUE" is generated.

If no further data are defined or cannot be written in the specified areas following the first value, these areas will be skipped. The data in these locations remains unchanged. This enables areas with gaps, or that are currently not writable, to be changed with a message. No error message is generated.

If a value is outside the adjustable range, the error message "ILLEGAL DATA VALUE" is generated. Subsequent data are not evaluated. Previously accepted correct data are active.

3.8 Error record

An error record is generated, if a message is received correctly, but message interpretation or the modification of a datum is not possible.

If a transmission error is detected, no response is generated. The master must retransmit the message.

Detected transmission errors are:

- Parity fault
- Framing error (no stop bit received)
- Overrun error (receiving buffer has overflowed or data could not be retrieved quickly enough from the UART)
- CRC error

The composition of the error record is as follows:

Field name	Value	Explanation
Address	11	Address 17
Function	90	Error record for the message 'Writing several parameters or configuration data'. Composition: 80_{hex} + function code
Error code	02	ILLEGAL DATA ADDRESS
CRC	CRC byte1 CRC byte2	

In the 'Function' field, the most significant bit is set.
The error code is transmitted in the subsequent byte.

3.8.1 Error codes

The following error codes are defined:

Code	Name	Explanation
01	ILLEGAL FUNCTION	The received function code is not defined in the device.
02	ILLEGAL DATA ADDRESS	The received address is not defined in the device, or the value may not be written (read only). If several data are read simultaneously (function codes 01, 03, 04) or written simultaneously (function codes 0F, 10), this error is only generated if the first datum is not defined.
03	ILLEGAL DATA VALUE	The received value is outside the adjusted limits or it cannot be written at present (device is not in the configuration mode). If several data are written simultaneously (function codes 0F, 10), this error is only generated if the first datum cannot be written.
04	SLAVE DEVICE FAILURE	More values are requested than permitted by the transmission buffer.

Other error codes specified in the MODBUS protocol are not supported.

3.9 Diagnosis

By means of the diagnosis message, the device can be prompted to send check messages, go into operational states, output counter values or to reset the counters.
This message can never be sent as a broadcast message.

The following functions have been defined:

Code	Explanation
0x00	Return transmission of the received message
0x01	Restart of communication (terminates the Listen Only mode)
0x02	Return transmission of the diagnosis register
0x04	Change to the Listen Only mode
0x0A	Delete the counter and reset the diagnosis register
0x0B	Return transmission of the message counter (all messages on the bus)
0x0C	Reset of the counter for faulty message transmissions to this slave (parity or CRC error)
0x0D	Return transmission of the counter for messages answered with error code
0x0E	Return transmission of the message counter for this slave
0x0F	Return transmission of the counter for unanswered messages
0x10	Return transmission of the counter for messages answered with NAK
0x11	Return transmission of the counter for messages answered with Busy
0x12	Return transmission of the counter for too long messages
0x40	Return transmission of the parity error counter
0x41	Return transmission of the framing error counter (stop bit not detected)
0x42	Return transmission of the counter for full buffer (message longer than receiving buffer)

- Request in the Integer format:
  If the setting for Integer with decimals (most significant 3 bits) is used for the address, the counter contents will be transmitted in accordance with the necessary conversion factor.

- Request in the Float format:
  If the setting for Float (most significant 3 bits are 010) is used for the address, the counter contents will be transmitted in the IEEE format. The largest value is 65535, because the counters in the device are designed as word counters.
  In the Float format, a 4-byte data field is returned with a request for counter contents. In all other cases, a 2-byte data field is returned.

When switching into the Listen mode (0x04) and at restart after the device has changed into the Listen mode, no response is generated.
If a restart diagnosis message is received while the device is not in the Listen mode, the device generates a response.

A diagnosis message is composed as follows:

Request:

Field name	Value	Explanation
Address	11	Address 17
Function	08	Diagnosis message
Sub-function High Sub-function Low	00 YY	Sub-function code
Data field	Byte 1 Byte 2	Further data definitions
CRC	CRC byte1 CRC byte2	

3.9.1 Return transmission of the received message (0x00)

The message serves as a check whether communication is operational.
Definition of the received and returned data:

Sub-function	Received data field	Transmitted data field
00 00	2 bytes of any content	Return transmission of the received datum

3.9.2 Restart of communication (terminates the Listen Only mode) (0x01)

The slave is instructed to initialize its interface, and to delete the event counters. In addition, the device is instructed to exit the Listen Only mode. If the device already is in the Listen Only mode, no response is generated.
Definition of the received and returned data:

Sub-function	Received data field	Transmitted data field
00 01	00 00	00 00

3.9.3 Return transmission of the diagnosis register (0x02)

The slave sends its 16-bit diagnosis register to the master. The data contained in this register are freely definable. For example, the information could be: EEPROM faulty, LED defective, etc.
Definition of the received and returned data:

Sub-function	Received data field	Transmitted data field
00 02	00 00	Contents of the diagnosis register

3.9.4 Change to the Listen Only mode (0x04)

The slave is instructed not to execute or answer any messages addressed to it. The device can only return to normal operation by means of the diagnosis message 'Sub-function 00 01' or by means of a new power up.

The function serves to disable a module that is behaving erratically on the MODBUS, so that the bus can continue operations. The device does not generate a response after receiving this message.
Definition of the received and returned data:

Sub-function	Received data field	Transmitted data field
00 04	00 00	No response

3.9.5 Delete the counter and reset the diagnosis register (0x0A)

The slave is instructed to delete the contents of its event counter and to reset the diagnosis register.
Definition of the received and returned data:

Sub-function	Received data field	Transmitted data field
00 0A	00 00	00 00

3.9.6 Return transmission of the message counter (0x0B)

The slave is instructed to return the value of its message counter.
The counter contains the sum of all messages, which the slave has recorded on the bus. This count includes all the messages transmitted by the master and the other slaves. The count does not include the response messages of this slave.
Definition of the received and returned data:

Sub-function	Received data field	Transmitted data field
00 0B	00 00	Message counter

3.9.7 Return transmission of the counter for faulty message transmissions

The slave is instructed to return the value of its counter for faulty message transmissions.
The counter contains the sum of all messages addressed to the slave, in which an error was detected. Hereby, the faults can be CRC or parity errors.
Definition of the received and returned data:

Sub-function	Received data field	Transmitted data field
00 0C	00 00	Contents of counter for faulty message transmissions

3.9.8 Return transmission of the counter for messages answered with error code

The slave is instructed to return the value of its counter for the messages answered with error code. The counter contains the sum of all messages addressed to the slave, and which were answered with an error code.
Definition of the received and returned data:

Sub-function	Received data field	Transmitted data field
00 0D	00 00	Contents of counter for messages answered with an error code

3.9.9 Return transmission of the message counter for this slave

The slave is instructed to return the value of its counter for messages to this slave.
The counter contains the sum of all messages addressed to the slave.
Definition of the received and returned data:

Sub-function	Received data field	Transmitted data field
00 0E	00 00	Contents of counter for messages addressed to this slave

3.9.10 Return transmission of the counter for unanswered messages

The slave is instructed to return the value of its counter for unanswered messages.
The counter contains the sum of all messages addressed to the slave, which were not answered because of internal events or detected errors.
Definition of the received and returned data:

Sub-function	Received data field	Transmitted data field
00 0F	00 00	Contents of counter for unanswered messages

3.9.11 Return transmission of the counter for messages answered with NAK

The slave is instructed to return the value of its counter for messages answered with NAK.
The counter contains the sum of all messages addressed to the slave, which were answered with NAK.
Definition of the received and returned data:

Sub-function	Received data field	Transmitted data field
00 10	00 00	Contents of counter for messages answered with NAK

3.9.12 Return transmission of the counter for messages answered with Busy

The slave is instructed to return the value of its counter for messages answered with Busy.
The counter contains the sum of all messages addressed to the slave, which were answered with Busy.
Definition of the received and returned data:

Sub-function	Received data field	Transmitted data field
00 12	00 00	Contents of counter for messages answered with Busy

3.9.13 Return transmission of the parity error counter

The slave is instructed to return the value of its counter for parity errors.
The counter contains the sum of all messages addressed to the slave, in which a parity error was detected.
Definition of the received and returned data:

Sub-function	Received data field	Transmitted data field
00 40	00 00	Contents of counter for the number of parity errors

3.9.14 Return transmission of the framing error counter

The slave is instructed to return the value of its counter for the number of framing errors.
The counter contains the sum of all messages addressed to the slave, in which a framing error was detected. A framing error occurs, if the stop bit at the end of a byte is not detected.
Definition of the received and returned data:

Sub-function	Received data field	Transmitted data field
00 41	00 00	Contents of counter for the number of framing errors

3.9.15 Return transmission of the counter for too long messages

The slave is instructed to return the value of its counter for too long messages.
The counter contains the sum of all messages addressed to the slave, which caused an overflow of the receiving buffer, or if the data were not retrieved from the UART quickly enough.
Definition of the received and returned data:

Sub-function	Received data field	Transmitted data field
00 42	00 00	Counter for too long messages

4 MODBUS addresses, address areas, and address formats

4.1 Area definitions

The address is coded in 2 bytes. The most significant 3 bits determine the data transmission format.
The following formats are available for *rail line* devices:

- **Integer**
- **Integer with 1 decimal**
- **(Float acc. to IEEE)**

Address area hex	dez.	Data transfer format	Smallest transferable value	Largest transferable value	Resolution
0x0000 ... 0x1FFF	0 … 8191	Integer without decimals	-30000	+32000	+/- 1
0x2000 ... 0x3FFF	8192 ... 16383	Integer with 1 decimal	-3000.0	+3200.0	+/- 0.1
0x4000 ... 0x7FFF	16384...32767	Float (IEEE format)	-1.0 E+037	+1.0 E+037	+/-1.4E-045

For integer numbers with and without decimals, the value range -30000 to +32000 is transmitted via the interface. Scaling with the factor 1 or 10 must be carried out by the transmitting device as well as by the receiving device.

- Values are transmitted in the Motorola format (big endian).
- The relevant areas are grouped for process data, parameter and configuration data reading and writing.
- Multiple definition of process data in different groups is possible.

4.2 Special values

The following special values are defined for transmission in the integer format:

- -31000 Sensor fault
  This value is returned for data that do not represent a meaningful value due to a sensor fault.
- -32000 Switch-off value
  The function is disabled.
- -32500 Undefined value
  The device returns this value, if a datum is not defined within the requested range („NOT DEFINED VALUE").
- -32768 Corresponds to 0x8000 hex.
  The value to be transmitted lies outside the transferable integer value range.

The following special values are defined for transmission in the Float format:

- -1.5E37 This datum is not defined.
  The device returns this value, if a datum is not defined within the requested range.

4.3 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
- Real — Floating point number / Float (IEEE format)
- Type — internal data type
- Value/off — permissible value range, switch-off value available
- Description — Explanations

4.4 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

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6 Address tables

The following sections describe the address tables for:

- **Universal process controller KS 90-1 / KS92-1**
- **Universal programmer KS 90-1P / KS 92-1P**

6.1 Notes to program addresses

Please note the following rules for addressing the programs of the programmer KS 90-1*programmer* / KS 92-1*programmer:*

- The currently active program can be addressed with 6100 ff.
- The start addresses of the stored programs begin with address 6200 ff for program 1, 6300 ff for program 2 and so on (see table below)
- The program structure is equal for each program.

	Program start addresses				
	base	1 dP	2 dP	3dP	real
currently active 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

Changes in the active program (address 6100ff) are not stored permanently. If a program value should be stored permanently, then write the value to the stored program address directly.

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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)
1	Program controller for setpoint profile. The program profile is definable by the user.
10	controller with start-up circuit.The start-up function is a protective function, e.g. with hot runner control. To prevent destruction of high-performance heating elements, they must be heated slowly to remove any humidity. With activated start-up function, the controller maintains the reduced starting temperature for a defined dwell period. Subsequently, the controller switches over to the main setpoint.
11	Setpoint controllers are switchable to external setpoint and to a second setpoint, always with the start-up function.The start-up function is a protective function, e.g. with hot runner control. To prevent destruction of high-performance heating elements, they must be heated slowly to remove any humidity. With activated start-up function, the controller maintains the reduced starting temperature for a defined dwell period. Subsequently, the controller switches over to the main setpoint.

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.

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).

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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.

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Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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.
3	y = mean output, manual operation enabled. 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				
SP2C	r/w	base	5054	42876	Enum	*Enum_SP2C*	When switching over to the 2nd setpoint SP.2, control is performed without cooling.
		1dP	13246				
		2dP	21438				
		3dP	29630				

0	Standard (cooling permitted with all setpoints).
1	No cooling with active SP.2.

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.
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.

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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				

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PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
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%).
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.

1 Cntr

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
tt	r/w	base	5015	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.
		1dP	13207					
		2dP	21399					
		3dP	29591					
Y.Lo	r/w	base	5018	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
		1dP	13210					
		2dP	21402					
		3dP	29594					
Y.Hi	r/w	base	5019	42806	Float	-105...105	☐	Upper output limit [%] The range is ymin+1 105
		1dP	13211					
		2dP	21403					
		3dP	29595					
Y2	r/w	base	5017	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!
		1dP	13209					
		2dP	21401					
		3dP	29593					
Y.0	r/w	base	5020	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.
		1dP	13212					
		2dP	21404					
		3dP	29596					
Ym.H	r/w	base	5021	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.
		1dP	13213					
		2dP	21405					
		3dP	29597					
L.Ym	r/w	base	5022	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.
		1dP	13214					
		2dP	21406					
		3dP	29598					
E.H2O	r/w	base	5013	42794	Float	-1999...9999	☐	Min. temperature for water cooling. Below the set temperature no water cooling happens
		1dP	13205					
		2dP	21397					
		3dP	29589					
t.on	r/w	base	5010	42788	Float	0,1...9999	☐	Impulse length for water cooling. Fixed for all values of controller output.The pause time is varied.
		1dP	13202					
		2dP	21394					
		3dP	29586					
t.oFF	r/w	base	5011	42790	Float	1...9999	☐	Min. pause time for water cooling. The max. effective controller output results from t.on/(t.on+t.off)·100%
		1dP	13203					
		2dP	21395					
		3dP	29587					

1 Cntr

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
F.H2O	r/w	base	5012	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%.
		1dP	13204				
		2dP	21396				
		3dP	29588				
HYS.L	r/w	base	5028	42824	Float	0...9999 ☐	Switching hysteresis below the setpoint of the signaller [engineering unit].
		1dP	13220				
		2dP	21412				
		3dP	29604				
HYS.H	r/w	base	5029	42826	Float	0...9999 ☐	Switching hysteresis above the setpoint of the signaller [engineering unit].
		1dP	13221				
		2dP	21413				
		3dP	29605				

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Tu2	r	base	5145	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.
		1dP	13337				
		2dP	21529				
		3dP	29721				
Vmax2	r	base	5146	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.
		1dP	13338				
		2dP	21530				
		3dP	29722				
Kp2	r	base	5147	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.
		1dP	13339				
		2dP	21531				
		3dP	29723				

1 Cntr

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
St.Cntr	r	base	5100	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.
		1dP	13292				
		2dP	21484				
		3dP	29676				

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)

diFF	r	base	5104	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.
		1dP	13296				
		2dP	21488				
		3dP	29680				
POS	r	base	5105	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.
		1dP	13297				
		2dP	21489				
		3dP	29681				
Tu1	r	base	5141	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.
		1dP	13333				
		2dP	21525				
		3dP	29717				

1 Cntr

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Ypid	r	base	5103	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.
		1dP	13295				
		2dP	21487				
		3dP	29679				
Ada.St	r/w	base	5150	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.
		1dP	13342				
		2dP	21534				
		3dP	29726				
						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	5151	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.
		1dP	13343				
		2dP	21535				
		3dP	29727				
dYman	r/w	base	5152	43072	Float	-220...220 ☐	Differential preset output value, which is added to the actual output value during manual operation. Negative values reduce the output.
		1dP	13344				
		2dP	21536				
		3dP	29728				
Yinc	r/w	base	5153	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.
		1dP	13345				
		2dP	21537				
		3dP	29729				
						0	Not active
						1	increment output
Ydec	r/w	base	5154	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.
		1dP	13346				
		2dP	21538				
		3dP	29730				
						0	Not active
						1	decrement output
SP.EF	r	base	5101	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.
		1dP	13293				
		2dP	21485				
		3dP	29677				
In.1	r	base	5102	42972	Float	-1999...9999 ☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
		1dP	13294				
		2dP	21486				
		3dP	29678				

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				
						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	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	5148	43064	Enum	*Enum_Msg*	The result of self-tuning for 'cooling' indicates whether self-tuning was successful, and with what result.
		1dP	13340				
		2dP	21532				
		3dP	29724				

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

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
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).
30	Current : 0...20 mA / 4...20 mA
40	0...10V / 2...10V

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
S.Lin	r/w	base	1151	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.
		1dP	9343				
		2dP	17535				
		3dP	25727				

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.

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.

2 InP.1

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				

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.

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).
5	Preset for external positioning value Y.E (switchover via -> LOGI/Y.E)

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)

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
InL.2	r/w	base	1200	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.
		1dP	9392				
		2dP	17584				
		3dP	25776				
OuL.2	r/w	base	1201	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].
		1dP	9393				
		2dP	17585				
		3dP	25777				
InH.2	r/w	base	1202	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.
		1dP	9394				
		2dP	17586				
		3dP	25778				
OuH.2	r/w	base	1203	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].
		1dP	9395				
		2dP	17587				
		3dP	25779				

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
In.2	r	base	1270	35308	Float	-1999...9999 ☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
		1dP	9462				
		2dP	17654				
		3dP	25846				

3 InP.2

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Fail	r	base	1271	35310	Enum	*Enum_InpFail*	Input circuit fault: faulty or incorrectly connected sensor.
		1dP	9463				
		2dP	17655				
		3dP	25847				

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	1272	35312	Float	-1999...9999 ☐	Measurement value before the measurement value correction (unprocessed).
		1dP	9464				
		2dP	17656				
		3dP	25848				
F.Inp	r/w	base	1280	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.)
		1dP	9472				
		2dP	17664				
		3dP	25856				

4 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.

4 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.
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.
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.

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
L.1	r/w	base	2100	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.
		1dP	10292				
		2dP	18484				
		3dP	26676				

4 Lim

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
H.1	r/w	base	2101	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.
		1dP	10293					
		2dP	18485					
		3dP	26677					
HYS.1	r/w	base	2102	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.
		1dP	10294					
		2dP	18486					
		3dP	26678					
dEL.1	r/w	base	2103	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.
		1dP	10295					
		2dP	18487					
		3dP	26679					
HC.A	r/w	base	2000	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.
		1dP	10192					
		2dP	18384					
		3dP	26576					

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
St.HC	r	base	2070	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).
		1dP	10262					
		2dP	18454					
		3dP	26646					
HC	r	base	2071	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.
		1dP	10263					
		2dP	18455					
		3dP	26647					
SSr	r	base	2072	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.
		1dP	10264					
		2dP	18456					
		3dP	26648					
St.Lim	r	base	2170	37108	Enum	*Enum_LimStatus*		Limit value status: No alarm present or stored.
		1dP	10362					
		2dP	18554					
		3dP	26746					

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

5 Lim2

ConF

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

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.

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

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.
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.
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	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.
		1dP	10392				
		2dP	18584				
		3dP	26776				
H.2	r/w	base	2201	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.
		1dP	10393				
		2dP	18585				
		3dP	26777				
HYS.2	r/w	base	2202	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.
		1dP	10394				
		2dP	18586				
		3dP	26778				

5 Lim2

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
dEL.2	r/w	base	2203	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.
		1dP	10395				
		2dP	18587				
		3dP	26779				

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.

6 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.

6 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.
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.
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					

6 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.

7 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.

7 LOGI

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Y2	r/w	base	1054	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!
		1dP	9246				
		2dP	17438				
		3dP	25630				

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	1055	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.
		1dP	9247				
		2dP	17439				
		3dP	25631				

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	1056	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.
		1dP	9248				
		2dP	17440				
		3dP	25632				

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	1057	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.
		1dP	9249				
		2dP	17441				
		3dP	25633				

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)

7 LOGI

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
m.Loc	r/w	base	1058	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.
		1dP	9250				
		2dP	17442				
		3dP	25634				
						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.
Err.r	r/w	base	1059	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).
		1dP	9251				
		2dP	17443				
		3dP	25635				
						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)
booS	r/w	base	1060	34888	Enum	*Enum_dInp1*	Source of the control signal for activating the boost function: The setpoint is increased by the value SP.bo for the duration t.bo. The boost function causes a brief setpoint increase, which is used to clear blocked channels from 'frozen' material in a hot runner system.
		1dP	9252				
		2dP	17444				
		3dP	25636				
						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.
Pid.2	r/w	base	1061	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.
		1dP	9253				
		2dP	17445				
		3dP	25637				
						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.

7 LOGI

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
P.run	r/w	base	1062	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.
		1dP	9254				
		2dP	17446				
		3dP	25638				

0	no function
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				

7 LOGI

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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				
A-M	r/w	base	1085	34938	Int	0...1 ☐	Signal for activating manual operation. In the manual mode, the controller provides output signals independent of the process.
		1dP	9277				
		2dP	17469				
		3dP	25661				
C.Off	r/w	base	1086	34940	Int	0...1 ☐	Signal for disabling all the controller outputs. Note: Forcing has priority; alarm processing remains active.
		1dP	9278				
		2dP	17470				
		3dP	25662				
L.AM	r/w	base	1087	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).
		1dP	9279				
		2dP	17471				
		3dP	25663				
Err.r	r/w	base	1088	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).
		1dP	9280				
		2dP	17472				
		3dP	25664				
SSR.Res	r/w	base	1089	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.
		1dP	9281				
		2dP	17473				
		3dP	25665				
Boost	r/w	base	1090	34948	Int	0...1 ☐	Signal for activating the boost function. The boost function causes a brief setpoint increase, which is used e.g. to clear blocked channels ('frozen' material) in a hot-runner system.
		1dP	9282				
		2dP	17474				
		3dP	25666				
Set1.2	r/w	base	1091	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.
		1dP	9283				
		2dP	17475				
		3dP	25667				
Prg.R.S	r/w	base	1092	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.
		1dP	9284				
		2dP	17476				
		3dP	25668				

7 LOGI

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
F.Di	r/w	base	1094	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.)
		1dP	9286				
		2dP	17478				
		3dP	25670				

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

8 ohnE

PArA

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

Signal

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

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

Hw.Opt	r	base	200	33168	Int	0...65535 ☑	
		1dP	8392				
		2dP	16584				
		3dP	24776				
Sw.Op	r	base	201	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.
		1dP	8393				
		2dP	16585				
		3dP	24777				
Bed.V	r	base	202	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.
		1dP	8394				
		2dP	16586				
		3dP	24778				
Unit	r	base	203	33174	Int	0...255 ☐	Identification of the device.
		1dP	8395				
		2dP	16587				
		3dP	24779				

8 ohnE

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
S.Vers	r	base	204	33176	Int	100...255 ☐	The sub-version number is given as an additional index for precise definition of software version.
		1dP	8396				
		2dP	16588				
		3dP	24780				
Uident	r	base	910	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
		1dP	9102				
		2dP	17294				
		3dP	25486				
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 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
		1dP	8443				
		2dP	16635				
		3dP	24827				

8 ohnE

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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	
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	
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	
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				

9 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				

10 ohnE2

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
In.2	r	base	233	33234	Float	-1999...9999 ☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
		1dP	8425				
		2dP	16617				
		3dP	24809				
In.2r	r	base	241	33250	Float	-1999...9999 ☐	Measurement value before the measurement value correction (unprocessed).
		1dP	8433				
		2dP	16625				
		3dP	24817				
F.Inp	r/w	base	301	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.)
		1dP	8493				
		2dP	16685				
		3dP	24877				

11 ohnE3

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
F.Out1	r/w	base	305	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.)
		1dP	8497				
		2dP	16689				
		3dP	24881				

12 othr

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
D2.Err	r/w	base	193	33154	Enum	*Enum_Disp2E*	Queued faults can be displayed directly in the 2nd line of the display. In case of a fault, the display then alternates between the value of the lower display line (standard = setpoint) and the error message for the fault with the highest priority (blinking display).
		1dP	8385				
		2dP	16577				
		3dP	24769				
						0	Display line 2 is not switched over in case of a fault. The fault is signalled via the LED, and the error message is shown in the error list.
						1	In case of a fault, display line 2 alternates between the error message and the value of the lower display line- The fault with the highest priority is displayed as long as it is present. Latched (stored) faults must be acknowledged in order to remove them from the display.
F.Coff	r/w	base	192	33152	Enum	*Enum_Coff*	The standard disabling procedure only switches off the controller outputs, whereby the alarms, displays, and other functions remain active. Alternatively, all functions can be switched off (including alarms and displays).
		1dP	8384				
		2dP	16576				
		3dP	24768				
						0	Only the PID controller functions are disabled. The analog controller outputs have the value 0.0, and the switching outputs generate the logical state FALSE. All other functions, e.g. alarms and displays, continue operating in the normal manner.
						1	All the controller functions are disabled. The analog outputs have the value 0.0, and the switching outputs generate the logical state FALSE. If configured, an inversion is carried out.
bAud	r/w	base	180	33128	Enum	*Enum_Baud*	Bit rate of the interface (only visible with OPTION). The bit rate determines the transmission speed.
		1dP	8372				
		2dP	16564				
		3dP	24756				
						0	2400 Baud
						1	4800 Baud
						2	9600 Baud
						3	19200 Baud
Addr	r/w	base	181	33130	Int	1...247 ☐	Address on the interface (only visible with OPTION)
		1dP	8373				
		2dP	16565				
		3dP	24757				
PrtY	r/w	base	182	33132	Enum	*Enum_Parity*	Parity of data on the interface (only visible with OPTION). Simple possibility of checking that transferred data is correct.
		1dP	8374				
		2dP	16566				
		3dP	24758				
						0	No parity, with 2 stop bits.
						1	even parity
						2	odd parity
						3	no parity (1 stop bit)
dELY	r/w	base	183	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.)
		1dP	8375				
		2dP	16567				
		3dP	24759				

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• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Unit	r/w	base	170	33108	Enum	*Enum_Unit*	Physical unit (temperature), f.e.°C
		1dP	8362				
		2dP	16554				
		3dP	24746				
						0	without unit
						1	°C
						2	°F
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.
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				
						0	The digital outputs OUT1, OUT2, and OUT3 are displayed.
						1	Display of controller output y1 (heating / open), alarm2, and alarm3.
						2	Display of controller output y1 (heating / open), controller output y2 (cooling / close), alarm3
						3	Display of controller output y2 (cooling / close), controller output y1 (heating / open), alarm3
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.
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.
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				

12 othr

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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.
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.
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.

12 othr

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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.
SSr	r/w	base	219	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!)
		1dP	8411				
		2dP	16603				
		3dP	24795				
						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.

12 othr

Signal

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.

12 othr

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
AdA.C	r/w	base	222	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!)
		1dP	8414				
		2dP	16606				
		3dP	24798				

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.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Lim.1	r/w	base	223	33214	Enum	*Limit*	Limit value 1 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)
		1dP	8415				
		2dP	16607				
		3dP	24799				

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.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Lim.2	r/w	base	224	33216	Enum	*Limit*	Limit value 2 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)
		1dP	8416				
		2dP	16608				
		3dP	24800				

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.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Lim.3	r/w	base	225	33218	Enum	*Limit*	Limit value 3 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)
		1dP	8417				
		2dP	16609				
		3dP	24801				

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.

12 othr

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.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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.

13 Out.1

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.Act	r/w	base	4150	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.
		1dP	12342				
		2dP	20534				
		3dP	28726				

0	direct / normally open
1	inverse / normally closed

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

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

13 Out.1

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Y.2	r/w	base	4152	41072	Enum	*Enum_Y2*	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
		1dP	12344				
		2dP	20536				
		3dP	28728				
						0	not active
						1	This output provides the controller output Y2.
Lim.1	r/w	base	4153	41074	Enum	*Enum_Lim1*	Output function: Signal limit 1
		1dP	12345				
		2dP	20537				
		3dP	28729				
						0	not active
						1	The output is activated by an alarm from limit value 1.
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.

13 Out.1

ConF

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

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Out1	r	base	4180	41128	Enum	*Enum_Ausgang*	Status of the digital output
		1dP	12372				
		2dP	20564				
		3dP	28756				
						0 off	
						1 on	
F.Do1	r/w	base	4181	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).
		1dP	12373				
		2dP	20565				
		3dP	28757				
						0 off	
						1 on	

14 Out.2

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.Act	r/w	base	4250	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.
		1dP	12442				
		2dP	20634				
		3dP	28826				
						0	direct / normally open
						1	inverse / normally closed
Y.1	r/w	base	4251	41270	Enum	*Enum_Y1*	Output function: Controller output Y1
		1dP	12443				
		2dP	20635				
		3dP	28827				
						0	not active
						1	This output provides the controller output Y1.
Y.2	r/w	base	4252	41272	Enum	*Enum_Y2*	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
		1dP	12444				
		2dP	20636				
		3dP	28828				
						0	not active
						1	This output provides the controller output Y2.
Lim.1	r/w	base	4253	41274	Enum	*Enum_Lim1*	Output function: Signal limit 1
		1dP	12445				
		2dP	20637				
		3dP	28829				
						0	not active
						1	The output is activated by an alarm from limit value 1.
Lim.2	r/w	base	4254	41276	Enum	*Enum_Lim2*	Output function: Signal limit 2
		1dP	12446				
		2dP	20638				
		3dP	28830				
						0	not active
						1	The output is activated by an alarm from limit value 2.
Lim.3	r/w	base	4255	41278	Enum	*Enum_Lim3*	Output function: Signal limit 3
		1dP	12447				
		2dP	20639				
		3dP	28831				
						0	not active
						1	The output is activated by an alarm from limit value 3.
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.

14 Out.2

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
P.End	r/w	base	4261	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).
		1dP	12453				
		2dP	20645				
		3dP	28837				

0	not active
1	This output is activated by the message 'Program end'.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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'.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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'.

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

14 Out.2

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
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

15 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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
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.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
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.

15 Out.3

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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.
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'.

15 Out.3

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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'.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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'.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Out.0	r/w	base	4371	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).
		1dP	12563				
		2dP	20755				
		3dP	28947				
Out.1	r/w	base	4372	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).
		1dP	12564				
		2dP	20756				
		3dP	28948				
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.

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

15 Out.3

Signal

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	
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				

16 Out.5

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.Act	r/w	base	4550	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.
		1dP	12742				
		2dP	20934				
		3dP	29126				
						0 direct / normally open	
						1 inverse / normally closed	
Y.1	r/w	base	4551	41870	Enum	*Enum_Y1*	Output function: Controller output Y1
		1dP	12743				
		2dP	20935				
		3dP	29127				
						0 not active	
						1 This output provides the controller output Y1.	
Y.2	r/w	base	4552	41872	Enum	*Enum_Y2*	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
		1dP	12744				
		2dP	20936				
		3dP	29128				
						0 not active	
						1 This output provides the controller output Y2.	
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.	

16 Out.5

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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'.
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'.

16 Out.5

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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'.

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Out3	r	base	4580	41928	Enum	*Enum_Ausgang*	Status of the digital output
		1dP	12772				
		2dP	20964				
		3dP	29156				

0	off
1	on

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
F.Do3	r/w	base	4581	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).
		1dP	12773				
		2dP	20965				
		3dP	29157				

0	off
1	on

17 Out.6

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.Act	r/w	base	4650	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.
		1dP	12842				
		2dP	21034				
		3dP	29226				

0	direct / normally open
1	inverse / normally closed

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Y.1	r/w	base	4651	42070	Enum	*Enum_Y1*	Output function: Controller output Y1
		1dP	12843				
		2dP	21035				
		3dP	29227				

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

17 Out.6

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Y.2	r/w	base	4652	42072	Enum	*Enum_Y2*	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
		1dP	12844				
		2dP	21036				
		3dP	29228				
						0	not active
						1	This output provides the controller output Y2.
Lim.1	r/w	base	4653	42074	Enum	*Enum_Lim1*	Output function: Signal limit 1
		1dP	12845				
		2dP	21037				
		3dP	29229				
						0	not active
						1	The output is activated by an alarm from limit value 1.
Lim.2	r/w	base	4654	42076	Enum	*Enum_Lim2*	Output function: Signal limit 2
		1dP	12846				
		2dP	21038				
		3dP	29230				
						0	not active
						1	The output is activated by an alarm from limit value 2.
Lim.3	r/w	base	4655	42078	Enum	*Enum_Lim3*	Output function: Signal limit 3
		1dP	12847				
		2dP	21039				
		3dP	29231				
						0	not active
						1	The output is activated by an alarm from limit value 3.
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.
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.
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.

17 Out.6

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
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'.

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Out4	r	base	4680	42128	Enum	*Enum_Ausgang*	Status of the digital output
		1dP	12872				
		2dP	21064				
		3dP	29256				
						0	off
						1	on
F.Do4	r/w	base	4681	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).
		1dP	12873				
		2dP	21065				
		3dP	29257				
						0	off
						1	on

18 PAr.2

• PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Pb12	r/w	base	5030	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).
		1dP	13222				
		2dP	21414				
		3dP	29606				
Pb22	r/w	base	5031	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).
		1dP	13223				
		2dP	21415				
		3dP	29607				
ti22	r/w	base	5033	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.
		1dP	13225				
		2dP	21417				
		3dP	29609				
ti12	r/w	base	5032	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.
		1dP	13224				
		2dP	21416				
		3dP	29608				
td12	r/w	base	5034	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.
		1dP	13226				
		2dP	21418				
		3dP	29610				
td22	r/w	base	5035	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.
		1dP	13227				
		2dP	21419				
		3dP	29611				

19 ProG

• PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP.01	r/w	base	6100	44968	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.
		1dP	14292				
		2dP	22484				
		3dP	30676				
Pt.01	r/w	base	6101	44970	Float	0...9999 ☐	Segment time 1 defines the duration of the first segment. The gradient of this segment is calculated using the segment time and the setpoint difference (SP – segment starting setpoint).Note: The 1st segment is started at process value.
		1dP	14293				
		2dP	22485				
		3dP	30677				

19 ProG

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
SP.02	r/w	base	6102	44972	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.
		1dP	14294					
		2dP	22486					
		3dP	30678					
Pt.02	r/w	base	6103	44974	Float	0...9999	☐	Segment time 2 defines the duration of the second segment. The gradient of this segment is calculated using the segment time and the setpoint difference (SP – segment starting setpoint).Note: The 1st segment is started at process value.
		1dP	14295					
		2dP	22487					
		3dP	30679					
SP.03	r/w	base	6104	44976	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	14296					
		2dP	22488					
		3dP	30680					
Pt.03	r/w	base	6105	44978	Float	0...9999	☐	Segment time 3 defines the duration of the third segment. The gradient of this segment is calculated using the segment time and the setpoint difference (SP – segment starting setpoint).Note: The 1st segment is started at process value.
		1dP	14297					
		2dP	22489					
		3dP	30681					
SP.04	r/w	base	6106	44980	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.
		1dP	14298					
		2dP	22490					
		3dP	30682					
Pt.04	r/w	base	6107	44982	Float	0...9999	☐	Segment time 4 defines the duration of the fourth segment. The gradient of this segment is calculated using the segment time and the setpoint difference (SP – segment starting setpoint).Note: The 1st segment is started at process value.
		1dP	14299					
		2dP	22491					
		3dP	30683					
SP.05	r/w	base	6108	44984	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	14300					
		2dP	22492					
		3dP	30684					
Pt.05	r/w	base	6109	44986	Float	0...9999	☐	Segment time 5 defines the duration of the fifth segment. The gradient of this segment is calculated from segment time and setpoint difference (SP – segment starting setpoint).Note: The 1st segment is started at process value.
		1dP	14301					
		2dP	22493					
		3dP	30685					
SP.06	r/w	base	6110	44988	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	14302					
		2dP	22494					
		3dP	30686					
Pt.06	r/w	base	6111	44990	Float	0...9999	☐	Segment time 6 defines the duration of the sixth segment. The gradient of this segment is calculated from segment time and setpoint difference (SP – segment starting setpoint).Note: The 1st segment is started at process value.
		1dP	14303					
		2dP	22495					
		3dP	30687					
SP.07	r/w	base	6112	44992	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.
		1dP	14304					
		2dP	22496					
		3dP	30688					

19 ProG

• PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Pt.07	r/w	base	6113	44994	Float	0...9999	☐	Segment time 7 defines the duration of the seventh segment. The gradient of this segment is calculated from segment time and setpoint difference (SP – segment starting setpoint).Note: The 1st segment is started at process value.
		1dP	14305					
		2dP	22497					
		3dP	30689					
SP.08	r/w	base	6114	44996	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.
		1dP	14306					
		2dP	22498					
		3dP	30690					
Pt.08	r/w	base	6115	44998	Float	0...9999	☐	Segment time 8 defines the duration of the eighth segment. The gradient of this segment is calculated from segment time and setpoint difference (SP – segment starting setpoint).Note: The 1st segment is started at process value.
		1dP	14307					
		2dP	22499					
		3dP	30691					
SP.09	r/w	base	6116	45000	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.
		1dP	14308					
		2dP	22500					
		3dP	30692					
Pt.09	r/w	base	6117	45002	Float	0...9999	☐	Segment time 9 defines the duration of the ninth segment fest. The gradient of this segment is calculated from segment time and setpoint difference (SP – segment starting setpoint).Note: The 1st segment is started at process value.
		1dP	14309					
		2dP	22501					
		3dP	30693					
SP.10	r/w	base	6118	45004	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.
		1dP	14310					
		2dP	22502					
		3dP	30694					
Pt.10	r/w	base	6119	45006	Float	0...9999	☐	Segment time 10 defines the duration of the tenth segment. The gradient of this segment is calculated from segment time and setpoint difference (SP – segment starting setpoint).Note: The 1st segment is started at process value.
		1dP	14311					
		2dP	22503					
		3dP	30695					
b.Lo	r/w	base	6120	45008	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.
		1dP	14312					
		2dP	22504					
		3dP	30696					
b.Hi	r/w	base	6121	45010	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.
		1dP	14313					
		2dP	22505					
		3dP	30697					

19 ProG

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
St.Prog	r	base 1dP 2dP 3dP	6170 14362 22554 30746	45108	Int	0...255 ☐	The programmer's status contains bit-wise coded data, e.g. which point of the program sequence the program has reached. 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
SP.Pr	r	base 1dP 2dP 3dP	6171 14363 22555 30747	45110	Float	-1999...9999 ☐	The programmer's setpoint is displayed as the effective setpoint while the program is running.
T1.Pr	r	base 1dP 2dP 3dP	6172 14364 22556 30748	45112	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.
T3.Pr	r	base 1dP 2dP 3dP	6173 14365 22557 30749	45114	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).
T2.Pr	r	base 1dP 2dP 3dP	6174 14366 22558 30750	45116	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.
T4.Pr	r	base 1dP 2dP 3dP	6175 14367 22559 30751	45118	Float	0...9999 ☐	Only with running program. The remaining time of the running program segment (without hold times).
SG.Pr	r	base 1dP 2dP 3dP	6176 14368 22560 30752	45120	Int	0...4 ☐	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.

20 SEtP

• PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
SP.LO	r/w	base	3100	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.
		1dP	11292					
		2dP	19484					
		3dP	27676					
SP.Hi	r/w	base	3101	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.
		1dP	11293					
		2dP	19485					
		3dP	27677					
SP.2	r/w	base	3102	38972	Float	-1999...9999	☐	Second (safety) setpoint. Ramp function as with other setpoints (effective, external). However, SP2 is not restricted by the setpoint limits.
		1dP	11294					
		2dP	19486					
		3dP	27678					
r.SP	r/w	base	3103	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.
		1dP	11295					
		2dP	19487					
		3dP	27679					
SP.bo	r/w	base	3105	38978	Float	-1999...9999	☐	Boost increase. Increases the setpoint SP for the duration t.bo by the amount SP.bo. The boost function causes a brief setpoint increase, which is used e.g. to clear blocked channels ('frozen' material) in a hot-runner system.
		1dP	11297					
		2dP	19489					
		3dP	27681					
t.bo	r/w	base	3106	38980	Float	0...9999	☐	Duration of the boost increase in minutes. When the boost time t.bo has elapsed, the controller switches back to the standard setpoint SP. The boost function causes a brief setpoint increase, which is used e.g. to clear blocked channels ('frozen' material) in a hot-runner system.
		1dP	11298					
		2dP	19490					
		3dP	27682					
Y.St	r/w	base	5023	42814	Float	-120...120	☐	Reduced output value for start-up [%]. The start-up function is a protective function, e.g. with hot runner control. To prevent destruction of high-performance heating elements, they must be heated slowly to remove any humidity. With activated start-up function, the controller maintains the reduced starting temperature for a defined dwell period. Subsequently, the controller switches over to the main setpoint.
		1dP	13215					
		2dP	21407					
		3dP	29599					
SP.St	r/w	base	3107	38982	Float	-1999...9999	☐	Setpoint for start-up function. The start-up function is a protective function, e.g. with hot runner control. To prevent destruction of high-performance heating elements, they must be heated slowly to remove any humidity. With activated start-up function, the controller maintains the reduced starting temperature for a defined dwell period. Subsequently, the controller switches over to the main setpoint.
		1dP	11299					
		2dP	19491					
		3dP	27683					
t.St	r/w	base	3108	38984	Float	0...9999	☐	Start-up dwell period [min]. The start-up function is a protective function, e.g. with hot runner control. To prevent destruction of high-performance heating elements, they must be heated slowly to remove any humidity. With activated start-up function, the controller maintains the reduced starting temperature for a defined dwell period. Subsequently, the controller switches over to the main setpoint.
		1dP	11300					
		2dP	19492					
		3dP	27684					

20 SEtP

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP.EF	r	base	3170	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.
		1dP	11362				
		2dP	19554				
		3dP	27746				
Diff	r	base	3171	39110	Float	-1999...9999 ☐	Difference between the effective setpoint and setpoint 2.
		1dP	11363				
		2dP	19555				
		3dP	27747				
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				

21 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

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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	-1 ... ☐	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	-1 ... ☐	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... ☐	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... ☐	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...	☑	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.
		1dP	13194					
		2dP	21386					
		3dP	29578					
ti2	r/w	base	5003	42774	Float	1...	☑	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.
		1dP	13195					
		2dP	21387					
		3dP	29579					
td1	r/w	base	5004	42776	Float	1...	☑	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...	☑	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...	☐	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...	☐	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...	☐	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	-1 ...	☐	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...	☑	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	5015	42798	Float	3... ☐	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.
		1dP	13207				
		2dP	21399				
		3dP	29591				
Y.Lo	r/w	base	5018	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
		1dP	13210				
		2dP	21402				
		3dP	29594				
Y.Hi	r/w	base	5019	42806	Float	-105...105 ☐	Upper output limit [%] The range is ymin+1 105
		1dP	13211				
		2dP	21403				
		3dP	29595				
Y2	r/w	base	5017	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!
		1dP	13209				
		2dP	21401				
		3dP	29593				
Y.0	r/w	base	5020	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.
		1dP	13212				
		2dP	21404				
		3dP	29596				
Ym.H	r/w	base	5021	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.
		1dP	13213				
		2dP	21405				
		3dP	29597				
L.Ym	r/w	base	5022	42812	Float	1... ☐	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.
		1dP	13214				
		2dP	21406				
		3dP	29598				
oFFS	r/w	base	5024	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.
		1dP	13216				
		2dP	21408				
		3dP	29600				
HYS.L	r/w	base	5028	42824	Float	0... ☐	Switching hysteresis below the setpoint of the signaller [engineering unit].
		1dP	13220				
		2dP	21412				
		3dP	29604				
HYS.H	r/w	base	5029	42826	Float	0... ☐	Switching hysteresis above the setpoint of the signaller [engineering unit].
		1dP	13221				
		2dP	21413				
		3dP	29605				

1 Cntr

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
C.InP	r	base	5102	42972	Float	-1 ... ☐	process value
		1dP	13294				
		2dP	21486				
		3dP	29678				
Tu2	r	base	5145	43058	Float	0... ☐	'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.
		1dP	13337				
		2dP	21529				
		3dP	29721				
Vmax2	r	base	5146	43060	Float	0... ☐	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.
		1dP	13338				
		2dP	21530				
		3dP	29722				
Kp2	r	base	5147	43062	Float	0... ☐	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.
		1dP	13339				
		2dP	21531				
		3dP	29723				

1 Cntr

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
St.Cntr	r	base	5100	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.
		1dP	13292				
		2dP	21484				
		3dP	29676				

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)

diFF	r	base	5104	42976	Float	-1 ... ☐	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.
		1dP	13296				
		2dP	21488				
		3dP	29680				
POS	r	base	5105	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.
		1dP	13297				
		2dP	21489				
		3dP	29681				
Tu1	r	base	5141	43050	Float	0... ☐	'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.
		1dP	13333				
		2dP	21525				
		3dP	29717				

1 Cntr

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Ypid	r	base	5103	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.
		1dP	13295				
		2dP	21487				
		3dP	29679				
Ada.St	r/w	base	5150	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.
		1dP	13342				
		2dP	21534				
		3dP	29726				
						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	5151	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.
		1dP	13343				
		2dP	21535				
		3dP	29727				
dYman	r/w	base	5152	43072	Float	-220...220 ☐	Differential preset output value, which is added to the actual output value during manual operation. Negative values reduce the output.
		1dP	13344				
		2dP	21536				
		3dP	29728				
Yinc	r/w	base	5153	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.
		1dP	13345				
		2dP	21537				
		3dP	29729				
						0	Not active
						1	increment output
Ydec	r/w	base	5154	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.
		1dP	13346				
		2dP	21538				
		3dP	29730				
						0	Not active
						1	decrement output
SP.EF	r	base	5101	42970	Float	-1 ... ☐	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.
		1dP	13293				
		2dP	21485				
		3dP	29677				

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				
						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	5142	43052	Float	0... ☐	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... ☐	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	5148	43064	Enum	*Enum_Msg*	The result of self-tuning for 'cooling' indicates whether self-tuning was successful, and with what result.
		1dP	13340				
		2dP	21532				
		3dP	29724				

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	1150	35068	Enum	*Enum_StYP*	Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted
		1dP	9342				
		2dP	17534				
		3dP	25726				

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	1151	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.
		1dP	9343				
		2dP	17535				
		3dP	25727				

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	-1 ... ☑	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	-1 ... ☐	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	-1 ... ☐	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	-1 ... ☐	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	-1 ... ☐	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	1170	35108	Float	-1 ... ☐	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.

In.1	r	base	1172	35112	Float	-1 ... ☐	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	-1 ... ☐	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.

3 InP.2

ConF

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	-1 ... ☑	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				

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
InL.2	r/w	base	1200	35168	Float	-1 ... ☐	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	9392				
		2dP	17584				
		3dP	25776				
OuL.2	r/w	base	1201	35170	Float	-1 ... ☐	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	9393				
		2dP	17585				
		3dP	25777				
InH.2	r/w	base	1202	35172	Float	-1 ... ☐	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	9394				
		2dP	17586				
		3dP	25778				

3 InP.2

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
OuH.2	r/w	base	1203	35174	Float	-1 ... ☐	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	9395				
		2dP	17587				
		3dP	25779				
t.F2	r/w	base	1204	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.
		1dP	9396				
		2dP	17588				
		3dP	25780				

Signal

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

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

In.2r	r	base	1272	35312	Float	-1 ... ☐	Measurement value before the measurement value correction (unprocessed).
		1dP	9464				
		2dP	17656				
		3dP	25848				
F.Inp	r/w	base	1280	35328	Float	-1 ... ☐	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	9472				
		2dP	17664				
		3dP	25856				

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	1350	35468	Enum	*Enum_StYP3*	Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted.
		1dP	9542				
		2dP	17734				
		3dP	25926				

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	1351	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.
		1dP	9543				
		2dP	17735				
		3dP	25927				

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	-1 ... ☑	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	-1 ... ☐	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	-1 ... ☐	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	-1 ... ☐	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	-1 ... ☐	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... , ☐	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	1370	35508	Float	-1 ... ☐	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.

In.3r	r	base	1372	35512	Float	-1 ... ☐	Measurement value before the measurement value correction (unprocessed).
		1dP	9564				
		2dP	17756				
		3dP	25948				
F.Inp	r/w	base	1380	35528	Float	-1 ... ☐	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.

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.

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

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
L.1	r/w	base	2100	36968	Float	-1 ... ☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
		1dP	10292				
		2dP	18484				
		3dP	26676				
H.1	r/w	base	2101	36970	Float	-1 ... ☑	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	10293				
		2dP	18485				
		3dP	26677				
HYS.1	r/w	base	2102	36972	Float	0... ☐	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	10294				
		2dP	18486				
		3dP	26678				
dEL.1	r/w	base	2103	36974	Float	0... ☐	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	10295				
		2dP	18487				
		3dP	26679				
HC.A	r/w	base	2000	36768	Float	-1 ... ☐	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.
		1dP	10192				
		2dP	18384				
		3dP	26576				

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
St.HC	r	base	2070	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).
		1dP	10262				
		2dP	18454				
		3dP	26646				
HC	r	base	2071	36910	Float	-1 ... ☐	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.
		1dP	10263				
		2dP	18455				
		3dP	26647				
SSr	r	base	2072	36912	Float	-1 ... ☐	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.
		1dP	10264				
		2dP	18456				
		3dP	26648				
St.Lim	r	base	2170	37108	Enum	*Enum_LimStatus*	Limit value status: No alarm present or stored.
		1dP	10362				
		2dP	18554				
		3dP	26746				

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	2250	37268	Enum	*Enum_Fcn*	Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.
		1dP	10442				
		2dP	18634				
		3dP	26826				

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	2251	37270	Enum	*Enum_Src*	Source for limit value. Selection of which value is to be monitored.
		1dP	10443				
		2dP	18635				
		3dP	26827				

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	37168	Float	-1 ... ☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
		1dP	10392				
		2dP	18584				
		3dP	26776				

6 Lim2

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
H.2	r/w	base	2201	37170	Float	-1 ... ☑	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	10393				
		2dP	18585				
		3dP	26777				
HYS.2	r/w	base	2202	37172	Float	0... ☐	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	10394				
		2dP	18586				
		3dP	26778				
dEL.2	r/w	base	2203	37174	Float	0... ☐	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	10395				
		2dP	18587				
		3dP	26779				

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	-1 ... ☑	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	-1 ... ☑	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... ☐	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... ☐	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	1054	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!
		1dP	9246				
		2dP	17438				
		3dP	25630				

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	1055	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.
		1dP	9247				
		2dP	17439				
		3dP	25631				

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	1056	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.
		1dP	9248				
		2dP	17440				
		3dP	25632				

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	1057	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.
		1dP	9249				
		2dP	17441				
		3dP	25633				

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	1058	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.
		1dP	9250				
		2dP	17442				
		3dP	25634				
						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.
Err.r	r/w	base	1059	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).
		1dP	9251				
		2dP	17443				
		3dP	25635				
						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)
Pid.2	r/w	base	1061	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.
		1dP	9253				
		2dP	17445				
		3dP	25637				
						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.
P.run	r/w	base	1062	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.
		1dP	9254				
		2dP	17446				
		3dP	25638				
						0	no function
						2	Digital Input DI1 switches
						3	DI2 switches (only visible with OPTION)
						4	DI3 switches (only visible with OPTION)
P.oFF	r/w	base	1063	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).
		1dP	9255				
		2dP	17447				
		3dP	25639				
						0	no function
						2	Digital Input DI1 switches
						3	DI2 switches (only visible with OPTION)
						4	DI3 switches (only visible with OPTION)

8 LOGI

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	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				
A-M	r/w	base	1085	34938	Int	0...1 ☐	Signal for activating manual operation. In the manual mode, the controller provides output signals independent of the process.
		1dP	9277				
		2dP	17469				
		3dP	25661				
C.Off	r/w	base	1086	34940	Int	0...1 ☐	Signal for disabling all the controller outputs. Note: Forcing has priority; alarm processing remains active.
		1dP	9278				
		2dP	17470				
		3dP	25662				
L.AM	r/w	base	1087	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).
		1dP	9279				
		2dP	17471				
		3dP	25663				
Err.r	r/w	base	1088	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).
		1dP	9280				
		2dP	17472				
		3dP	25664				
SSR.Res	r/w	base	1089	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.
		1dP	9281				
		2dP	17473				
		3dP	25665				
Set1.2	r/w	base	1091	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.
		1dP	9283				
		2dP	17475				
		3dP	25667				
Prg.R.S	r/w	base	1092	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.
		1dP	9284				
		2dP	17476				
		3dP	25668				
Prg.Res	r/w	base	1093	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.
		1dP	9285				
		2dP	17477				
		3dP	25669				

8 LOGI

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
F.Di	r/w	base	1094	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.)
		1dP	9286				
		2dP	17478				
		3dP	25670				
						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	1095	34958	Int	0...1 ☐	Signal for switching the effective process value between the first process value X1 and second process value X2.
		1dP	9287				
		2dP	17479				
		3dP	25671				

9 ohnE

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
CDis3	r/w	base	126	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.
		1dP	8318				
		2dP	16510				
		3dP	24702				
						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	120	33008	Float	1... ☑	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.
		1dP	8312				
		2dP	16504				
		3dP	24696				

9 ohnE

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
DigForc	r/w	base	121	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
		1dP	8313					
		2dP	16505					
		3dP	24697					
ErwBedie	r/w	base	124	33016	Int	0...9000	☐	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.
		1dP	8316					
		2dP	16508					
		3dP	24700					
Lin	r/w	base	139	33046	Float	- ...	☑	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.
		1dP	8331					
		2dP	16523					
		3dP	24715					
LocBedie	r/w	base	123	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)
		1dP	8315					
		2dP	16507					
		3dP	24699					
Pass	r/w	base	125	33018	Int	0...	☑	Password. 4-digit number for the password-protected access to blocked operating functions such as e.g. the Calibrating Level.
		1dP	8317					
		2dP	16509					
		3dP	24701					
PDis3	r/w	base	130	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.
		1dP	8322					
		2dP	16514					
		3dP	24706					
T.dis3	r/w	base	900	34568	Text	0...255	☐	This address contains 8 bytes for the text that is to appear in Display 3.No text: 1st byte 0x00.
		1dP	9092					
		2dP	17284					
		3dP	25476					

9 ohnE

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
T.Inf	r/w	base	901	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
		1dP	9093				
		2dP	17285				
		3dP	25477				
T.Prog	r/w	base	902	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
		1dP	9094				
		2dP	17286				
		3dP	25478				
Tdis3	r/w	base	128	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.
		1dP	8320				
		2dP	16512				
		3dP	24704				
ValuDis3	r/w	base	127	33022	Int	0...9000 ☐	Address, which defines the display value in Display 3.
		1dP	8319				
		2dP	16511				
		3dP	24703				
VisibelM	r/w	base	903	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).
		1dP	9095				
		2dP	17287				
		3dP	25479				

PArA

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

9 ohnE

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
UPD	r/w	base	95	32958	Enum	*Enum_Aenderungsflag*	Status message indicating that parameter / configuration have been changed via the front panel.
		1dP	8287				
		2dP	16479				
		3dP	24671				
						0	No change via the front panel keys.
						1	A change has been made via the front panel keys, which must be processed.
Hw.Opt	r	base	200	33168	Int	0...65535 ☑	
		1dP	8392				
		2dP	16584				
		3dP	24776				
Sw.Op	r	base	201	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.
		1dP	8393				
		2dP	16585				
		3dP	24777				
Bed.V	r	base	202	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.
		1dP	8394				
		2dP	16586				
		3dP	24778				
Unit	r	base	203	33174	Int	0...255 ☐	Identification of the device.
		1dP	8395				
		2dP	16587				
		3dP	24779				
S.Vers	r	base	204	33176	Int	100...255 ☐	The sub-version number is given as an additional index for precise definition of software version.
		1dP	8396				
		2dP	16588				
		3dP	24780				
Uident	r	base	910	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
		1dP	9102				
		2dP	17294				
		3dP	25486				
IntUnitD	r	base	911	34590	Text	... ☐	Internal device data
		1dP	9103				
		2dP	17295				
		3dP	25487				

9 ohnE

Signal

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 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
		1dP	8443				
		2dP	16635				
		3dP	24827				
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	
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	
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	-1 ... ☐	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	-1 ... ☐	Measurement value before the measurement value correction (unprocessed).
		1dP	8432				
		2dP	16624				
		3dP	24816				
F.Inp	r/w	base	300	33368	Float	-1 ... ☐	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	233	33234	Float	-1 ... ☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
		1dP	8425				
		2dP	16617				
		3dP	24809				
In.2r	r	base	241	33250	Float	-1 ... ☐	Measurement value before the measurement value correction (unprocessed).
		1dP	8433				
		2dP	16625				
		3dP	24817				
F.Inp	r/w	base	301	33370	Float	-1 ... ☐	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	8493				
		2dP	16685				
		3dP	24877				

12 ohnE3

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
In.3	r	base	234	33236	Float	-1 ... ☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
		1dP	8426				
		2dP	16618				
		3dP	24810				
In.3r	r	base	242	33252	Float	-1 ... ☐	Measurement value before the measurement value correction (unprocessed).
		1dP	8434				
		2dP	16626				
		3dP	24818				
F.Inp	r/w	base	302	33372	Float	-1 ... ☐	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	8494				
		2dP	16686				
		3dP	24878				
F.Out1	r/w	base	305	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.)
		1dP	8497				
		2dP	16689				
		3dP	24881				

13 ohnE4

• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
F.Out2	r/w	base	306	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.)
		1dP	8498				
		2dP	16690				
		3dP	24882				

14 othr

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
bAud	r/w	base	180	33128	Enum	*Enum_Baud*	Bit rate of the interface (only visible with OPTION). The bit rate determines the transmission speed.
		1dP	8372				
		2dP	16564				
		3dP	24756				
						0 2400 Baud	
						1 4800 Baud	
						2 9600 Baud	
						3 19200 Baud	
Addr	r/w	base	181	33130	Int	1...247 ☐	Address on the interface (only visible with OPTION)
		1dP	8373				
		2dP	16565				
		3dP	24757				
PrtY	r/w	base	182	33132	Enum	*Enum_Parity*	Parity of data on the interface (only visible with OPTION). Simple possibility of checking that transferred data is correct.
		1dP	8374				
		2dP	16566				
		3dP	24758				
						0 No parity, with 2 stop bits.	
						1 even parity	
						2 odd parity	
						3 no parity (1 stop bit)	
dELY	r/w	base	183	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.)
		1dP	8375				
		2dP	16567				
		3dP	24759				
dp.Ad	r/w	base	195	33158	Int	0...126 ☐	Address of the device on the PROFIBUS. The address identifies the device clearly.
		1dP	8387				
		2dP	16579				
		3dP	24771				
bc.uP	r/w	base	196	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.
		1dP	8388				
		2dP	16580				
		3dP	24772				
						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	170	33108	Enum	*Enum_Unit*	Physical unit (temperature), f.e.°C
		1dP	8362				
		2dP	16554				
		3dP	24746				
						0 without unit	
						1 °C	
						2 °F	

14 othr

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.

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				
dp.ra	r/w	base	197	33162	Int	0...91 1 ☐	Addresses of the data that are to be read out of the device via the PROFIBUS (57 values).
		1dP	8389				
		2dP	16581				
		3dP	24773				
dp.wr	r/w	base	198	33164	Int	0...91 1 ☐	Addresses of the data that are to be written into the device via the PROFIBUS (57 values).
		1dP	8390				
		2dP	16582				
		3dP	24774				

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.	
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.	

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	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.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SSr	r/w	base	219	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!)
		1dP	8411				
		2dP	16603				
		3dP	24795				

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	220	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!)
		1dP	8412				
		2dP	16604				
		3dP	24796				

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	221	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!)
		1dP	8413				
		2dP	16605				
		3dP	24797				

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	222	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!)
		1dP	8414				
		2dP	16606				
		3dP	24798				

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.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Lim.1	r/w	base	223	33214	Enum	*Limit*	Limit value 1 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)
		1dP	8415				
		2dP	16607				
		3dP	24799				

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.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Lim.2	r/w	base	224	33216	Enum	*Limit*	Limit value 2 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)
		1dP	8416				
		2dP	16608				
		3dP	24800				

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.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Lim.3	r/w	base	225	33218	Enum	*Limit*	Limit value 3 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)
		1dP	8417				
		2dP	16609				
		3dP	24801				

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.

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Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
E.3	r/w	base	403	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!)
		1dP	8595				
		2dP	16787				
		3dP	24979				

0	No configuration error
2	There is a configuration error. The configuration is missing or wrong, or it does not match the parameter settings.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
dAc	r/w	base	404	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!)
		1dP	8596				
		2dP	16788				
		3dP	24980				

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.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
E.5	r/w	base	410	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!)
		1dP	8602				
		2dP	16794				
		3dP	24986				

0	No fault, resetting possible (Reset).
1	A Profibus error has occurred and has been stored.
2	Please contact Service.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
dP.1	r/w	base	411	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!)
		1dP	8603				
		2dP	16795				
		3dP	24987				

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.2	r/w	base	412	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!)
		1dP	8604				
		2dP	16796				
		3dP	24988				

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

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• Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
dP.3	r/w	base	413	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!)
		1dP	8605				
		2dP	16797				
		3dP	24989				

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	414	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!)
		1dP	8606				
		2dP	16798				
		3dP	24990				

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	4150	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.
		1dP	12342				
		2dP	20534				
		3dP	28726				

0	direct / normally open
1	inverse / normally closed

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

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	4152	41072	Enum	*Enum_Y2*	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
		1dP	12344				
		2dP	20536				
		3dP	28728				

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	4153	41074	Enum	*Enum_Lim1*	Output function: Signal limit 1
		1dP	12345				
		2dP	20537				
		3dP	28729				

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	4163	41094	Enum	*Enum_FAi2*	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
		1dP	12355				
		2dP	20547				
		3dP	28739				
						0	not active
						1	The output sends the error message 'INP2 fault'.
FAi.3	r/w	base	4164	41096	Enum	*Enum_FAi3*	Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.
		1dP	12356				
		2dP	20548				
		3dP	28740				
						0	not active
						1	The output sends the error message 'INP3 fault'.
PrG.1	r/w	base	4165	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.
		1dP	12357				
		2dP	20549				
		3dP	28741				
						0	not active
						1	Control output 1 is assigned to this output.
PrG.2	r/w	base	4166	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.
		1dP	12358				
		2dP	20550				
		3dP	28742				
						0	not active
						1	Control output 2 is assigned to this output.
PrG.3	r/w	base	4167	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.
		1dP	12359				
		2dP	20551				
		3dP	28743				
						0	not active
						1	Control output 3 is assigned to this output.
PrG.4	r/w	base	4168	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.
		1dP	12360				
		2dP	20552				
		3dP	28744				
						0	not active
						1	Control output 4 is assigned to this output.
CALL	r/w	base	4169	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.
		1dP	12361				
		2dP	20553				
		3dP	28745				
						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	4175	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.
		1dP	12367				
		2dP	20559				
		3dP	28751				

0	Not active
1	This output sends the Profibus fault.

Signal

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

0	off
1	on

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
F.Do1	r/w	base	4181	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).
		1dP	12373				
		2dP	20565				
		3dP	28757				

0	off
1	on

16 Out.2

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.Act	r/w	base	4250	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.
		1dP	12442				
		2dP	20634				
		3dP	28826				

0	direct / normally open
1	inverse / normally closed

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Y.1	r/w	base	4251	41270	Enum	*Enum_Y1*	Output function: Controller output Y1
		1dP	12443				
		2dP	20635				
		3dP	28827				

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	4252	41272	Enum	*Enum_Y2*	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
		1dP	12444				
		2dP	20636				
		3dP	28828				
						0	not active
						1	This output provides the controller output Y2.
Lim.1	r/w	base	4253	41274	Enum	*Enum_Lim1*	Output function: Signal limit 1
		1dP	12445				
		2dP	20637				
		3dP	28829				
						0	not active
						1	The output is activated by an alarm from limit value 1.
Lim.2	r/w	base	4254	41276	Enum	*Enum_Lim2*	Output function: Signal limit 2
		1dP	12446				
		2dP	20638				
		3dP	28830				
						0	not active
						1	The output is activated by an alarm from limit value 2.
Lim.3	r/w	base	4255	41278	Enum	*Enum_Lim3*	Output function: Signal limit 3
		1dP	12447				
		2dP	20639				
		3dP	28831				
						0	not active
						1	The output is activated by an alarm from limit value 3.
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.

16 Out.2

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
P.End	r/w	base	4261	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).
		1dP	12453				
		2dP	20645				
		3dP	28837				
						0	not active
						1	This output is activated by the message 'Program end'.
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'.
PrG.1	r/w	base	4265	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.
		1dP	12457				
		2dP	20649				
		3dP	28841				
						0	not active
						1	Control output 1 is assigned to this output.
PrG.2	r/w	base	4266	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.
		1dP	12458				
		2dP	20650				
		3dP	28842				
						0	not active
						1	Control output 2 is assigned to this output.
PrG.3	r/w	base	4267	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.
		1dP	12459				
		2dP	20651				
		3dP	28843				
						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	4268	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.
		1dP	12460				
		2dP	20652				
		3dP	28844				
						0	not active
						1	Control output 4 is assigned to this output.
CALL	r/w	base	4269	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.
		1dP	12461				
		2dP	20653				
		3dP	28845				
						0	not active
						1	The output is switched by an operator call.
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.
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	4364	41496	Enum	*Enum_FAi3*	Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.
		1dP	12556				
		2dP	20748				
		3dP	28940				
						0	not active
						1	The output sends the error message 'INP3 fault'.
PrG.1	r/w	base	4365	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.
		1dP	12557				
		2dP	20749				
		3dP	28941				
						0	not active
						1	Control output 1 is assigned to this output.
PrG.2	r/w	base	4366	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.
		1dP	12558				
		2dP	20750				
		3dP	28942				
						0	not active
						1	Control output 2 is assigned to this output.
PrG.3	r/w	base	4367	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.
		1dP	12559				
		2dP	20751				
		3dP	28943				
						0	not active
						1	Control output 3 is assigned to this output.
PrG.4	r/w	base	4368	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.
		1dP	12560				
		2dP	20752				
		3dP	28944				
						0	not active
						1	Control output 4 is assigned to this output.
CALL	r/w	base	4369	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.
		1dP	12561				
		2dP	20753				
		3dP	28945				
						0	not active
						1	The output is switched by an operator call.
dP.Er	r/w	base	4375	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.
		1dP	12567				
		2dP	20759				
		3dP	28951				
						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	4371	41510	Float	-1 ... ☐	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).
		1dP	12563				
		2dP	20755				
		3dP	28947				
Out.1	r/w	base	4372	41512	Float	-1 ... ☐	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).
		1dP	12564				
		2dP	20756				
		3dP	28948				
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

17 Out.3

Signal

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	
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.	

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	4462	41692	Enum	*Enum_FAi1*	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
		1dP	12654				
		2dP	20846				
		3dP	29038				
						0	not active
						1	The output sends the error message 'INP1 fault'.
FAi.2	r/w	base	4463	41694	Enum	*Enum_FAi2*	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
		1dP	12655				
		2dP	20847				
		3dP	29039				
						0	not active
						1	The output sends the error message 'INP2 fault'.
FAi.3	r/w	base	4464	41696	Enum	*Enum_FAi3*	Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.
		1dP	12656				
		2dP	20848				
		3dP	29040				
						0	not active
						1	The output sends the error message 'INP3 fault'.
PrG.1	r/w	base	4465	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.
		1dP	12657				
		2dP	20849				
		3dP	29041				
						0	not active
						1	Control output 1 is assigned to this output.
PrG.2	r/w	base	4466	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.
		1dP	12658				
		2dP	20850				
		3dP	29042				
						0	not active
						1	Control output 2 is assigned to this output.
PrG.3	r/w	base	4467	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.
		1dP	12659				
		2dP	20851				
		3dP	29043				
						0	not active
						1	Control output 3 is assigned to this output.
PrG.4	r/w	base	4468	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.
		1dP	12660				
		2dP	20852				
		3dP	29044				
						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	4469	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.
		1dP	12661				
		2dP	20853				
		3dP	29045				

0	not active
1	The output is switched by an operator call.

dP.Er	r/w	base	4475	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.
		1dP	12667				
		2dP	20859				
		3dP	29051				

0	Not active
1	This output sends the Profibus fault.

Out.0	r/w	base	4471	41710	Float	-1 ... ☐	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).
		1dP	12663				
		2dP	20855				
		3dP	29047				
Out.1	r/w	base	4472	41712	Float	-1 ... ☐	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).
		1dP	12664				
		2dP	20856				
		3dP	29048				
O.Src	r/w	base	4473	41714	Enum	*Enum_OSrc*	Signal source of the analog output (visible not with all output signal types O.TYP).
		1dP	12665				
		2dP	20857				
		3dP	29049				

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	4474	41716	Enum	*Enum_OFail*	fail behaviour
		1dP	12666				
		2dP	20858				
		3dP	29050				

0	upscale
1	downscale

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Out2	r	base	4480	41728	Enum	*Enum_Ausgang*	Status of the digital output
		1dP	12672				
		2dP	20864				
		3dP	29056				
						0 off	
						1 on	
F.Do2	r/w	base	4481	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).
		1dP	12673				
		2dP	20865				
		3dP	29057				
						0 off	
						1 on	
F.Out2	r/w	base	4482	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.)
		1dP	12674				
		2dP	20866				
		3dP	29058				

19 Out.5

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.Act	r/w	base	4550	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.
		1dP	12742				
		2dP	20934				
		3dP	29126				
						0 direct / normally open	
						1 inverse / normally closed	
Y.1	r/w	base	4551	41870	Enum	*Enum_Y1*	Output function: Controller output Y1
		1dP	12743				
		2dP	20935				
		3dP	29127				
						0 not active	
						1 This output provides the controller output Y1.	
Y.2	r/w	base	4552	41872	Enum	*Enum_Y2*	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
		1dP	12744				
		2dP	20936				
		3dP	29128				
						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	4569	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.
		1dP	12761				
		2dP	20953				
		3dP	29145				
						0	not active
						1	The output is switched by an operator call.
dP.Er	r/w	base	4575	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.
		1dP	12767				
		2dP	20959				
		3dP	29151				
						0	Not active
						1	This output sends the Profibus fault.

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Out3	r	base	4580	41928	Enum	*Enum_Ausgang*	Status of the digital output
		1dP	12772				
		2dP	20964				
		3dP	29156				
						0	off
						1	on
F.Do3	r/w	base	4581	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).
		1dP	12773				
		2dP	20965				
		3dP	29157				
						0	off
						1	on

20 Out.6

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.Act	r/w	base	4650	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.
		1dP	12842				
		2dP	21034				
		3dP	29226				
						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	4651	42070	Enum	*Enum_Y1*	Output function: Controller output Y1
		1dP	12843				
		2dP	21035				
		3dP	29227				
						0	not active
						1	This output provides the controller output Y1.
Y.2	r/w	base	4652	42072	Enum	*Enum_Y2*	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
		1dP	12844				
		2dP	21036				
		3dP	29228				
						0	not active
						1	This output provides the controller output Y2.
Lim.1	r/w	base	4653	42074	Enum	*Enum_Lim1*	Output function: Signal limit 1
		1dP	12845				
		2dP	21037				
		3dP	29229				
						0	not active
						1	The output is activated by an alarm from limit value 1.
Lim.2	r/w	base	4654	42076	Enum	*Enum_Lim2*	Output function: Signal limit 2
		1dP	12846				
		2dP	21038				
		3dP	29230				
						0	not active
						1	The output is activated by an alarm from limit value 2.
Lim.3	r/w	base	4655	42078	Enum	*Enum_Lim3*	Output function: Signal limit 3
		1dP	12847				
		2dP	21039				
		3dP	29231				
						0	not active
						1	The output is activated by an alarm from limit value 3.
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.
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.

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	4667	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.
		1dP	12859				
		2dP	21051				
		3dP	29243				
						0	not active
						1	Control output 3 is assigned to this output.
PrG.4	r/w	base	4668	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.
		1dP	12860				
		2dP	21052				
		3dP	29244				
						0	not active
						1	Control output 4 is assigned to this output.
CALL	r/w	base	4669	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.
		1dP	12861				
		2dP	21053				
		3dP	29245				
						0	not active
						1	The output is switched by an operator call.
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	4680	42128	Enum	*Enum_Ausgang*	Status of the digital output
		1dP	12872				
		2dP	21064				
		3dP	29256				
						0	off
						1	on
F.Do4	r/w	base	4681	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).
		1dP	12873				
		2dP	21065				
		3dP	29257				
						0	off
						1	on

21 PAr.2

• PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Pb12	r/w	base	5030	42828	Float	0,1... ☐	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).
		1dP	13222				
		2dP	21414				
		3dP	29606				
Pb22	r/w	base	5031	42830	Float	0,1... ☐	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).
		1dP	13223				
		2dP	21415				
		3dP	29607				
ti22	r/w	base	5033	42834	Float	0... ☑	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.
		1dP	13225				
		2dP	21417				
		3dP	29609				
ti12	r/w	base	5032	42832	Float	0... ☑	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.
		1dP	13224				
		2dP	21416				
		3dP	29608				
td12	r/w	base	5034	42836	Float	0... ☑	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	13226				
		2dP	21418				
		3dP	29610				
td22	r/w	base	5035	42838	Float	0... ☑	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	13227				
		2dP	21419				
		3dP	29611				

22 ProG

• ConF

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

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

22 ProG

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Pr.no	r/w	base	6000	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.
		1dP	14192				
		2dP	22384				
		3dP	30576				

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	6100	44968	Float	0... ☑	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.
		1dP	14292				
		2dP	22484				
		3dP	30676				
b.Hi	r/w	base	6101	44970	Float	0... ☑	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.
		1dP	14293				
		2dP	22485				
		3dP	30677				
d.00	r/w	base	6134	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.
		1dP	14326				
		2dP	22518				
		3dP	30710				

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	6135	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.
		1dP	14327				
		2dP	22519				
		3dP	30711				

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.

SP	r/w	base	6102	44972	Float	-1 ... ☐	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.
		1dP	14294				
		2dP	22486				
		3dP	30678				
Pt	r/w	base	6103	44974	Float	0... ☐	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).
		1dP	14295				
		2dP	22487				
		3dP	30679				
d.Out	r/w	base	6136	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.
		1dP	14328				
		2dP	22520				
		3dP	30712				

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	6137	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).
		1dP	14329				
		2dP	22521				
		3dP	30713				

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.

SP	r/w	base	6104	44976	Float	-1 ... ☐	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.
		1dP	14296				
		2dP	22488				
		3dP	30680				
Pt	r/w	base	6105	44978	Float	0... ☐	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).
		1dP	14297				
		2dP	22489				
		3dP	30681				
d.Out	r/w	base	6138	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.
		1dP	14330				
		2dP	22522				
		3dP	30714				

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	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	-1 ... ☐	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... ☐	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	6141	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).
		1dP	14333				
		2dP	22525				
		3dP	30717				

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.

SP	r/w	base	6108	44984	Float	-1 ... ☐	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.
		1dP	14300				
		2dP	22492				
		3dP	30684				
Pt	r/w	base	6109	44986	Float	0... ☐	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).
		1dP	14301				
		2dP	22493				
		3dP	30685				
d.Out	r/w	base	6142	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.
		1dP	14334				
		2dP	22526				
		3dP	30718				

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	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.

SP	r/w	base	6110	44988	Float	-1 ... ☐	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... ☐	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.

SP	r/w	base	6112	44992	Float	-1 ... ☐	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... ☐	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	6147	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).
		1dP	14339				
		2dP	22531				
		3dP	30723				

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	6114	44996	Float	-1 ... ☐	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.
		1dP	14306				
		2dP	22498				
		3dP	30690				
Pt	r/w	base	6115	44998	Float	0... ☐	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).
		1dP	14307				
		2dP	22499				
		3dP	30691				
d.Out	r/w	base	6148	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.
		1dP	14340				
		2dP	22532				
		3dP	30724				

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	6149	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).
		1dP	14341				
		2dP	22533				
		3dP	30725				

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.

SP	r/w	base	6116	45000	Float	-1 ... ☐	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.
		1dP	14308				
		2dP	22500				
		3dP	30692				
Pt	r/w	base	6117	45002	Float	0... ☐	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).
		1dP	14309				
		2dP	22501				
		3dP	30693				
d.Out	r/w	base	6150	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.
		1dP	14342				
		2dP	22534				
		3dP	30726				

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	6151	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).
		1dP	14343				
		2dP	22535				
		3dP	30727				

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.

SP	r/w	base	6118	45004	Float	-1 ... ☐	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.
		1dP	14310				
		2dP	22502				
		3dP	30694				
Pt	r/w	base	6119	45006	Float	0... ☐	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).
		1dP	14311				
		2dP	22503				
		3dP	30695				
d.Out	r/w	base	6152	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.
		1dP	14344				
		2dP	22536				
		3dP	30728				

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	6153	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).
		1dP	14345				
		2dP	22537				
		3dP	30729				

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.

SP	r/w	base	6120	45008	Float	-1 ... ☐	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.
		1dP	14312				
		2dP	22504				
		3dP	30696				
Pt	r/w	base	6121	45010	Float	0... ☐	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).
		1dP	14313				
		2dP	22505				
		3dP	30697				
d.Out	r/w	base	6154	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.
		1dP	14346				
		2dP	22538				
		3dP	30730				

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	6155	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).
		1dP	14347				
		2dP	22539				
		3dP	30731				

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	6122	45012	Float	-1 ... ☐	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.
		1dP	14314				
		2dP	22506				
		3dP	30698				
Pt	r/w	base	6123	45014	Float	0... ☐	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).
		1dP	14315				
		2dP	22507				
		3dP	30699				
d.Out	r/w	base	6156	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.
		1dP	14348				
		2dP	22540				
		3dP	30732				

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.

SP	r/w	base	6124	45016	Float	-1 ... ☐	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... ☐	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.

SP	r/w	base	6126	45020	Float	-1 ... ☐	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... ☐	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	6161	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).
		1dP	14353				
		2dP	22545				
		3dP	30737				

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.

SP	r/w	base	6128	45024	Float	-1 ... ☐	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.
		1dP	14320				
		2dP	22512				
		3dP	30704				
Pt	r/w	base	6129	45026	Float	0... ☐	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).
		1dP	14321				
		2dP	22513				
		3dP	30705				
d.Out	r/w	base	6162	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.
		1dP	14354				
		2dP	22546				
		3dP	30738				

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	6163	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).
		1dP	14355				
		2dP	22547				
		3dP	30739				

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.

SP	r/w	base	6130	45028	Float	-1 ... ☐	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.
		1dP	14322				
		2dP	22514				
		3dP	30706				
Pt	r/w	base	6131	45030	Float	0... ☐	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).
		1dP	14323				
		2dP	22515				
		3dP	30707				
d.Out	r/w	base	6164	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.
		1dP	14356				
		2dP	22548				
		3dP	30740				

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	-1 ... ☐	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... ☐	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	
SP.Pr	r	base	6051	44870	Float	-1 0... ☐	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... ☐	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... ☐	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... ☐	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... ☐	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				

22 ProG

Signal

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

23 SEtP

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP.LO	r/w	base	3100	38968	Float	-1 ... ☐	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.
		1dP	11292				
		2dP	19484				
		3dP	27676				
SP.Hi	r/w	base	3101	38970	Float	-1 ... ☐	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.
		1dP	11293				
		2dP	19485				
		3dP	27677				
SP.2	r/w	base	3102	38972	Float	-1 ... ☐	Second (safety) setpoint. Ramp function as with other setpoints (effective, external). However, SP2 is not restricted by the setpoint limits.
		1dP	11294				
		2dP	19486				
		3dP	27678				
r.SP	r/w	base	3103	38974	Float	0,01... ☑	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.
		1dP	11295				
		2dP	19487				
		3dP	27679				

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP.EF	r	base	3170	39108	Float	-1 ... ☐	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.
		1dP	11362				
		2dP	19554				
		3dP	27746				
Diff	r	base	3171	39110	Float	-1 ... ☐	Difference between the effective setpoint and setpoint 2.
		1dP	11363				
		2dP	19555				
		3dP	27747				

23 SEtP

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
SP	r/w	base	3180	39128	Float	-1 ... ☐	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	-1 ... ☐	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				

24 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

A4, unibind, SW-Druck, 80g/m² weiß