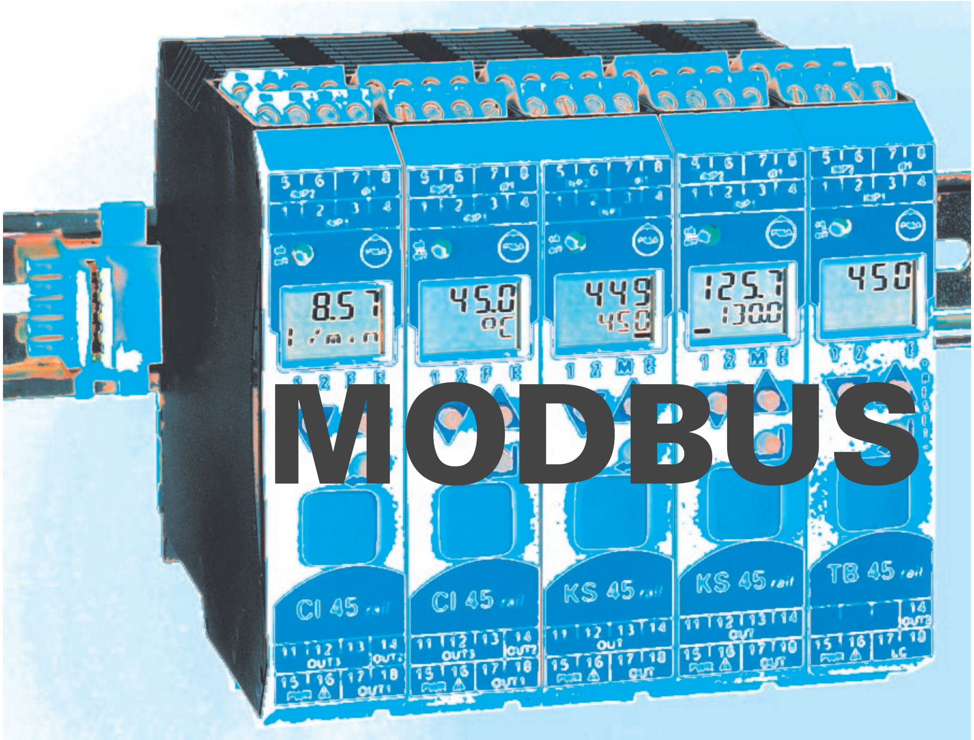
PMA Prozeß- und Maschinen-Automation GmbH

rail line
UNIFLEX CI 45, KS 45, TB 45



rail line

Interface description

english

9499-040-72011

Valid from: 12/2004

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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 ***rail line*** product range. This document describes the implementation and operation of the MODBUS interface used in the different versions of ***rail line*** equipment (CI 45-1xx-1.., KS 45-1xx-1..., TB 45-1xx-1....), which will be called ‘device’ in the rest of this document.
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 ***rail line*** devices:

[3] Universal transmitter UNIFLEX CI 45
- Data sheet CI 45 9498 737 48313
- Operating notes CI 45 9499 040 71441
- Operating instructions CI 45 9499 040 71711

[4] Universal controller KS 45
- Data sheet KS 45 9498 737 48513
- Operating notes KS 45 9499 040 71541
- Operating instructions KS 45 9499 040 71811

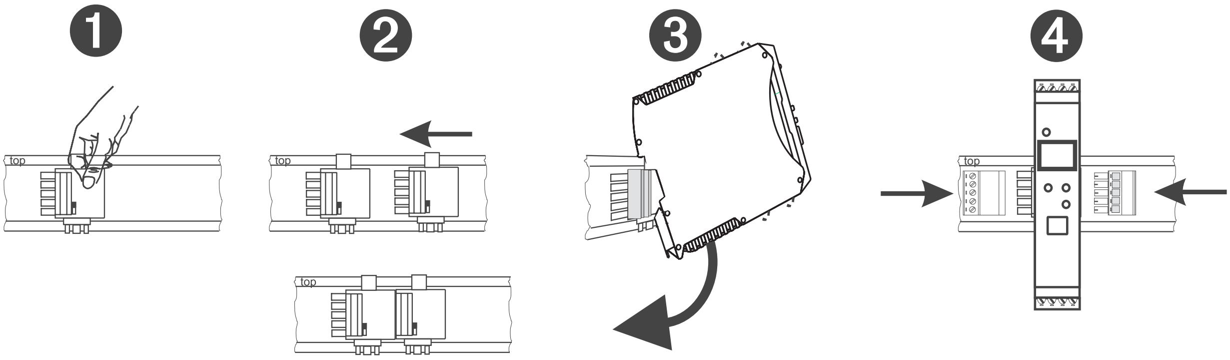
[5] Temperature limiter TB 45
- Data sheet KS 45 9498 737 48413
- Operating notes KS 45 9499 040 71541
- Operating instructions KS 45 9499 040 71911

2 Commissioning the interface

The field bus connections to the devices are made by means of bus connectors, which are clipped into the channel of the top-hat rail. If several devices are to be connected to the bus, they can be mounted side by side on the rail, whereby the bus links between the devices are made directly via the bus connectors.

2.1 Installation

Fig. 1 Installation steps



The devices are intended for vertical mounting on 35 mm top-hat rails to EN 50 022.
The place of installation should be free from vibrations, aggressive media (e.g. acids, leaches), liquids, dust or other suspended particle.
Devices of the ***rail line*** family can be mounted directly side by side (close packed). To ensure easy mounting/dismounting, there should be a clearance of at least 8 cm above and below the devices.

Proceed as follows to install the bus connectors:

❶ Clip the bus connector into the top-hat rail.

❷ If several devices are to be mounted side by side, the bus connectors must be pushed together to provide the connections.

❸ Clip the devices onto the top-hat rail above their respective bus connectors – the bus connection is finished!

❹ Connection of the external bus leads is done by means of plug-in screw terminals
- e.g. left-sided via inverted terminals with horizontal cable exit (9407 998 07131)
- e.g. right-sided via terminals with vertical cable exit (9407 998 07141).

For dismounting, the above steps are carried out in reverse order.

rail line **devices do not contain any serviceable parts, and therefore need not be opened by the customer.**

- The device may only be used in environments with the specified protection class.
- The ventilation slots in the housing must be kept free.
- In plants where transient voltage spikes can occur, the devices should be protected by means of suitable overvoltage or surge arresters!

Caution! The device contains ESD-sensitive components.

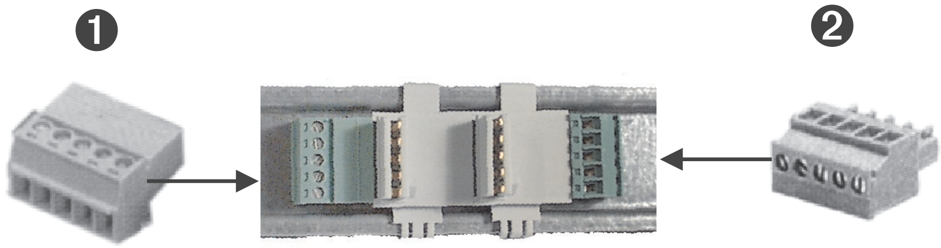
Please observe the safety instructions.

2.1.1 Plug-in screw terminals

The external bus leads are connected to the bus connectors by means of plug-in screw terminals, which can be plugged into the bus connectors from the left or right side of the devices. Removal of the screw terminals is done with the help of a screwdriver used as a lever.

Two types of bus connector are available, depending on the side from which the connections are made (left or right) or the direction of cable entry (see Fig. 4):
❶ Bus connector for left-hand connection with horizontal cable entry, Order no. 9407 998 07131
❷ Bus connector for right-hand connection with vertical cable entry, Order no. 9407 998 07141

Fig. 2 Bus connectors



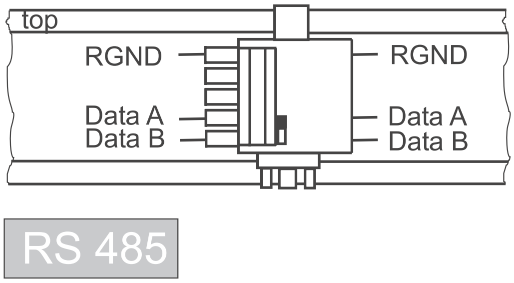
The connectors are fitted with screw terminals with standard 3,81 mm spacing for lead cross sections up to 1,5 mm^2, and should be tightened with a torque of 0,22 - 0,25 Nm.

Additional bus connector types are available from the MINI COMBICON range of Phoenix Contact.

2.2 Electrical connections

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'.

Fig. 3 Connector pin assignment



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] .

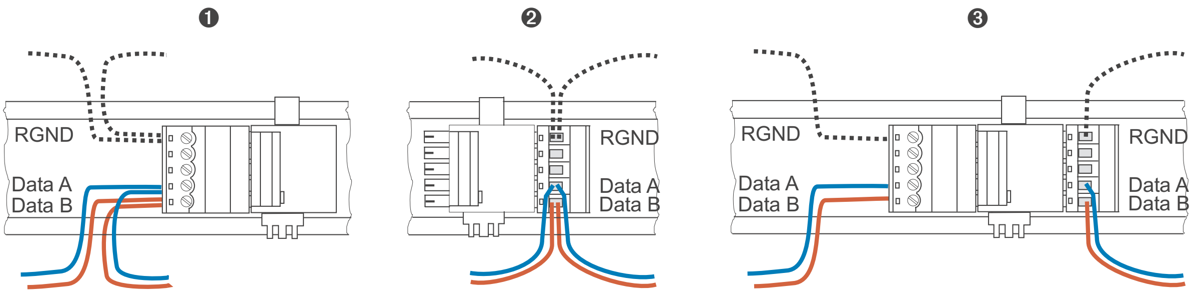
For the purpose of limiting ground current loops, signal ground (GND) can be grounded at one point via a resistor 'RGND' (100 ohms, ¼ watt).

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

There are various possibilities for cable entry of the RS 485, as shown below.

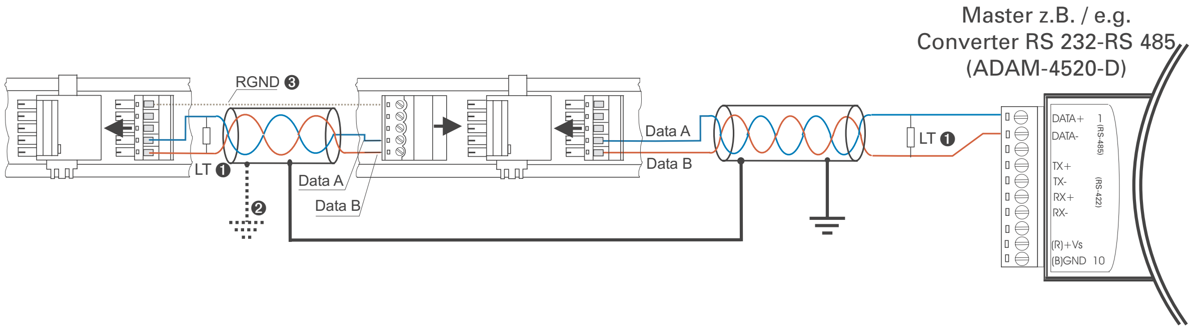
Fig. 4 Wiring options



❶ horizontal cable entry
❷ vertical cable entry
❸ cable entry at both sides

Wiring example

Fig. 1 connection example



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)

2.2.1 Wiring (general)

- 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 09111)).
- To increase signal transmission reliability, we recommend using screened, twisted pairs for the bus leads.

2.2.2 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.

2.2.3 Terminating resistors

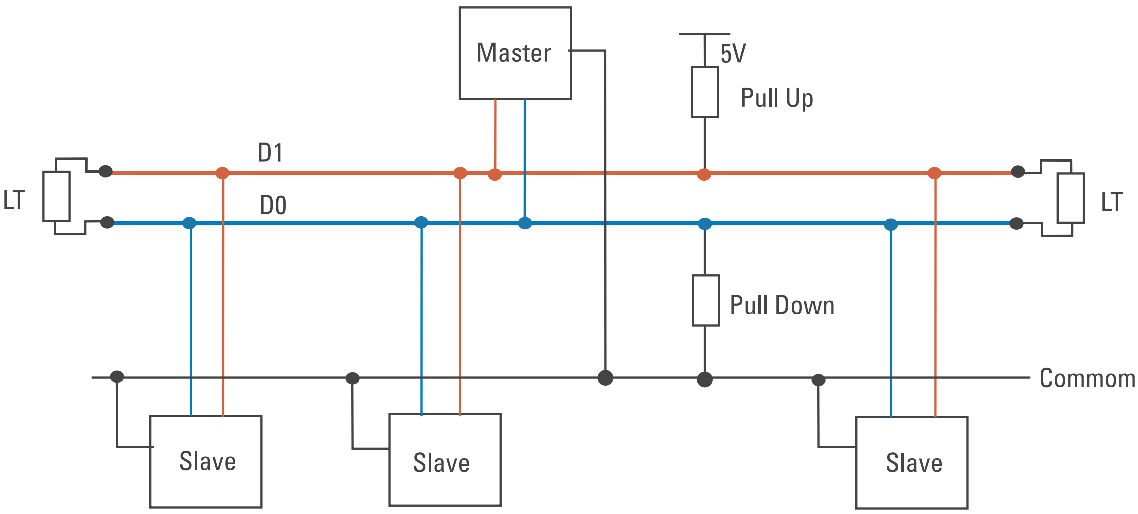
The widespread US Standard EIA RS 485 recommends fitting terminating resistors at each end of the bus cable. Terminating resistors usually have a value of approx. 120 ohms, and are connected in parallel between the data lines A and B (depending on the cable impedance; for details, see the cable manufacturer's 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. 6 Recommended connections



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 Bit/s	≤ 1000 m	< 8	no
19200 Bit/s	≤ 500 m	< 8	no
38400 Bit/s	≤ 250 m	< 8	no
any		≥ 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!

2.2.4 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.

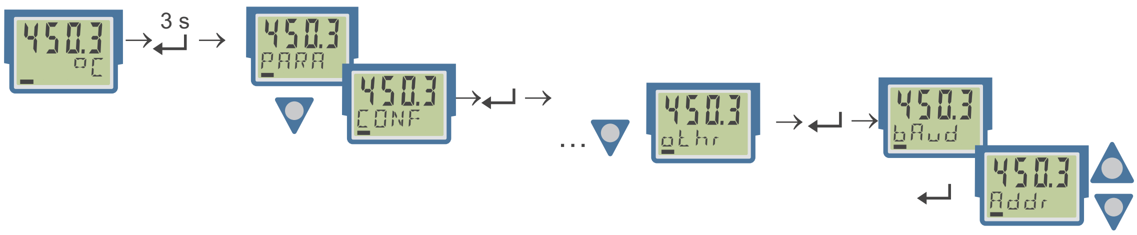
2.3 Bus settings

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. 7 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 64 bytes.

2.4 System layout

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

2.4.1 Minimum configuration of a MODBUS installation

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

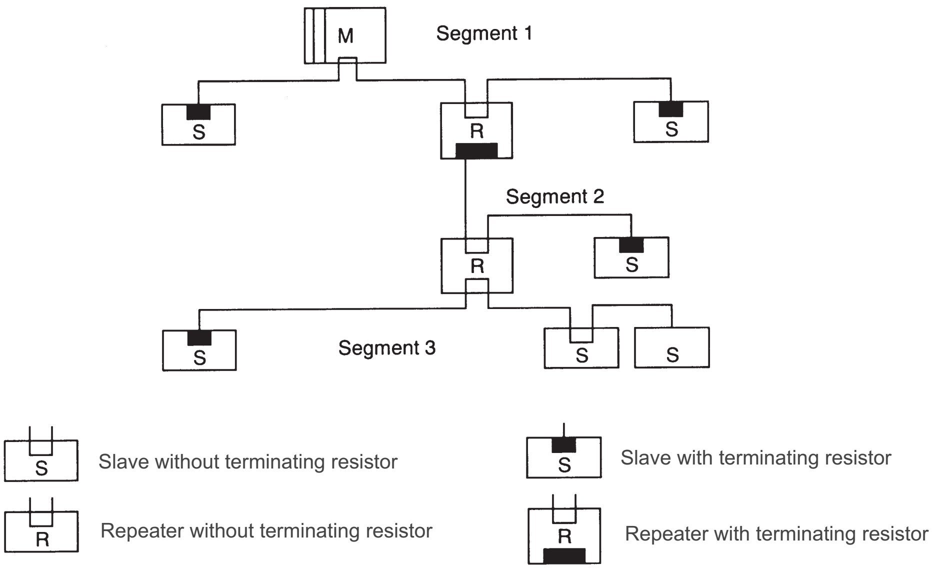
- a bus master, which controls the data traffic
- one or more slave participants, which provide data upon demand by the master
- the transmission media, consisting of the bus cable and bus connectors to link the individual participants, plus a bus segment (or several, which are connected by means of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

2.4.2 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. 8 MODBUS line structure

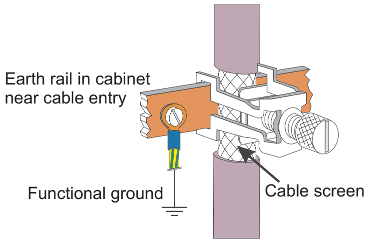


A fully configured MODBUS installation may contain max. 247 participants with the address range 1...247. Every installed repeater reduces the max. number of participants with a segment. Repeaters are passive participants and do not require a MODBUS address. However, its input circuit represents an additional 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.

2.4.3 Wiring inside buildings

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

Fig. 9 Screen connection



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.

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	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 not possible 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 messages (0x0C)

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 transm. of counter for messages answered with error code (0x0D)

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 (0x0E)

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 (0x0F)

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 counter for messages answered with NAK (0x10)

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 counter for messages answered with Busy (0x11)

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 (0x40)

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 (0x41)

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 (0x12)

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).

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

5 Index

Index

6 Address tables

The following sections describe the address tables for:

- **Universal transmitter UNIFLEX CI 45 (version 2)**
- **Universal controller KS 45 (version 2)**
- **Temperature limiter TB 45 (version 1).**

7

Table Of Contents

1 Cn.Fr

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
I.Fnc	r/w	base 1dP	1120 9312	18624	Enum	*Enum_IFncCnFr*		Function select

0	Control input
1	up counter, positive edge
2	up counter, negative edge
3	down counter, positive edge
4	down counter, negative edge
5	ferquency measurement

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Frq.t	r/w	base 1dP	1121 9313	18626	Float	0,1. . . 20	☐	Frequency gate time [s]

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Cnt.d	r/w	base 1dP	1100 9292	18584	Float	0,1. . . 9999	☐	Counter divider
Cnt.S	r/w	base 1dP	1101 9293	18586	Float	0. . . 9999	☐	Counter start value
Cnt.E	r/w	base 1dP	1102 9294	18588	Float	0. . . 9999	☑	Counter end value
Frq.L	r/w	base 1dP	1103 9295	18590	Float	0. . . 9999	☐	lower input value [kHz]
Ou.L	r/w	base 1dP	1104 9296	18592	Float	-1999. . . 9999	☐	lower output value [phys]
Frq.H	r/w	base 1dP	1105 9297	18594	Float	0. . . 9999	☐	upper input value [kHz]
Ou.H	r/w	base 1dP	1106 9298	18596	Float	-1999. . . 9999	☐	upper output value [phys]
Frq.F	r/w	base 1dP	1107 9299	18598	Float	0. . . 9999	☐	filter time [s]

1 Cn.Fr

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Cn.Fr.Eff	r	base 1dP	1140 9332	18664	Float	0. . . 0 ☐	Counter/frequency value
Cn.Pres	r/w	base 1dP	1144 9336	18672	Enum	*Enum_CnPres*	Counter preset

0	No counter preset
1	Counter preset

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Fail	r	base 1dP	1143 9335	18670	Enum	*Enum_FrFail*	frequency too high at digital input

0	no error
1	Frequency to high

2 Func

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Fnc.1	r/w	base 1dP	1262 9454	18908	Enum	*Enum_Fnc1Rail*	function 1 = process value processing. 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.

0	standard (process value = Inp1)
2	The process value is calculated from the difference between the two values (Inp1 - Inp2).
3	Maximum value of Inp1 and Inp2. The bigger value ist used as process value. At sensor failure the remaining actual value is used as process value.
4	Minimum value of Inp1 and Inp2. The smaller value is used as process value. At sensor failure the remaining actual value is used as process value.
5	Mean value (Inp1, Inp2). At sensor failure the remaining actual value is used as process value.
6	Switching between Inp1 and Inp2
7	O2 function with constant sensor temperature. The engineering unit for the O2 setting should be checked under: Other -> parameter unit (ppm / %). The sensor temperature must be defined under: Parameters -> Controller -> Sensor temperature.
8	O2 function with measured sensor temperature. The sensor temperature is required as the second process value Inp2. The engineering unit for the O2 settings (ppm / %) must be checked under 'Other | Parameter unit.'
9	counter/frequency
10	In case of measuring the thermocouple of Inp1 the cold junction compensation is read from Inp2.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Fnc.2	r/w	base 1dP	1265 9457	18914	Enum	*Enum_Fnc2*	function 2

0	no function
1	2nd power
2	square root

2 Func

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Fnc.3	r/w	base 1dP	1263 9455	18910	Enum	*Enum_Fnc3*	function 3

0	no function
1	tara function
2	sample & hold
3	integrator

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
tEmP	r/w	base 1dP	1236 9428	18856	Float	0. . . 9999 ☐	Constant sensor temperature. With O2 measurement, the actual oxygen content is derived from the constant sensor temperature and the EMF (electromotive force in volts) generated by the sensor.Note: A constant sensor temperature is only ensured with heated lambda sensors.
t.I	r/w	base 1dP	1237 9429	18858	Float	0,1. . . 9999 ☐	
P.I	r/w	base 1dP	1238 9430	18860	Float	-1999. . . 9999 ☐	

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
C.InP	r	base 1dP	1302 9494	18988	Float	-1999. . . 9999 ☐	process value
In.Hi	r	base 1dP	1306 9498	18996	Float	-1999. . . 9999 ☐	maximum value
In.Lo	r	base 1dP	1305 9497	18994	Float	-1999. . . 9999 ☐	minimum value

3 InP.1

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
S.tYP	r/w	base 1dP	520 8712	17424	Enum	*Enum_StYP*	Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted

0	thermocouple type L (-100...900°C), Fe-CuNi DIN Fahrenheit: -148...1652°F
1	thermocouple type J (-100...1200°C), Fe-CuNi Fahrenheit: -148...2192°F
2	thermocouple type K (-100...1350°C), NiCr-Ni Fahrenheit: -148...2462°F
3	thermocouple type N (-100...1300°C), Nicrosil-Nisil Fahrenheit: -148...2372°F
4	thermocouple type S (0...1760°C), PtRh-Pt10% Fahrenheit: 32...3200°F
5	thermocouple type R (0...1760°C), PtRh-Pt13% Fahrenheit: 32...3200°F
6	thermocouple type T (-200...400°C), Cu-CuNi Fahrenheit: -328...752°F
7	thermocouple type C (0...2315°C), W5%Re-W26%Re Fahrenheit: 32...4199°F
8	thermocouple type D (0...2315°C), W3%Re-W25%Re Fahrenheit: 32...4199°F
9	thermocouple type E (-100...1000°C), NiCr-CuNi Fahrenheit: -148...1832°F
10	thermocouple type B (0/400...1820°C), PtRh-Pt6% Fahrenheit: 32/752...3308°F
18	Special thermocouple with a linearization characteristic selectable by the user. This enables non-linear signals to be simulated or linearized.
20	Pt100 (-200.0 ... 100.0(150.0)°C) Measuring range up to 150°C at reduced lead resistance. Fahrenheit: -328...212(302) °F
21	Pt100 (-200.0 ... 850,0 °C) Fahrenheit: -328...1562 °F
22	Pt 1000 (-200.0...850.0 °C) Fahrenheit: -328...1562 °F
23	Special : 0...4500 Ohms. For KTY 11-6 with preset special linearization (-50...150 °C or -58...302 °F).
24	Special 0...450 Ohm
25	Special : 0...1600 Ohm
26	Special : 0...160 Ohms
30	Current : 0...20 mA / 4...20 mA
40	0...10V / 2...10V
41	Special -2.5...115 mV
42	Special : -25...1150 mV
43	Special : -25...90 mV
44	Special : -500...500 mV
45	Special : -5...5 V
46	Special : -10...10 V
47	Special : -200...200 mV
50	potentiometer 0...160 Ohm
51	potentiometer 0...450 Ohm
52	potentiometer 0...1600 Ohm
53	potentiometer 0...4500 Ohm

3 InP.1

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
4wir	r/w	base 1dP	523 8715	17430	Enum	*Enum_4wire*	Connection principle for resistive inputs.

0	Normally, resistance and resistance thermometer measurement is in 3-wire connection, whereby the resistance of all leads is equal.
1	With measurement in 4-wire connection, the lead resistance is determined by means of reference measurement.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
S.Lin	r/w	base 1dP	521 8713	17426	Enum	*Enum_SLin*	Linearization (not adjustable for all sensor types S.tYP). Special linearization. The linearization table can be created with the Engineering Tool. The default characteristic is for KTY 11-6 temperature sensors.

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

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Corr	r/w	base 1dP	265 8457	16914	Enum	*Enum_Corr*	Measured value correction / scaling

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

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
In.F	r/w	base 1dP	522 8714	17428	Float	-1999. . . 9999 ☑	Substitute value in case of a fault. This value is used for calculations, if there is a fault at the input (e.g. FAIL).

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
InL.1	r/w	base 1dP	500 8692	17384	Float	-1999. . . 9999 ☐	Input value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the lower scaling point (e.g. 4 mA) is done using the corresponding electrical value.
OuL.1	r/w	base 1dP	501 8693	17386	Float	-1999. . . 9999 ☐	Display value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the lower scaling point, e.g. 4 mA is displayed as 2 [pH].
InH.1	r/w	base 1dP	502 8694	17388	Float	-1999. . . 9999 ☐	Input value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the upper scaling point (e.g. 20 mA) is done using the corresponding electrical value.

3 InP.1

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
OuH.1	r/w	base 1dP	503 8695	17390	Float	-1999. . . 9999	☐	Display value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the upper scaling point, e.g. 20 mA is displayed as 12 [pH].
t.F1	r/w	base 1dP	504 8696	17392	Float	0. . . 999	☐	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.
b.F1	r/w	base 1dP	505 8697	17394	Float	0. . . 99999	☐	The filter bandwidth is used in a 1st order mathematical filter. The filter bandwidth is the adjustable tolerance around the measured value within which the filter is active. Measurement value changes in excess of the adjusted bandwidth are not filtered.
E.tc1	r/w	base 1dP	506 8698	17396	Float	0. . . 100	☑	External temperature compensation (temperature at the junction of thermocouple/copper lead with external temperature compensation).

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.1r	r	base 1dP	540 8732	17464	Float	-1999. . . 9999	☐	Measurement value before the measurement value correction (unprocessed).
Fail	r	base 1dP	541 8733	17466	Enum	*Enum_InpFail*		Input circuit fault: faulty or incorrectly connected sensor.

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

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.1	r	base 1dP	542 8734	17468	Float	-1999. . . 9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
F.Inp	r/w	base 1dP	543 8735	17470	Float	-1999. . . 9999	☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)

4 InP.2

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
I.Fnc	r/w	base 1dP	266 8458	16916	Enum	*Enum_IFunc*		Function INP2

0	no measurement
1	measurement

4 InP.2

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
S.tYP	r/w	base 1dP	570 8762	17524	Enum	*Enum_StYP2*	Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted.

0	Thermocouple Type L (-100...900 °C), Fe-CuNi DIN Fahrenheit: -148...1652°F
1	Thermocouple Type J (-100...1200 °C), Fe-CuNi Fahrenheit: -148...2192°F
2	Thermocouple Type K (-100...1350 °C), NiCr-Ni Fahrenheit: -148...2462°F
3	Thermocouple Type N (-100...1300 °C), Nicrosil-Nisil Fahrenheit: -148...2372°F
4	Thermocouple Type S (0...1760 °C), PtRh-Pt 10% 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: 32/752 ... 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
25	Special : 0...1,6 kOhm
26	Special : 0...160 Ohm
30	Current : 0...20 mA / 4...20 mA
41	Special -2.5...115 mV
42	Special : -25...1150 mV
43	Special : -25...90 mV
44	Special : -500...500 mV
47	Special : -200...200 mV
50	Potentiometer 0...160 Ohm
51	Potentiometer 0...450 Ohm
52	Potentiometer 0...1600 Ohm
53	Potentiometer 0...4500 Ohm

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
S.Lin	r/w	base 1dP	571 8763	17526	Enum	*Enum_SLin*	Linearization (not adjustable for all sensor types S.tYP). Special linearization. The linearization table can be created with the Engineering Tool. The default characteristic is for KTY 11-6 temperature sensors.

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

4 InP.2

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Corr	r/w	base 1dP	267 8459	16918	Enum	*Enum_Corr*		Measured value correction / scaling

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

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.F	r/w	base 1dP	572 8764	17528	Float	-1999. . . 9999	☑	Substitute value in case of a fault. This value is used for calculations, if there is a fault at the input (e.g. FAIL).

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
InL.2	r/w	base 1dP	550 8742	17484	Float	-1999. . . 9999	☐	Input value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the lower scaling point (e.g. 4 mA) is done using the corresponding electrical value.
OuL.2	r/w	base 1dP	551 8743	17486	Float	-1999. . . 9999	☐	Display value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the lower scaling point, e.g. 4 mA is displayed as 2 [pH].
InH.2	r/w	base 1dP	552 8744	17488	Float	-1999. . . 9999	☐	Input value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the upper scaling point (e.g. 20 mA) is done using the corresponding electrical value.
OuH.2	r/w	base 1dP	553 8745	17490	Float	-1999. . . 9999	☐	Display value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the upper scaling point, e.g. 20 mA is displayed as 12 [pH].
t.F2	r/w	base 1dP	554 8746	17492	Float	0. . . 999	☐	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.
b.F2	r/w	base 1dP	555 8747	17494	Float	0. . . 99999	☐	The filter bandwidth is used in a 1st order mathematical filter. The filter bandwidth is the adjustable tolerance around the measured value within which the filter is active. Measurement value changes in excess of the adjusted bandwidth are not filtered.
E.tc2	r/w	base 1dP	556 8748	17496	Float	0. . . 100	☑	External temperature compensation (temperature at the junction of thermocouple/copper lead with external temperature compensation).

4 InP.2

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.2	r	base 1dP	590 8782	17564	Float	-1999. . . 9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
Fail	r	base 1dP	591 8783	17566	Enum	*Enum_InpFail*		Input circuit fault: faulty or incorrectly connected sensor.

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

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.2r	r	base 1dP	592 8784	17568	Float	-1999. . . 9999	☐	Measurement value before the measurement value correction (unprocessed).
F.Inp	r/w	base 1dP	593 8785	17570	Float	-1999. . . 9999	☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)

5 Lim

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Fnc.1	r/w	base 1dP	670 8862	17724	Enum	*Enum_Fcn*	Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Src.1	r/w	base 1dP	672 8864	17728	Enum	*Enum_Src*	Source for limit value. Selection of which value is to be monitored.

0	Process value = absolute alarm
3	Measured value of the analog input INP1.
4	Measured value of the analog input INP2.
10	Measurement value of the counter/frequency input.

5 Lim

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L.1	r/w	base 1dP	650 8842	17684	Float	-1999. . . 9999	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
H.1	r/w	base 1dP	651 8843	17686	Float	-1999. . . 9999	☑	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.
HYS.1	r/w	base 1dP	652 8844	17688	Float	0. . . 9999	☐	Hysteresis of the limit value. Switching difference for upper and lower limit value. The limit value must change by this amount (rise above upper limit or fall below lower limit) before the limit value alarm is reset.
dEL.1	r/w	base 1dP	653 8845	17690	Float	0. . . 9999	☐	Delayed alarm of a limit value. The alarm is only triggered after the defined delay time. It is only indicated, and possibly stored, if it is still present after the delay time has elapsed.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
St.Lim	r	base 1dP	690 8882	17764	Enum	*Enum_LimStatus*	Limit value status: No alarm present or stored.

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

6 Lim2

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Fnc.2	r/w	base 1dP	720 8912	17824	Enum	*Enum_Fcn*	Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.

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

6 Lim2

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Src.2	r/w	base 1dP	721 8913	17826	Enum	*Enum_Src*	Source for limit value. Selection of which value is to be monitored.

0	Process value = absolute alarm
3	Measured value of the analog input INP1.
4	Measured value of the analog input INP2.
10	Measurement value of the counter/frequency input.

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L.2	r/w	base 1dP	700 8892	17784	Float	-1999. . . 9999	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
H.2	r/w	base 1dP	701 8893	17786	Float	-1999. . . 9999	☑	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.
HYS.2	r/w	base 1dP	702 8894	17788	Float	0. . . 9999	☐	Hysteresis of the limit value. Switching difference for upper and lower limit value. The limit value must change by this amount (rise above upper limit or fall below lower limit) before the limit value alarm is reset.
dEL.2	r/w	base 1dP	703 8895	17790	Float	0. . . 9999	☐	Delayed alarm of a limit value. The alarm is only triggered after the defined delay time. It is only indicated, and possibly stored, if it is still present after the delay time has elapsed.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
St.Lim	r	base 1dP	740 8932	17864	Enum	*Enum_LimStatus*	Limit value status: No alarm present or stored.

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

7 Lim3

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Fnc.3	r/w	base 1dP	770 8962	17924	Enum	*Enum_Fcn*	Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Src.3	r/w	base 1dP	771 8963	17926	Enum	*Enum_Src*	Source for limit value. Selection of which value is to be monitored.

0	Process value = absolute alarm
3	Measured value of the analog input INP1.
4	Measured value of the analog input INP2.
10	Measurement value of the counter/frequency input.

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L.3	r/w	base 1dP	750 8942	17884	Float	-1999. . . 9999	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
H.3	r/w	base 1dP	751 8943	17886	Float	-1999. . . 9999	☑	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.
HYS.3	r/w	base 1dP	752 8944	17888	Float	0. . . 9999	☐	Hysteresis of the limit value. Switching difference for upper and lower limit value. The limit value must change by this amount (rise above upper limit or fall below lower limit) before the limit value alarm is reset.
dEL.3	r/w	base 1dP	753 8945	17890	Float	0. . . 9999	☐	Delayed alarm of a limit value. The alarm is only triggered after the defined delay time. It is only indicated, and possibly stored, if it is still present after the delay time has elapsed.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
St.Lim	r	base 1dP	790 8982	17964	Enum	*Enum_LimStatus*	Limit value status: No alarm present or stored.

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 1dP	421 8613	17226	Enum	*Enum_dInPRail1*	Local / remote switchover (Remote: Adjustment of all values via the front panel is blocked).

0	No function (switchover via interface is possible).
1	Always active.
2	DI1 switches.
5	func switches
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Err.r	r/w	base 1dP	429 8621	17242	Enum	*Enum_dInPRail2*	Source of the control signal for resetting all stored entries in the error list (the list contains all error messages and alarms). If an alarm is still present, i.e. the source of trouble has not been remedied, stored alarms cannot be acknowledged (reset).

0	No function (switchover via interface is possible).
2	DI1 switches.
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
I.ChG	r/w	base 1dP	434 8626	17252	Enum	*Enum_dInPRail2*	Signal source for switching the effective process value between x1 and x2.

0	No function (switchover via interface is possible).
2	DI1 switches.
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
tArA	r/w	base 1dP	435 8627	17254	Enum	*Enum_dInPRail2*	Signal source for activating the 'Tare' function

0	No function (switchover via interface is possible).
2	DI1 switches.
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
HOLd	r/w	base 1dP	436 8628	17256	Enum	*Enum_dInPRail2*	Signal source for activating the Sample&hold function

0	No function (switchover via interface is possible).
2	DI1 switches.
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

8 LOGI

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
rES.L	r/w	base 1dP	425 8617	17234	Enum	*Enum_dInPRail2*	Signal source for aktivating the function Reset of minimum value

0	No function (switchover via interface is possible).
2	DI1 switches.
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
rES.H	r/w	base 1dP	426 8618	17236	Enum	*Enum_dInPRail2*	Signal source for activating the function Reset of maximum value

0	No function (switchover via interface is possible).
2	DI1 switches.
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
rES.I	r/w	base 1dP	437 8629	17258	Enum	*Enum_dInPrail5*	

0	No function (switchover via interface is possible).
2	di1 switches
6	Reset-keys switches
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
di.Fn	r/w	base 1dP	420 8612	17224	Enum	*Enum_diFn*	Function of digital inputs (valid for all inputs)

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'.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
rES.C	r/w	base 1dP	438 8630	17260	Enum	*Enum_dInPRail4*	

0	no function (switch-over via interface is possible)
6	Reset-keys switches
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

8 LOGI

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
St.Di	r	base 1dP	450 8642	17284	Int	. . .	☐	Status of the digital inputs or of push-buttons (binary coded). Bit 0: Input di1 Bit 8: Status of Enter key Bit 9: Status of 'Down' key Bit 10: Status of 'Up' key
L-R	r/w	base 1dP	460 8652	17304	Int	0. . . 1	☐	Remote operation. Remote means that all values can only be adjusted via the interface. Adjustments via the front panel are blocked.
rES.L	r/w	base 1dP	472 8664	17328	Int	0. . . 1	☐	Reset of minimum value. The positiv signal (=1) resets the minimum value.
rES.H	r/w	base 1dP	473 8665	17330	Int	0. . . 1	☐	Reset of maximum value. The positiv signal (=1) resets the maximum value.
Err.r	r/w	base 1dP	470 8662	17324	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).
F.Di	r/w	base 1dP	480 8672	17344	Int	0. . . 1	☐	Forcing of digital inputs. Forcing involves the external operation of at least one input. The instrument takes over this value as input value (preset value for inputs from a superordinate system, e.g. for a function test.) Bit 0 Forcing of digital Input 1
I.Chg	r/w	base 1dP	471 8663	17326	Int	0. . . 1	☐	Signal for switching the effective process value between x1 and x2. The positiv signal (=1) activates x2.
tArA	r/w	base 1dP	474 8666	17332	Int	0. . . 1	☐	The positiv signal (=1) activates the tare function. Switching on the tare function sets the instantaneous input value to zero and measurement is continued with this offset. By switching off the tare function, the actual measurement value is displayed again.
HOLd	r/w	base 1dP	475 8667	17334	Int	0. . . 1	☐	The positiv signal (=1) activates the hold function. With the sample & hold function activated, the measured value is held on the display. After de-activating the sample & hold function, the actual measurement value is displayed again.
rES.I	r/w	base 1dP	477 8669	17338	Int	0. . . 1	☐	

9 ohnE

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
B.BedEbe	r/w	base 1dP	1839 10031	20062	Int	0. . . 255	☐	Operating Levels (Parameter, Configuration, and Calibration) can be disabled here.
B.Bedien	r/w	base 1dP	1838 10030	20060	Int	0. . . 255	☐	Used to disable various operating functions (e.g. access to the extended Operating Level).
C.Sch	r/w	base 1dP	1801 9993	19986	Float	1. . . 9999999	☑	Data defines the number of switching cycles for which the message InF.2 is generated.
C.Std	r/w	base 1dP	1800 9992	19984	Float	1. . . 9999999	☑	Data defines the number of operating hours for which the message InF.1 is generated.
D.ForcIn	r/w	base 1dP	1803 9995	19990	Int	0. . . 255	☐	The data defines the inputs to be forced: Bit 0 analog input 1 Bit 1 analog input 2 Bit 2 not used Bit 3 not used Bit 4 digital input 1 Bit 5 not used Bit 6 not used Bit 7 not used
D.ForcOut	r/w	base 1dP	1804 9996	19992	Int	0. . . 255	☐	The data defines the outputs to be forced. Bit 0 output 1 Bit 1 output 2 Bit 2 output 3 Bit 3 not used Bit 4 not used Bit 5 not used Bit 6 not used Bit 7 not used
Dis2	r/w	base 1dP	1848 10040	20080	Int	256. . . 8190	☐	Datum to be shown in display 2. The basic address of the datum that is to be displayed must be entered.
EOP1	r/w	base 1dP	1840 10032	20064	Int	256. . . 8190	☐	1st datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP2	r/w	base 1dP	1841 10033	20066	Int	256. . . 8190	☐	2nd datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP3	r/w	base 1dP	1842 10034	20068	Int	256. . . 8190	☐	3rd datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP4	r/w	base 1dP	1843 10035	20070	Int	256. . . 8190	☐	4th datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP5	r/w	base 1dP	1844 10036	20072	Int	256. . . 8190	☐	5th datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.

9 ohnE

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
EOP6	r/w	base 1dP	1845 10037	20074	Int	256. . . 8190	☐	6th datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP7	r/w	base 1dP	1846 10038	20076	Int	256. . . 8190	☐	7th datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP8	r/w	base 1dP	1847 10039	20078	Int	256. . . 8190	☐	8th datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
In.1	r/w	base 1dP	1861 10053	20106	Float	0. . . 2	☐	Input 1 for measurement value 1 (to Output 1 for display value 1). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.10	r/w	base 1dP	1879 10071	20142	Float	0. . . 2	☑	Input 10 for measurement value 10 (to Output 10 for display value 10). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.11	r/w	base 1dP	1881 10073	20146	Float	0. . . 2	☑	Input 11 for measurement value 11 (to Output 11 for display value 11). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.12	r/w	base 1dP	1883 10075	20150	Float	0. . . 2	☑	Input 12 for measurement value 12 (to Output 12 for display value 12). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.13	r/w	base 1dP	1885 10077	20154	Float	0. . . 2	☑	Input 13 for measurement value 13 (to Output 13 for display value 13). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.14	r/w	base 1dP	1887 10079	20158	Float	0. . . 2	☑	Input 14 for measurement value 14 (to Output 14 for display value 14). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.15	r/w	base 1dP	1889 10081	20162	Float	0. . . 2	☑	Input 15 for measurement value 15 (to Output 15 for display value 15). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.16	r/w	base 1dP	1891 10083	20166	Float	0. . . 2	☑	Input 16 for measurement value 16 (to Output 16 for display value 16). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.

9 ohnE

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.17	r/w	base 1dP	1893 10085	20170	Float	0. . . 2	☑	input 17 for measurement value 17 (to Output 17 for display value 17). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.18	r/w	base 1dP	1895 10087	20174	Float	0. . . 2	☑	input 18 for measurement value 18 (to Output 18 for display value 18). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.19	r/w	base 1dP	1897 10089	20178	Float	0. . . 2	☑	input 19 for measurement value 19 (to Output 19 for display value 19). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.2	r/w	base 1dP	1863 10055	20110	Float	0. . . 2	☐	Input 2 for measurement value 2 (to Output 2 for display value 2). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.20	r/w	base 1dP	1899 10091	20182	Float	0. . . 2	☑	input 20 for measurement value 20 (to Output 20 for display value 20). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.21	r/w	base 1dP	1901 10093	20186	Float	0. . . 2	☑	input 21 for measurement value 21 (to Output 21 for display value 21). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.22	r/w	base 1dP	1903 10095	20190	Float	0. . . 2	☑	input 22 for measurement value 22 (to Output 22 for display value 22). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.23	r/w	base 1dP	1905 10097	20194	Float	0. . . 2	☑	input 23 for measurement value 23 (to Output 23 for display value 23). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.24	r/w	base 1dP	1907 10099	20198	Float	0. . . 2	☑	input 24 for measurement value 24 (to Output 24 for display value 24). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.25	r/w	base 1dP	1909 10101	20202	Float	0. . . 2	☑	input 25 for measurement value 25 (to Output 25 for display value 25). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.

9 ohnE

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Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.26	r/w	base 1dP	1911 10103	20206	Float	0. . . 2	☑	input 26 for measurement value 26 (to Output 26 for display value 26). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.27	r/w	base 1dP	1913 10105	20210	Float	0. . . 2	☑	input 27 for measurement value 27 (to Output 27 for display value 27). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.28	r/w	base 1dP	1915 10107	20214	Float	0. . . 2	☑	input 28 for measurement value 28 (to Output 28 for display value 28). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.29	r/w	base 1dP	1917 10109	20218	Float	0. . . 2	☑	input 29 for measurement value 29 (to Output 29 for display value 29). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.3	r/w	base 1dP	1865 10057	20114	Float	0. . . 2	☑	Input 3 for measurement value 3 (to Output 3 for display value 3). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.30	r/w	base 1dP	1919 10111	20222	Float	0. . . 2	☑	input 30 for measurement value 30 (to Output 30 for display value 30). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.31	r/w	base 1dP	1921 10113	20226	Float	0. . . 2	☑	input 31 for measurement value 31 (to Output 31 for display value 31). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.32	r/w	base 1dP	1923 10115	20230	Float	0. . . 2	☑	input 32 for measurement value 32 (to Output 32 for display value 32). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.4	r/w	base 1dP	1867 10059	20118	Float	0. . . 2	☑	Input 4 for measurement value 4 (to Output 4 for display value 4). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.5	r/w	base 1dP	1869 10061	20122	Float	0. . . 2	☑	Input 5 for measurement value 5 (to Output 5 for display value 5). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.

9 ohnE

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Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.6	r/w	base 1dP	1871 10063	20126	Float	0. . . 2	☑	Input 6 for measurement value 6 (to Output 6 for display value 6). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.7	r/w	base 1dP	1873 10065	20130	Float	0. . . 2	☑	Input 7 for measurement value 7 (to Output 7 for display value 7). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.8	r/w	base 1dP	1875 10067	20134	Float	0. . . 2	☑	Input 8 for measurement value 8 (to Output 8 for display value 8). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.9	r/w	base 1dP	1877 10069	20138	Float	0. . . 2	☑	Input 9 for measurement value 9 (to Output 9 for display value 9). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.1	r/w	base 1dP	1862 10054	20108	Float	0. . . 2	☐	Output 1 for display value 1 (to Input 1 for measurement value 1). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.10	r/w	base 1dP	1880 10072	20144	Float	0. . . 2	☑	Output 10 for display value 10 (to Input 10 for measurement value 10). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.11	r/w	base 1dP	1882 10074	20148	Float	0. . . 2	☑	Output 11 for display value 11 (to Input 11 for measurement value 11). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.12	r/w	base 1dP	1884 10076	20152	Float	0. . . 2	☑	Output 12 for display value 12 (to Input 12 for measurement value 12). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.13	r/w	base 1dP	1886 10078	20156	Float	0. . . 2	☑	Output 13 for display value 13 (to Input 13 for measurement value 13). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.14	r/w	base 1dP	1888 10080	20160	Float	0. . . 2	☑	Output 14 for display value 14 (to Input 14 for measurement value 14). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.

9 ohnE

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Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Ou.15	r/w	base 1dP	1890 10082	20164	Float	0. . . 2	☑	Output 15 for display value 15 (to Input 15 for measurement value 15). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.16	r/w	base 1dP	1892 10084	20168	Float	0. . . 2	☑	Output 16 for display value 16 (to Input 16 for measurement value 16). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.17	r/w	base 1dP	1894 10086	20172	Float	0. . . 2	☑	output 17 for display value 17 (to Input 17 for measurement value 17). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.18	r/w	base 1dP	1896 10088	20176	Float	0. . . 2	☑	output 18 for display value 18 (to Input 18 for measurement value 18). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.19	r/w	base 1dP	1898 10090	20180	Float	0. . . 2	☑	output 19 for display value 19 (to Input 19 for measurement value 19). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.2	r/w	base 1dP	1864 10056	20112	Float	0. . . 2	☐	Output 2 for display value 2 (to Input 2 for measurement value 2). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.20	r/w	base 1dP	1900 10092	20184	Float	0. . . 2	☑	output 20 for display value 20 (to Input 20 for measurement value 20). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.21	r/w	base 1dP	1902 10094	20188	Float	0. . . 2	☑	output 21 for display value 21 (to Input 21 for measurement value 21). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.22	r/w	base 1dP	1904 10096	20192	Float	0. . . 2	☑	output 22 for display value 22 (to Input 22 for measurement value 22). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.23	r/w	base 1dP	1906 10098	20196	Float	0. . . 2	☑	output 23 for display value 23 (to Input 23 for measurement value 23). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.

9 ohnE

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Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Ou.24	r/w	base 1dP	1908 10100	20200	Float	0. . . 2	☑	output 24 for display value 24 (to Input 24 for measurement value 24). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.25	r/w	base 1dP	1910 10102	20204	Float	0. . . 2	☑	output 25 for display value 25 (to Input 25 for measurement value 25). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.26	r/w	base 1dP	1912 10104	20208	Float	0. . . 2	☑	output 26 for display value 26 (to Input 26 for measurement value 26). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.27	r/w	base 1dP	1914 10106	20212	Float	0. . . 2	☑	output 27 for display value 27 (to Input 27 for measurement value 27). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.28	r/w	base 1dP	1916 10108	20216	Float	0. . . 2	☑	output 28 for display value 28 (to Input 28 for measurement value 28). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.29	r/w	base 1dP	1918 10110	20220	Float	0. . . 2	☑	output 29 for display value 29 (to Input 29 for measurement value 29). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.3	r/w	base 1dP	1866 10058	20116	Float	0. . . 2	☑	Output 3 for display value 3 (to Input 3 for measurement value 3). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.30	r/w	base 1dP	1920 10112	20224	Float	0. . . 2	☑	output 30 for display value 30 (to Input 30 for measurement value 30). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.31	r/w	base 1dP	1922 10114	20228	Float	0. . . 2	☑	output 31 for display value 31 (to Input 31 for measurement value 31). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.32	r/w	base 1dP	1924 10116	20232	Float	0. . . 2	☑	output 32 for display value 32 (to Input 32 for measurement value 32). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.

9 ohnE

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Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Ou.4	r/w	base 1dP	1868 10060	20120	Float	0. . . 2	☑	Output 4 for display value 4 (to Input 4 for measurement value 4). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.5	r/w	base 1dP	1870 10062	20124	Float	0. . . 2	☑	Output 5 for display value 5 (to Input 5 for measurement value 5). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.6	r/w	base 1dP	1872 10064	20128	Float	0. . . 2	☑	Output 6 for display value 6 (to Input 6 for measurement value 6). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.7	r/w	base 1dP	1874 10066	20132	Float	0. . . 2	☑	Output 7 for display value 7 (to Input 7 for measurement value 7). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.8	r/w	base 1dP	1876 10068	20136	Float	0. . . 2	☑	Output 8 for display value 8 (to Input 8 for measurement value 8). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.9	r/w	base 1dP	1878 10070	20140	Float	0. . . 2	☑	Output 9 for display value 9 (to Input 9 for measurement value 9). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
PASS	r/w	base 1dP	1850 10042	20084	Int	0. . . 9999	☑	Password. 4-digit number for the password-protected access to blocked operating functions such as e.g. the Parameter Level.
T.Dis2	r/w	base 1dP	1851 10043	20086	Text	. . .	☐	This address contains 5 bytes for the text that is to appear in Display 2. No text: 1st byte 0x00.
U.LinT	r/w	base 1dP	1860 10052	20104	Enum	*Enum_Unit*		Engineering unit of linearization table (temperature).

0	without unit
1	°C
2	°F
3	K

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
V.Mask	r/w	base 1dP	1810 10002	20004	Int	0. . . 255	☐	Definition of the visibility templates.The templates define the configurations and parameters displayed for operation (contents on request).

9 ohnE

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Conf	r/w	base 1dP	256 8448	16896	Int	0. . . 2	☐	Start/Stop and abortion of the configuration mode 0 = End of configuration 1 = Start of configuration 2 = Abort configuration
tEmP	r/w	base 1dP	91 8283	16566	Float	0. . . 9999	☐	Constant sensor temperature. With O2 measurement, the actual oxygen content is derived from the constant sensor temperature and the EMF (electromotive force in volts) generated by the sensor.Note: A constant sensor temperature is only ensured with heated lambda sensors.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
C.InP	r	base 1dP	39 8231	16462	Float	-1999. . . 9999	☐	process value
CAH	r	base 1dP	390 8582	17164	Long	0. . .	☐	Total operating hours. Count starts with the first switch-on. Internal test routine. Is stored and displayed not more than once per hour.
CPH	r	base 1dP	394 8586	17172	Long	0. . .	☐	Operating hours of the current maintenance period. Internal test routine. Is stored and displayed not more than once per hour. Reset when the time limit message is acknowledged.
Diag	r	base 1dP	382 8574	17148	Int	0. . . 255	☐	Result of diagnosis. Any faults detected during the self-test for data, RAM, processor, and EEPROM, as well as an exceeded count for the operating hours (maintenance period) and no. of switching cycles (maintenance period) are stored. Can be reset by acknowledgement.
EE.Ver	r	base 1dP	381 8573	17146	Int	0. . . 0	☐	EEPROM version
Id.NrH	r	base 1dP	370 8562	17124	Int	0. . . 0	☐	More significant part of the device Ident number.
Id.NrL	r	base 1dP	371 8563	17126	Int	0. . . 0	☐	Less significant part of the device Ident number.
Id.NrZ	r	base 1dP	372 8564	17128	Int	0. . . 0	☐	Sequential Ident number of the device.
In.Hi	r	base 1dP	43 8235	16470	Float	-1999. . . 9999	☐	maximum value
In.Lo	r	base 1dP	42 8234	16468	Float	-1999. . . 9999	☐	minimum value

9 ohnE

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Int.Tmp	r	base 1dP	380 8572	17144	Int	0. . . 0	☐	Max. measured operating temperature. Internal test routine.
Oem.NrH	r	base 1dP	373 8565	17130	Int	0. . . 0	☐	More significant part of the device OEM no.
Oem.NrL	r	base 1dP	374 8566	17132	Int	0. . . 0	☐	Less significant part of the device OEM no.
SAO1	r	base 1dP	391 8583	17166	Long	0. . .	☐	Total number of switching cycles of OUT1. Internal test routine that is stored and displayed not more than once per hour.
SAO2	r	base 1dP	392 8584	17168	Long	0. . .	☐	Total number of switching cycles of OUT2. Internal test routine that is stored and displayed not more than once per hour.
SAO3	r	base 1dP	393 8585	17170	Long	0. . .	☐	Total number of switching cycles of OUT3. Internal test routine that is stored and displayed not more than once per hour.
SPO1	r/w	base 1dP	395 8587	17174	Long	0. . .	☐	Switching cycles of OUT1 during the present maintenance period. Internal test routine that is stored and displayed not more than once per hour. Resetting is done by acknowledging the switching cycle message.
SPO2	r/w	base 1dP	396 8588	17176	Long	0. . .	☐	Switching cycles of OUT2 during the present maintenance period. Internal test routine that is stored and displayed not more than once per hour. Resetting is done by acknowledging the switching cycle message.
SPO3	r/w	base 1dP	397 8589	17178	Long	0. . .	☐	Switching cycles of OUT3 during the present maintenance period. Internal test routine that is stored and displayed not more than once per hour. Resetting is done by acknowledging the switching cycle message.
Sw.Nr	r	base 1dP	375 8567	17134	BCD	0. . . 0	☐	Digits 7 to 12 of the software order number.
T.CodeNr	r	base 1dP	360 8552	17104	Text	0. . . 0	☐	15-digit order number of the device.
UPD	r/w	base 1dP	257 8449	16898	Enum	*Enum_Aenderungsflag*		Status message indicating that parameter / configuration have been changed via the front panel.

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

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L-R	r/w	base 1dP	55 8247	16494	Int	0. . . 1	☐	Remote operation. Remote means that all values can only be adjusted via the interface. Adjustments via the front panel are blocked.

9 ohnE

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Hw.Opt	r	base 1dP	200 8392	16784	Int	0. . . 65535	☐	Device options: 0000 WXYZ 0000 DCBA Z = 1: Modbus interface Y = 1: System device X = 1: Option 1 W = 1: Option 2 A = 1: OUT1 available B = 1: OUT2 available C = 1: OUT3 available D = 1: OUT3 is an analog output
Sw.Op	r	base 1dP	201 8393	16786	Int	0. . . 255	☐	Software version XY Major and Minor Release (e.g. 21 = Version 2.1). The software version specifies the firmware in the unit. For the correct interaction of E-Tool and device, it must match the operating version (OpVersion) in the E-Tool.
Bed.V	r	base 1dP	202 8394	16788	Int	0. . . 255	☐	Operating version (numeric value). For the correct interaction of E-Tool and device, the software version and operating version must match.
rES.L	r/w	base 1dP	65 8257	16514	Int	0. . . 1	☐	Reset of minimum value. The positiv signal (=1) resets the minimum value.
Unit	r	base 1dP	203 8395	16790	Int	0. . . 255	☐	Identification of the device.
rES.H	r/w	base 1dP	66 8258	16516	Int	0. . . 1	☐	Reset of maximum value. The positiv signal (=1) resets the maximum value.
S.Vers	r	base 1dP	204 8396	16792	Int	100. . . 255	☐	The sub-version number is given as an additional index for precise definition of software version.
St.Ala	r	base 1dP	23 8215	16430	Int	. . .	☐	Alarm status: Bit-wise coded status of the individual alarms, e.g. exceeded limit value.
						Bit 0 Existing/stored exceeded limit 1 Bit 1 Existing/stored exceeded limit 2 Bit 2 Existing/stored exceeded limit 3 Bit 3 Not usedBit 4 Not used Bits 5 - 7 Not used Bit 8 Existing exceeded limit 1 Bit 9 Existing exceeded limit 2 Bit 10 Existing exceeded limit 3 Bits 11 - 15 Not used		
Err.r	r/w	base 1dP	63 8255	16510	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).

9 ohnE

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
St.Do	r	base 1dP	24 8216	16432	Int	0. . . 15	☐	Status of the digital outputs Bit 0 digital output 1 Bit 1 digital output 2 Bit 2 digital output 3 Bit 3 digital output 4 Bit 4 digital output 5 Bit 5 digital output 6
St.Ain	r	base 1dP	22 8214	16428	Int	0. . . 127	☐	Bit-coded status of the analog input (fault, e.g. short circuit)
						Bit 0 Break at Input 1 Bit 1 Reversed polarity at Input 1 Bit 2 Short-circuit at Input 1 Bit 3 Not used Bit 4 Break at Input 2 Bit 5 Reversed polarity at Input 2 Bit 6 Short-circuit at Input 2 Bits 7-15 Not used		
St.Di	r	base 1dP	25 8217	16434	Int	. . .	☐	Status of the digital inputs or of push-buttons (binary coded).
						Bit 0: Input di1 Bit 8: Status of Enter key Bit 9: Status of 'Down' key Bit 10: Status of 'Up' key		
F.Di	r/w	base 1dP	28 8220	16440	Int	0. . . 1	☐	Forcing of digital inputs. Forcing involves the external operation of at least one input. The instrument takes over this value as input value (preset value for inputs from a superordinate system, e.g. for a function test.)
						Bit 0 Forcing of digital Input 1		
F.Do	r/w	base 1dP	29 8221	16442	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).
I.Chg	r/w	base 1dP	64 8256	16512	Int	0. . . 1	☐	Signal for switching the effective process value between x1 and x2. The positiv signal (=1) activates x2.
tArA	r/w	base 1dP	67 8259	16518	Int	0. . . 1	☐	The positiv signal (=1) activates the tare function. Switching on the tare function sets the instantaneous input value to zero and measurement is continued with this offset. By switching off the tare function, the actual measurement value is displayed again.
HOLd	r/w	base 1dP	68 8260	16520	Int	0. . . 1	☐	The positiv signal (=1) activates the hold function. With the sample & hold function activated, the measured value is held on the display. After de-activating the sample & hold function, the actual measurement value is displayed again.

10 ohnE1

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
T.Dis2	r/w	base 1dP	910 9102	18204	Text	0. . . 0	☐	This address contains 5 bytes for the text that is to appear in Display 2. No text: 1st byte 0x00.

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L.1	r/w	base 1dP	73 8265	16530	Float	-1999. . . 9999	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
H.1	r/w	base 1dP	74 8266	16532	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.
t.F1	r/w	base 1dP	70 8262	16524	Float	0. . . 999	☐	Filter time constant [s]. Every input is fitted with a digital (software) low-pass filter for suppressing process-related disturbances on the input leads. Higher filter settings improve the suppression, but increase the delay of the input signals.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.1	r	base 1dP	20 8212	16424	Float	-1999. . . 9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
Sw.Nr	r	base 1dP	908 9100	18200	BCD	0. . . 0	☐	Digits 7 to 12 of the software order number.
T.CodeNr	r	base 1dP	900 9092	18184	Text	0. . . 0	☐	15-digit order number of the device.
F.Do1	r/w	base 1dP	31 8223	16446	Enum	*Enum_Ausgang*		Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).

0	off
1	on

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.1r	r	base 1dP	2005 10197	20394	Float	-1999. . . 9999	☐	Measurement value before the measurement value correction (unprocessed).
F.Inp	r/w	base 1dP	26 8218	16436	Float	-1999. . . 9999	☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)

11 ohnE2

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L.2	r/w	base 1dP	75 8267	16534	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.
t.F2	r/w	base 1dP	71 8263	16526	Float	0. . . 999	☐	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.
H.2	r/w	base 1dP	76 8268	16536	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.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.2	r	base 1dP	21 8213	16426	Float	-1999. . . 9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
F.Do2	r/w	base 1dP	32 8224	16448	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).

Value	
0	off
1	on

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.2r	r	base 1dP	2006 10198	20396	Float	-1999. . . 9999	☐	Measurement value before the measurement value correction (unprocessed).
F.Inp	r/w	base 1dP	27 8219	16438	Float	-1999. . . 9999	☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)

12 ohnE3

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L.3	r/w	base 1dP	77 8269	16538	Float	-1999. . . 9999	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
H.3	r/w	base 1dP	78 8270	16540	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.

12 ohnE3

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
F.Do3	r/w	base 1dP	33 8225	16450	Enum	*Enum_Ausgang*		Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
						0	off	
						1	on	
Out.3	r	base 1dP	34 8226	16452	Float	-1999. . . 9999	☐	Value of the analog output [%]
F.Ou1	r/w	base 1dP	30 8222	16444	Float	-1999. . . 9999	☐	Forcing value of the analog output. Forcing involves the external operation of an output, i.e. the instrument has no influence on this output. (Used for the operation of free outputs e.g. by a supervisory PLC.)

13 othr

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
bAud	r/w	base 1dP	290 8482	16964	Enum	*Enum_Baud*		Bit rate of the interface (only visible with OPTION). The bit rate determines the transmission speed.
						0	2400 Baud	
						1	4800 Baud	
						2	9600 Baud	
						3	19200 Baud	
						4	38.400 bits/s	
Addr	r/w	base 1dP	291 8483	16966	Int	1. . . 247	☐	Address on the interface (only visible with OPTION)
PrtY	r/w	base 1dP	292 8484	16968	Enum	*Enum_Parity*		Parity of data on the interface (only visible with OPTION). Simple possibility of checking that transferred data is correct.
						0	No parity, with 2 stop bits.	
						1	even parity	
						2	odd parity	
						3	no parity (1 stop bit)	
dELY	r/w	base 1dP	293 8485	16970	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.)

13 othr

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
D.Unt	r/w	base 1dP	284 8476	16952	Enum	*EnumDUnit*	display unit

0	without unit
1	Temperature unit
2	O2 unit
3	%
4	bar
5	mbar
6	Pa
7	kPa
8	psi
9	l
10	l/s
11	l/min
12	Ohm
13	kOhm
14	m
15	A
16	mA
17	V
18	mV
19	kg
20	g
21	t
22	Text of phys. Unit

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
O2	r/w	base 1dP	283 8475	16950	Enum	*O2Unit*	Parameter definition for O2 measurement. With O2 measurement it is necessary to define whether the parameter is to be evaluated in ppm or %.

0	Parameter for O2 function in ppm
1	Parameter for O2 function in %

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Unit	r/w	base 1dP	280 8472	16944	Enum	*Enum_Unit_rail*	Physical unit (temperature), f.e.°C

1	°C
2	°F
3	K

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
dP	r/w	base 1dP	281 8473	16946	Enum	*Enum_dP*	Decimal point (max. no of decimals). Format of the measured value display.

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

13 othr

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
SEGm	r/w	base 1dP	300 8492	16984	Enum	*EnumSegm*		Meaning of the display elements '1' and '2'.
						0	OUT1, OUT2	
						1	INP1, INP2	
C.dEL	r/w	base 1dP	294 8486	16972	Int	0. . . 200	☐	For both interfaces, Modbus only. Additional acceptable delay time between 2 received bytes, before "end of message" is assumed. This time is needed if data is not transmitted continousely by the modem.
FrEq	r/w	base 1dP	260 8452	16904	Enum	*Enum_FrEq*		Switchover of the applied mains frequency 50 / 60 Hz, thereby better adaptation of the input filter for hum suppression.
						0	Mains frequency is 50 Hz.	
						1	Mains frequency is 60 Hz.	
S.IF	r/w	base 1dP	1700 9892	19784	Enum	*Enum_SIF*		activate system interface
						0	The system bus is deactivated.	
						1	The system bus is activated (fieldbus communication via bus coppler).	
Pr.rd	r/w	base 1dP	1710 9902	19804	Int	0. . . 8191	☐	Addresses of the data that are to be read out of the device via process data (15 values).
Pr.wr	r/w	base 1dP	1730 9922	19844	Int	0. . . 8191	☐	Addresses of the data that are to be written into the device via process data (15 values).

13 othr

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
D.Unt	r	base 1dP	340 8532	17064	Enum	*EnumDUnit*	Effective display unit (can be used for extended Operating Level or display 2)

0	without unit
1	Temperature unit
2	O2 unit
3	%
4	bar
5	mbar
6	Pa
7	kPa
8	psi
9	l
10	l/s
11	l/min
12	Ohm
13	kOhm
14	m
15	A
16	mA
17	V
18	mV
19	kg
20	g
21	t
22	Text of phys. Unit

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
E.1	r/w	base 1dP	310 8502	17004	Enum	*Defect*	Err 1 (internal error) Contact Service.

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Bus.Status	r	base 1dP	1750 9942	19884	Int	0. . . 3 ☐	Busstatus Bit 0 = 1 Error on the HPR-bus Bit 1 = 1 Error on the external fieldbus
E.2	r/w	base 1dP	311 8503	17006	Enum	*Problem*	Err 2 (internal error, resettable) (As a process value via fieldbus interface not writable!)

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
E.3	r/w	base 1dP	329 8521	17042	Enum	*ConfErr*	configuration fault. Typical causes and suggested remedies: Missing or faulty configuration: check interactions in the configuration and parameter settings. (As a process value via fieldbus interface not writable!)

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

13 othr

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
E.4	r/w	base 1dP	328 8520	17040	Enum	*Problem*	Hardware fault.Cause: Code number and hardware are not identical. Remedy: Contact Service. (As a process value via fieldbus interface not writable!)

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

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
FbF.1	r/w	base 1dP	312 8504	17008	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!)

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.	

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Sht.1	r/w	base 1dP	313 8505	17010	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!)

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
POL.1	r/w	base 1dP	314 8506	17012	Enum	*Polarity*	Incorrect polarity at input INP1. Suggested remedy: reverse the polarity at INP1. (As a process value via fieldbus interface not writable!)

0	No fault, resetting of the incorrect polarity alarm possible (Reset).
1	An incorrect polarity fault has occurred and has been stored.
2	Incorrect polarity. The wiring of the input circuit is not correct.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
FbF.2	r/w	base 1dP	315 8507	17014	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!)

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.	

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Sht.2	r/w	base 1dP	316 8508	17016	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!)

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.	

13 othr

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
POL.2	r/w	base 1dP	317 8509	17018	Enum	*Polarity*	Incorrect polarity at input INP2. Suggested remedy: reverse the polarity at INP2. (As a process value via fieldbus interface not writable!)

0	No fault, resetting of the incorrect polarity alarm possible (Reset).
1	An incorrect polarity fault has occurred and has been stored.
2	Incorrect polarity. The wiring of the input circuit is not correct.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Err.F	r/w	base 1dP	330 8522	17044	Enum	*FFail*	Frequency fault. Typical causes and remedies: Frequency too high (reduce the frequency) (As a process value via fieldbus interface not writable!)

0	No fault or reset of the frequency fault alarm exists (Reset).
1	A frequency fault has occurred and has been stored; the fault is no longer present. The operator must acknowledge the error message in order to delete it from the error list.
2	Frequency fault: The applied frequency is too high.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.1	r/w	base 1dP	323 8515	17030	Enum	*Limit*	Limit value 1 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)

0	No fault, resetting of the limit value alarm possible (Reset).
1	The limit value has been exceeded, and the fault has been stored.
2	The limit value has been exceeded; the monitored (measurement) value is outside the set limits.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.2	r/w	base 1dP	324 8516	17032	Enum	*Limit*	Limit value 2 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)

0	No fault, resetting of the limit value alarm possible (Reset).
1	The limit value has been exceeded, and the fault has been stored.
2	The limit value has been exceeded; the monitored (measurement) value is outside the set limits.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.3	r/w	base 1dP	325 8517	17034	Enum	*Limit*	Limit value 3 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)

0	No fault, resetting of the limit value alarm possible (Reset).
1	The limit value has been exceeded, and the fault has been stored.
2	The limit value has been exceeded; the monitored (measurement) value is outside the set limits.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
InF.1	r/w	base 1dP	326 8518	17036	Enum	*Time*	Message from the operating hours counter that the preset no. of hours for this maintenance period has been reached. The op-hours counter for the maintenance period is reset when this message is acknowledged. Counting the operating hours is used for preventive maintenance. - Acknowledge the error to reset it. (As a process value via fieldbus interface not writable!)

0	No signal, resetting of the time limit signal possible (Reset).
1	Operating hours - limit value (maintenance period) reached: please acknowledge.

13 othr

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
InF.2	r/w	base	327	17038	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	8519				

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.

14 Out.1

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
O.Act	r/w	base	920	18224	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	9112				

0	direct / normally open
1	inverse / normally closed

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.1	r/w	base	923	18230	Enum	*Enum_Lim1*	Output function: Signal limit 1
		1dP	9115				

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.2	r/w	base	924	18232	Enum	*Enum_Lim2*	Output function: Signal limit 2
		1dP	9116				

0	not active
1	The output is activated by an alarm from limit value 2.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.3	r/w	base	925	18234	Enum	*Enum_Lim3*	Output function: Signal limit 3
		1dP	9117				

0	not active
1	The output is activated by an alarm from limit value 3.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Cnt	r/w	base	926	18236	Enum	*Enum_Cnt*	Output function: Signal counter end
		1dP	9118				

0	not active
1	The output is activated at the end of the count.

14 Out.1

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
FAi.1	r/w	base 1dP	932 9124	18248	Enum	*Enum_FAi1*	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
						0	not active
						1	The output sends the error message 'INP1 fault'.
FAi.2	r/w	base 1dP	933 9125	18250	Enum	*Enum_FAi2*	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
						0	not active
						1	The output sends the error message 'INP2 fault'.
FAi.F	r/w	base 1dP	934 9126	18252	Enum	*Enum_FAiF*	Output function: Signal frequency fault. The 'Fail' signal is generated if a fault occurs at the counter/frequency input.
						0	not active
						1	The output is activated by the 'Frequency fault' error message.
InF.1	r/w	base 1dP	935 9127	18254	Enum	*Enum_Inf1*	Output function: Signal Inf.1 status. The Inf.1 signal is generated, when the preset value of the operating hours counter has been reached.
						0	not active
						1	The output is activated by the status message 'Inf.1'.
InF.2	r/w	base 1dP	936 9128	18256	Enum	*Enum_Inf2*	Output function: Signal Inf.2 status. The Inf.2 signal is generated, when the preset value of the switching cycle counter has been reached.
						0	Not active
						1	The output is activated by the status message 'Inf.2'.
Sb.Er	r/w	base 1dP	937 9129	18258	Enum	*Enum_SbErr*	Signal: error in internal system bus communication. The output is set when an error occurs in the internal system bus communication, or no communication is executed with the bus coupler.
						0	not active
						1	The output is activated by a system bus failure.

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Out1	r	base 1dP	940 9132	18264	Enum	*Enum_Ausgang*	Status of the digital output
						0	off
						1	on

14 Out.1

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
F.Do1	r/w	base 1dP	941 9133	18266	Enum	*Enum_Ausgang*	Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).

0	off
1	on

15 Out.2

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
O.Act	r/w	base 1dP	970 9162	18324	Enum	*Enum_OAct*	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.

0	direct / normally open
1	inverse / normally closed

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.1	r/w	base 1dP	973 9165	18330	Enum	*Enum_Lim1*	Output function: Signal limit 1

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.2	r/w	base 1dP	974 9166	18332	Enum	*Enum_Lim2*	Output function: Signal limit 2

0	not active
1	The output is activated by an alarm from limit value 2.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.3	r/w	base 1dP	975 9167	18334	Enum	*Enum_Lim3*	Output function: Signal limit 3

0	not active
1	The output is activated by an alarm from limit value 3.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Cnt	r/w	base 1dP	976 9168	18336	Enum	*Enum_Cnt*	Output function: Signal counter end

0	not active
1	The output is activated at the end of the count.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
FAi.1	r/w	base 1dP	982 9174	18348	Enum	*Enum_FAi1*	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.

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

15 Out.2

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
FAi.2	r/w	base 1dP	983 9175	18350	Enum	*Enum_FAi2*	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
						0	not active
						1	The output sends the error message 'INP2 fault'.
FAi.F	r/w	base 1dP	984 9176	18352	Enum	*Enum_FAiF*	Output function: Signal frequency fault. The 'Fail' signal is generated if a fault occurs at the counter/frequency input.
						0	not active
						1	The output is activated by the 'Frequency fault' error message.
InF.1	r/w	base 1dP	985 9177	18354	Enum	*Enum_Inf1*	Output function: Signal Inf.1 status. The Inf.1 signal is generated, when the preset value of the operating hours counter has been reached.
						0	not active
						1	The output is activated by the status message 'Inf.1'.
InF.2	r/w	base 1dP	986 9178	18356	Enum	*Enum_Inf2*	Output function: Signal Inf.2 status. The Inf.2 signal is generated, when the preset value of the switching cycle counter has been reached.
						0	Not active
						1	The output is activated by the status message 'Inf.2'.
Sb.Er	r/w	base 1dP	987 9179	18358	Enum	*Enum_SbErr*	Signal: error in internal system bus communication. The output is set when an error occurs in the internal system bus communication, or no communication is executed with the bus coupler.
						0	not active
						1	The output is activated by a system bus failure.

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Out2	r	base 1dP	990 9182	18364	Enum	*Enum_Ausgang*	Status of the digital output
						0	off
						1	on
F.Do2	r/w	base 1dP	991 9183	18366	Enum	*Enum_Ausgang*	Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
						0	off
						1	on

16 Out.3

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
O.tYP	r/w	base 1dP	1035 9227	18454	Enum	*Enum_OtYP*		Signal type selection OUT

0	Relay / logic
1	0 ... 20 mA continuous
2	4 ... 20 mA continuous
3	0...10 V continuous
4	2...10 V continuous
5	transmitter supply

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
O.Act	r/w	base 1dP	1020 9212	18424	Enum	*Enum_OAct*		Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.

0	direct / normally open
1	inverse / normally closed

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Out.0	r/w	base 1dP	1036 9228	18456	Float	-1999. . . 9999	☐	Lower scaling limit of the analog output (corresponds to 0%). If current and voltage signals are used as output values, the display can be scaled to the output value in the Parameter Level. The output value of the lower scaling point is indicated in the respective electrical unit (mA / V).
Out.1	r/w	base 1dP	1037 9229	18458	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).
Out.L	r/w	base 1dP	1050 9242	18484	Float	-1999. . . 9999	☐	Input value for lower output frequency
Frq.L	r/w	base 1dP	1051 9243	18486	Float	0. . . 9999	☐	lower output frequency [Hz]
Out.H	r/w	base 1dP	1052 9244	18488	Float	-1999. . . 9999	☐	Input value for upper output frequency
Frq.H	r/w	base 1dP	1053 9245	18490	Float	0. . . 9999	☐	upper output frequency [Hz]
O.Src	r/w	base 1dP	1038 9230	18460	Enum	*Enum_OSrc*		Signal source of the analog output (visible not with all output signal types O.TYP).

0	not used
3	process value
7	measured value INP1
8	measured value INP2
10	The measurement value of the counter/frequency input is supplied.

16 Out.3

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
O.FAI	r/w	base 1dP	1039 9231	18462	Enum	*Enum_OFail*	fail behaviour

0	upscale
1	downscale

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.1	r/w	base 1dP	1023 9215	18430	Enum	*Enum_Lim1*	Output function: Signal limit 1

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.2	r/w	base 1dP	1024 9216	18432	Enum	*Enum_Lim2*	Output function: Signal limit 2

0	not active
1	The output is activated by an alarm from limit value 2.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.3	r/w	base 1dP	1025 9217	18434	Enum	*Enum_Lim3*	Output function: Signal limit 3

0	not active
1	The output is activated by an alarm from limit value 3.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Cnt	r/w	base 1dP	1026 9218	18436	Enum	*Enum_Cnt*	Output function: Signal counter end

0	not active
1	The output is activated at the end of the count.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
FAi.1	r/w	base 1dP	1032 9224	18448	Enum	*Enum_FAi1*	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
FAi.2	r/w	base 1dP	1033 9225	18450	Enum	*Enum_FAi2*	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
FAi.F	r/w	base 1dP	1034 9226	18452	Enum	*Enum_FAiF*	Output function: Signal frequency fault. The 'Fail' signal is generated if a fault occurs at the counter/frequency input.

0	not active
1	The output is activated by the 'Frequency fault' error message.

16 Out.3

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
InF.1	r/w	base 1dP	1055 9247	18494	Enum	*Enum_Inf1*	Output function: Signal Inf.1 status. The Inf.1 signal is generated, when the preset value of the operating hours counter has been reached.
						0	not active
						1	The output is activated by the status message 'Inf.1'.
InF.2	r/w	base 1dP	1056 9248	18496	Enum	*Enum_Inf2*	Output function: Signal Inf.2 status. The Inf.2 signal is generated, when the preset value of the switching cycle counter has been reached.
						0	Not active
						1	The output is activated by the status message 'Inf.2'.
Sb.Er	r/w	base 1dP	1057 9249	18498	Enum	*Enum_SbErr*	Signal: error in internal system bus communication. The output is set when an error occurs in the internal system bus communication, or no communication is executed with the bus coupler.
						0	not active
						1	The output is activated by a system bus failure.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Out3	r	base 1dP	1040 9232	18464	Enum	*Enum_Ausgang*	Status of the digital output
						0	off
						1	on
F.Do3	r/w	base 1dP	1041 9233	18466	Enum	*Enum_Ausgang*	Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
						0	off
						1	on
Out.3	r	base 1dP	1043 9235	18470	Float	-1999. . . 9999 ☐	Value of the analog output [%]
F.Ou3	r/w	base 1dP	1042 9234	18468	Float	-1999. . . 9999 ☐	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.)
Ou.3P	r	base 1dP	1044 9236	18472	Float	-1999. . . 9999 ☐	Value of the analog output [mA/V/Hz]

Table Of Contents

1 Cntr

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
SP.Fn	r/w	base 1dP	820 9012	18024	Enum	*Enum_SPFN*	Basic configuration for setpoint processing, e.g. 'setpoint controller switchable to external setpoint'. Configuration of special, controller-dependent setpoint functions.

Value	Description
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.
2	Timer, operating mode 1 (bandwidth monitoring, switch-off at the end). After timer start, the controller lines out at the defined setpoint. The timer time (t.SP) runs when the process value enters the adjusted band around the setpoint (x = SP ± b.ti). When the timer has elapsed, the controller is switched to Y2 (= fixed positioning value) and the lower display alternates between 'End' and the setpoint.
3	Timer, operating mode 2 (bandwidth monitoring, pause at the end). After timer start, the controller lines out at the defined setpoint. The timer time (t.SP) runs when the process value enters the adjusted band around the setpoint (x = SP ± b.ti). When the timer has elapsed, the controller continues with setpoint SP, and the lower display alternates between 'End' and the setpoint.
4	Timer, operating mode 3 (switch-off at the end). After timer start, the controller lines out at the defined setpoint. The timer time (t.SP) runs immediately after switchover. When the timer has elapsed, the controller is switched to Y2 (= fixed positioning value) and the lower display alternates between 'End' and the setpoint.
5	Timer, operating mode 4 (pause at the end). After timer start, the controller lines out at the defined setpoint. The timer time (t.SP) runs immediately after switchover. When the timer has elapsed, the controller continues with setpoint SP, and the lower display alternates between 'End' and the setpoint.
6	Timer, operating mode 5 (delayed start). The timer starts immediately. The controller continues with Y2 (= fixes positioning value). When the timer (t.SP) has elapsed, the controller switches over to the adjusted setpoint.
7	Timer, operating mode 6 (setpoint switchover). After switching over from SP to SP.2, the controller lines out at SP.2. The time (t.SP) runs when the process value enters the adjusted band around the setpoint (x = SP ± b.ti). When the timer has elapsed, the controller switches back to setpoint SP, and the lower display alternates between 'End' and the setpoint.
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
b.ti	r/w	base 1dP	822 9014	18028	Float	0. . . 9999 ☐	Timer tolerance band for operating mode:1 (bandwidth monitoring with switch-off at the end)2 (bandwidth monitoring with pause at the end), and6 (setpoint switchover). The timer runs as long as the process value is within the bandwidth limits (setpoint ± b.ti).

1 Cntr

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
C.tYP	r/w	base 1dP	1262 9454	18908	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.

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
C.Fnc	r/w	base 1dP	1250 9442	18884	Enum	*Enum_CFnc*	Control behaviour (algorithm) referred to output value: e.g. 2- or 3-point controller, signaller, 3-point stepping control.

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.

1 Cntr

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
mAn	r/w	base 1dP	1251 9443	18886	Enum	*Enum_mAn*	Enables the output value to be adjusted in manual operation. If adjustment is not enabled, the output value cannot be changed in manual operation, neither with the front keys nor via the interface.Note: This setting does not affect the auto/manual switchover function.
						0	The output value cannot be changed in manual operation, neither with the front keys nor via the interface.
						1	The output value is to be adjusted in manual operation (see also LOGI/mAn).
C.Act	r/w	base 1dP	1252 9444	18888	Enum	*Enum_CAct*	Operating sense of the controller. Inverse operation (e.g. heating) means increased heat input when the process value falls. Direct operation (e.g. cooling) means increased heat input when the process value increases.
						0	Inverse or opposed-sense response, e.g. heating. The controller output is increased with a falling process value, and decreased with a rising process value.
						1	Direct or same-sense response, e.g. cooling. The controller output is increased with a rising process value, and decreased with a falling process value.
FAIL	r/w	base 1dP	1253 9445	18890	Enum	*Enum_FAIL*	With the sensor break response, the operator determines the instrument's reaction to a sensor break, thus ensuring a safe process condition.
						0	controller outputs switched off
						1	y = parameter Y2 (Caution: fixed parameter Y2, not controller output Y2!). Note for three-point stepping controller: With Y2 < 0.01 CLOSED is set (DY= -100%), with 0.01 =< Y2 =< 99.9 no output is set (DY=0%), with Y2 > 99.9 OPEN is set (DY= +100%). Note for signallers: With Y2 < 0.01 OFF is set, with 0.01 =< Y2 =< 99.9 status keeps unchanged, with Y2 > 99.9 ON is set.
						2	y = mean output. The maximum permissible output can be adjusted with parameter Ym.H. To prevent determination of inadmissible values, mean value formation is only if the control deviation is lower than parameter L.Ym.
rnG.L	r/w	base 1dP	1259 9451	18902	Float	-1999. . . 9999 ☐	Lower limit for the controller's operating range. The control range is independent of the measurement range. Reducing the control range will increase the sensitivity of the self-tuning process.
rnG.H	r/w	base 1dP	1260 9452	18904	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.
Adt0	r/w	base 1dP	1261 9453	18906	Enum	*Enum_Adt0*	Optimization of the switching cycles t1 and t2 for the DED conversion can be disabled here. In order to fine-tune the positioning action, the switching periods are changed by the self-tuning function, if automatic tuning is configured.
						0	The cycle duration is determinated by auto-tuning. Thereby the best controlling results are obtained.
						1	The cycle duration is not determinated by auto-tuning. An oversized cycle duration causes bad control behavior. An undersized cycle duration causes a more frequent switching, which can raise the wearout of mechanical actuators (relay, contactor).

1 Cntr

PArA

Name	r/w	Adr. Integer	real	Typ	Value/off	Description
Pb1	r/w	base 1200 1dP 9392	18784	Float	1. . . 9999 ☐	Proportional band 1 (heating) in engineering unit, e.g. °C. Pb defines the relationship between controller output and control deviation. The smaller Pb is, the stronger is the control action for a given control deviation. If Pb is too large or too small, the control loop will oscillate (hunting).
Pb2	r/w	base 1201 1dP 9393	18786	Float	1. . . 9999 ☐	Proportional band 2 (cooling) in engineering units, e.g. °C. Pb defines the relationship between controller output and control deviation. The smaller Pb is, the stronger is the control action for a given control deviation. If Pb is too large or too small, the control loop will oscillate (hunting).
ti1	r/w	base 1202 1dP 9394	18788	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 1203 1dP 9395	18790	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 1204 1dP 9396	18792	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 1205 1dP 9397	18794	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 1206 1dP 9398	18796	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 1207 1dP 9399	18798	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 1214 1dP 9406	18812	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.

1 Cntr

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
d.SP	r/w	base 1dP	1216 9408	18816	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	1209 9401	18802	Float	0,1. . . 9999	☑	Minimum pulse duration [s]. Used for switching with constant periods. For positioning values that require a shorter pulse than adjusted for 'tp', the output is suppressed, but 'remembered'. The controller continues adding the internal short pulses until a value equal to 'tp' can be output.
tt	r/w	base 1dP	1215 9407	18814	Float	3. . . 9999	☐	Travel time of the actuator motor [s]. If no feedback signal is available, the controller calculates the actuator position by means of an integrator and the adjusted motor travel time. For this reason, a precise definition of the motor travel time between min and max (0% and 100%) is important.
Y.Lo	r/w	base 1dP	1218 9410	18820	Float	-105. . . 105	☐	Lower output limit [%] The range is depedant of the type of controller: 2 point controller: 0...ymax+1 3 point controller: -105 ymax-1
Y.Hi	r/w	base 1dP	1219 9411	18822	Float	-105. . . 105	☐	Upper output limit [%] The range is ymin+1 105
Y2	r/w	base 1dP	1217 9409	18818	Float	-100. . . 100	☐	Second positioning value [%]. Activated Y2 = positioner control. Caution: The parameter 'positioning output Y2' must not be confused with the controller output Y2!
Y.0	r/w	base 1dP	1220 9412	18824	Float	-100. . . 100	☐	Offset for die positioning value [%]. This is added to the controller output, and has the most effect with P and PD controllers. (With PID controllers, the effect is compensated by the integral action.) With a control deviation = 0, the P controller generates a control output Y0.
Ym.H	r/w	base 1dP	1221 9413	18826	Float	-100. . . 100	☐	Limit for the mean control output value Ym in case of sensor break [%]. The mean control output value is configurable as the response to sensor break. The maximum mean output value = YmH.
L.Ym	r/w	base 1dP	1222 9414	18828	Float	1. . . 9999	☐	Max. control deviation (xw), at the start of mean value calculation [engineering unit]. When calculating the mean value, data are only taken into account if the control deviation is small enough. 'Lym' is a preset value that determines how precisely the calculated output value is matched to the setpoint.
oFFS	r/w	base 1dP	1224 9416	18832	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.
tEmP	r/w	base 1dP	1236 9428	18856	Float	0. . . 9999	☐	Constant sensor temperature. With O2 measurement, the actual oxygen content is derived from the constant sensor temperature and the EMF (electromotive force in volts) generated by the sensor.Note: A constant sensor temperature is only ensured with heated lambda sensors.

1 Cntr

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
C.InP	r	base 1dP	1302 9494	18988	Float	-1999. . . 9999	☐	process value
Tu2	r	base 1dP	1345 9537	19074	Float	0. . . 9999	☐	'Cooling' delay time of the loop. Tu is calculated by the self-tuning function: It is the time delay before the process reacts significantly. In effect, Tu is a dead time that is determined by the reaction of the process to a change of the control output. It is used for defining controller action.
Vmax2	r	base 1dP	1346 9538	19076	Float	0. . . 9999	☐	Max. rate of change for 'cooling', i.e. the fastest process value increase during self-tuning. Vmax is calculated by the self-tuning function, and is determined by the reaction of the process to a change of the control output. It is used for defining controller action.
Kp2	r	base 1dP	1347 9539	19078	Float	0. . . 9999	☐	Process gain for 'cooling'. For control loops with self-regulation, process gain is the ratio determined by the change of the control output and the resulting permanent change of the process value. Kp is calculated by the self-tuning function, and is used for defining controller action.

1 Cntr

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
St.Cntr	r	base 1dP	1300 9492	18984	Int	0. . . 65535	☐	Status informations of the controller.f.e. switching signals, controller off or informations about selftuning. The controller sratus shows the actual adjustments of the controller.

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

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
diFF	r	base 1dP	1304 9496	18992	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.
Tu1	r	base 1dP	1341 9533	19066	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.
Ypid	r	base 1dP	1303 9495	18990	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.

1 Cntr

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Ada.St	r/w	base 1dP	1350 9542	19084	Enum	*Enum_AdaStart*		Starting / stopping the self-tuning function.After the start signal, the controller waits until the process reaches a stable condition (PIR) before it starts the self-tuning process. Self-tuning can be aborted manually at any time. After a successful self-tuning attempt, the controller automatically resumes normal operation.
						0		'Stop' will abort the self-tuning process, and the controller returns to normal operation with the previous parameter settings.
						1		Start of the self-tuning process is possible during manual or automatic controller operation.
Yman	r/w	base 1dP	1351 9543	19086	Float	-110. . . 110	☐	Absolute preset output value, which is used as output value during manual operation. Caution: With 3-point stepping controllers, Yman (evaluated the same as Dyman) is added to the actual output value as a relative shift.
dYman	r/w	base 1dP	1352 9544	19088	Float	-220. . . 220	☐	Differential preset output value, which is added to the actual output value during manual operation. Negative values reduce the output.
Yinc	r/w	base 1dP	1353 9545	19090	Enum	*Enum_YInc*		Increasing the output value. There are two speeds: 40 s or 10 s for the change from 0 % to 100 %. Note: The 3-point stepping controller translates the increments as UP.
						0		Not active
						1		increment output
Ydec	r/w	base 1dP	1354 9546	19092	Enum	*Enum_YDec*		Decreasing the output value. There are two speeds: 40 s or 10 s for the change from 0 % to 100 %. Note: The 3-point stepping controller translates the increments as DOWN.
						0		Not active
						1		decrement output
SP.EF	r	base 1dP	1301 9493	18986	Float	-1999. . . 9999	☐	Effective setpoint. The value reached at the end of setpoint processing, after taking W2, external setpoint, gradient, boost function, programmer settings, start-up function, and limit functions into account. Comparison with the effective process value leads to the control deviation, from which the necessary controller response is derived.

1 Cntr

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
St.Tune	r	base 1dP	1340 9532	19064	Int	0. . . 65535	☐	Status information during self-tuning, e.g. the actual condition, and possible results, warnings, and error messages.
								Bit 0 Process lined out; 0 = No; 1 = Yes Bit 1 Operating mode 'Self-tuning controller; 0 = Off; 1 = On Bit 2 Result of controller self-tuning; 0 = OK; 1 = Fault Bit 3 - 7 Not used Bit 8 - 11 Result of the 'heating' attempt 0 0 0 0 No message / Attempt still running 0 0 0 1 Successful 0 0 1 0 Successful, with risk of exceeded setpoint 0 0 1 1 Error: Wrong operating sense 0 1 0 0 Error: No response from process 0 1 0 1 Error: Turning point too low 0 1 1 0 Error: Risk of exceeded setpoint 0 1 1 1 Error: Step output too small 1 0 0 0 Error: Setpoint reserve too small Bit 12 - 15 Result of 'cooling' attempt (same as heating attempt)
Vmax1	r	base 1dP	1342 9534	19068	Float	0. . . 9999	☐	Max. rate of change for 'heating', i.e. the fastest process value increase during self-tuning. Vmax is calculated by the self-tuning function, and is determined by the reaction of the process to a change of the control output. It is used for defining controller action.
Kp1	r	base 1dP	1343 9535	19070	Float	0. . . 9999	☐	Process gain for 'heating'. For control loops with self-regulation, process gain is the ratio determined by the change of the control output and the resulting permanent change of the process value. Kp is calculated by the self-tuning function, and is used for defining controller action.

1 Cntr

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Msg2	r	base 1dP	1348 9540	19080	Enum	*Enum_Msg*	The result of self-tuning for 'cooling' indicates whether self-tuning was successful, and with what result.

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

1 Cntr

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Msg1	r	base 1dP	1344 9536	19072	Enum	*Enum_Msg*	The result of self-tuning for 'heating' indicates whether self-tuning was successful, and with what result.

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
YGrw	r/w	base 1dP	1355 9547	19094	Enum	*Enum_YGrwLs*	Gradient of Y-variation 'slow' or 'fast'. Changes the positioning output speed. There are two speeds for output variation: from 0% to 100% in 40s or in 10s.

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

2 InP.1

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
I.Fnc	r/w	base 1dP	270 8462	16924	Enum	*Enum_IFnc*	Selection of the function assigned to the value at INP1, e.g. value at INP1 is the external setpoint.

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

2 InP.1

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
S.tYP	r/w	base 1dP	520 8712	17424	Enum	*Enum_StYP*	Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted

Value	Description
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
25	Special : 0...1600 Ohm
26	Special : 0...160 Ohms
30	Current : 0...20 mA / 4...20 mA
40	0...10V / 2...10V
41	Special -2.5...115 mV
42	Special : -25...1150 mV
43	Special : -25...90 mV
44	Special : -500...500 mV
45	Special : -5...5 V
46	Special : -10...10 V
47	Special : -200...200 mV
50	potentiometer 0...160 Ohm
51	potentiometer 0...450 Ohm
52	potentiometer 0...1600 Ohm
53	potentiometer 0...4500 Ohm

2 InP.1

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
4wir	r/w	base 1dP	523 8715	17430	Enum	*Enum_4wire*		Connection principle for resistive inputs.

0	Normally, resistance and resistance thermometer measurement is in 3-wire connection, whereby the resistance of all leads is equal.
1	With measurement in 4-wire connection, the lead resistance is determined by means of reference measurement.

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
S.Lin	r/w	base 1dP	521 8713	17426	Enum	*Enum_SLin*		Linearization (not adjustable for all sensor types S.tYP). Special linearization. The linearization table can be created with the Engineering Tool. The default characteristic is for KTY 11-6 temperature sensors.

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

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Corr	r/w	base 1dP	265 8457	16914	Enum	*Enum_Corr*		Measured value correction / scaling

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

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.F	r/w	base 1dP	522 8714	17428	Float	-1999. . . 9999	☑	Substitute value in case of a fault. This value is used for calculations, if there is a fault at the input (e.g. FAIL).

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
InL.1	r/w	base 1dP	500 8692	17384	Float	-1999. . . 9999	☐	Input value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the lower scaling point (e.g. 4 mA) is done using the corresponding electrical value.
OuL.1	r/w	base 1dP	501 8693	17386	Float	-1999. . . 9999	☐	Display value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the lower scaling point, e.g. 4 mA is displayed as 2 [pH].
InH.1	r/w	base 1dP	502 8694	17388	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.

2 InP.1

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
OuH.1	r/w	base 1dP	503 8695	17390	Float	-1999. . . 9999	☐	Display value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the upper scaling point, e.g. 20 mA is displayed as 12 [pH].
t.F1	r/w	base 1dP	504 8696	17392	Float	0. . . 999	☐	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.
E.tc1	r/w	base 1dP	506 8698	17396	Float	0. . . 100	☑	External temperature compensation (temperature at the junction of thermocouple/copper lead with external temperature compensation).

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.1r	r	base 1dP	540 8732	17464	Float	-1999. . . 9999	☐	Measurement value before the measurement value correction (unprocessed).
Fail	r	base 1dP	541 8733	17466	Enum	*Enum_InpFail*		Input circuit fault: faulty or incorrectly connected sensor.

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

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.1	r	base 1dP	542 8734	17468	Float	-1999. . . 9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
F.Inp	r/w	base 1dP	543 8735	17470	Float	-1999. . . 9999	☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)

3 InP.2

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
I.Fnc	r/w	base 1dP	266 8458	16916	Enum	*Enum_IFnc*	Selection of the function assigned to the value at INP2, e.g. value at INP2 is the external setpoint.

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

3 InP.2

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
S.tYP	r/w	base 1dP	570 8762	17524	Enum	*Enum_StYP2*	Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted.

Value	Description
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-Pt 10% 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: 32/752 ... 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
25	Special : 0...1,6 kOhm
26	Special : 0...160 Ohm
30	Current : 0...20 mA / 4...20 mA
31	0...50 mA current (AC)
41	Special -2.5...115 mV
42	Special : -25...1150 mV
43	Special : -25...90 mV
44	Special : -500...500 mV
47	Special : -200...200 mV
50	Potentiometer 0...160 Ohm
51	Potentiometer 0...450 Ohm
52	Potentiometer 0...1600 Ohm
53	Potentiometer 0...4500 Ohm

3 InP.2

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
S.Lin	r/w	base 1dP	571 8763	17526	Enum	*Enum_SLin*	Linearization (not adjustable for all sensor types S.tYP). Special linearization. The linearization table can be created with the Engineering Tool. The default characteristic is for KTY 11-6 temperature sensors.

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Corr	r/w	base 1dP	267 8459	16918	Enum	*Enum_Corr*	Measured value correction / scaling

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
In.F	r/w	base 1dP	572 8764	17528	Float	-1999. . . 9999 ☑	Substitute value in case of a fault. This value is used for calculations, if there is a fault at the input (e.g. FAIL).

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
InL.2	r/w	base 1dP	550 8742	17484	Float	-1999. . . 9999 ☐	Input value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the lower scaling point (e.g. 4 mA) is done using the corresponding electrical value.
OuL.2	r/w	base 1dP	551 8743	17486	Float	-1999. . . 9999 ☐	Display value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the lower scaling point, e.g. 4 mA is displayed as 2 [pH].
InH.2	r/w	base 1dP	552 8744	17488	Float	-1999. . . 9999 ☐	Input value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the upper scaling point (e.g. 20 mA) is done using the corresponding electrical value.
OuH.2	r/w	base 1dP	553 8745	17490	Float	-1999. . . 9999 ☐	Display value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the upper scaling point, e.g. 20 mA is displayed as 12 [pH].
t.F2	r/w	base 1dP	554 8746	17492	Float	0. . . 999 ☐	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.

3 InP.2

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
E.tc2	r/w	base 1dP	556 8748	17496	Float	0. . . 100	☑	External temperature compensation (temperature at the junction of thermocouple/copper lead with external temperature compensation).

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.2	r	base 1dP	590 8782	17564	Float	-1999. . . 9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
Fail	r	base 1dP	591 8783	17566	Enum	*Enum_InpFail*		Input circuit fault: faulty or incorrectly connected sensor.

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

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.2r	r	base 1dP	592 8784	17568	Float	-1999. . . 9999	☐	Measurement value before the measurement value correction (unprocessed).
F.Inp	r/w	base 1dP	593 8785	17570	Float	-1999. . . 9999	☐	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)

4 Lim

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Fnc.1	r/w	base 1dP	670 8862	17724	Enum	*Enum_Fcn*		Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.

0	No limit value monitoring.
1	measured value monitoring. The alarm signal is generated, if the limit is exceeded. If the measured value is within the limits (including hysteresis) again, this alarm signal is resetted.
2	Measured value monitoring + alarm status latch. An alarm signal is generated, if the limit is exceeded. A latched alarm signal remains latched until it is manually resetted.

4 Lim

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Src.1	r/w	base 1dP	672 8864	17728	Enum	*Enum_Src*	Source for limit value. Selection of which value is to be monitored.

0	Process value = absolute alarm
1	control deviation xw (process value - set-point) = relative alarm Note: Monitoring with the effective set-point Weff. For example using a ramp it is the changing set-point, not the target set-point of the ramp.
2	Control deviation Xw (= relative alarm) with suppression during start-up and setpoint changes. Limit value monitoring is continued as soon as the control deviation comes within the alarm limits again, at the latest after 10 * Tn.
3	Measured value of the analog input INP1.
4	Measured value of the analog input INP2.
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)
11	Control deviation Xw (= relative alarm) with suppression during start-up and setpoint change. Limit value monitoring is continued as soon as the control deviation comes within the alarm limits again.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
HC.AL	r/w	base 1dP	620 8812	17624	Enum	*Enum_HCAL*	Activation of alarm heat current function. Either overload or break can be monitored, overload = current I > heat current limit, or break = current I < heat current limit. Short circuit is monitored in both cases.

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

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
LP.AL	r/w	base 1dP	1258 9450	18900	Enum	*Enum_LPAL*	Monitoring of control loop interruption (not possible with 3-point stepping controller, not possible with signaller)

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

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
L.1	r/w	base 1dP	650 8842	17684	Float	-1999. . . 9999	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
H.1	r/w	base 1dP	651 8843	17686	Float	-1999. . . 9999	☑	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.
HYS.1	r/w	base 1dP	652 8844	17688	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.

4 Lim

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
HC.A	r/w	base 1dP	600 8792	17584	Float	-1999. . . 9999	☐	Heating current monitoring limit [A]. Depending on configuration, and apart from short-circuit monitoring, an overload test checks whether the heating current is above the adjusted current limit, or below the limit when the heating is switched off. The heating current is measured by means of a current transformer (accessory), and the current range can be adapted.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
St.HC	r	base 1dP	640 8832	17664	Int	0. . . 3	☐	Status of the heating current alarm. Displayable are heating current short-circuit and/or heating current alarm. Depending on configuration, the heating current alarm is either an interruption of heating current (I < limit value) or heating current overload (I > limit value).
HC	r	base 1dP	641 8833	17666	Float	-1999. . . 9999	☐	Measured heating current [A]. Apart from the short circuit test, and depending on configuration, an overcurrent test (current I > heating current limit) and an open circuit test (current I < heating current limit) is executed. The heating current is measured by means of a (separate) current transformer, whereby the input range can be scaled.
SSr	r	base 1dP	642 8834	17668	Float	-1999. . . 9999	☐	Measured current with SSr [A]. The heating current (SSR) is short circuited, if there is a current flow even though the controller output is switched off.Suggested remedy: check heating current circuit, replace solid-state relay if necessary.
St.Lim	r	base 1dP	690 8882	17764	Enum	*Enum_LimStatus*		Limit value status: No alarm present or stored.

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 1dP	720 8912	17824	Enum	*Enum_Fcn*		Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.

0	No limit value monitoring.
1	measured value monitoring. The alarm signal is generated, if the limit is exceeded. If the measured value is within the limits (including hysteresis) again, this alarm signal is resetted.
2	Measured value monitoring + alarm status latch. An alarm signal is generated, if the limit is exceeded. A latched alarm signal remains latched until it is manually resetted.

5 Lim2

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Src.2	r/w	base 1dP	721 8913	17826	Enum	*Enum_Src*	Source for limit value. Selection of which value is to be monitored.

0	Process value = absolute alarm
1	control deviation xw (process value - set-point) = relative alarm Note: Monitoring with the effective set-point Weff. For example using a ramp it is the changing set-point, not the target set-point of the ramp.
2	Control deviation Xw (= relative alarm) with suppression during start-up and setpoint changes. Limit value monitoring is continued as soon as the control deviation comes within the alarm limits again, at the latest after 10 * Tn.
3	Measured value of the analog input INP1.
4	Measured value of the analog input INP2.
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)
11	Control deviation Xw (= relative alarm) with suppression during start-up and setpoint change. Limit value monitoring is continued as soon as the control deviation comes within the alarm limits again.

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L.2	r/w	base 1dP	700 8892	17784	Float	-1999. . . 9999	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
H.2	r/w	base 1dP	701 8893	17786	Float	-1999. . . 9999	☑	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.
HYS.2	r/w	base 1dP	702 8894	17788	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.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
St.Lim	r	base 1dP	740 8932	17864	Enum	*Enum_LimStatus*	Limit value status: No alarm present or stored.

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

6 Lim3

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Fnc.3	r/w	base 1dP	770 8962	17924	Enum	*Enum_Fcn*	Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.

Value	Description
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.3	r/w	base 1dP	771 8963	17926	Enum	*Enum_Src*	Source for limit value. Selection of which value is to be monitored.

Value	Description
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.
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)
11	Control deviation Xw (= relative alarm) with suppression during start-up and setpoint change. Limit value monitoring is continued as soon as the control deviation comes within the alarm limits again.

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L.3	r/w	base 1dP	750 8942	17884	Float	-1999. . . 9999	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
H.3	r/w	base 1dP	751 8943	17886	Float	-1999. . . 9999	☑	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.
HYS.3	r/w	base 1dP	752 8944	17888	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.

6 Lim3

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
St.Lim	r	base 1dP	790 8982	17964	Enum	*Enum_LimStatus*	Limit value status: No alarm present or stored.

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

7 LOGI

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
L_r	r/w	base 1dP	421 8613	17226	Enum	*Enum_dInPRail1*	Local / remote switchover (Remote: Adjustment of all values via the front panel is blocked).

0	No function (switchover via interface is possible).
1	Always active.
2	DI1 switches.
5	func switches
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP.2	r/w	base 1dP	422 8614	17228	Enum	*Enum_dInPRail2*	Source of the control signal for activating the second (safety) setpoint (SP.2=) W2. Note: W2 is not restricted by the setpoint limits.

0	No function (switchover via interface is possible).
2	DI1 switches.
5	func switches
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
SP.E	r/w	base 1dP	423 8615	17230	Enum	*Enum_dInPRail1*	Switching between internal set-point an external setpoint SP.E. The external SP.E is either the absolute set-point Wext or the offset to the set-point (dependent on instrument and configuration).

0	No function (switchover via interface is possible).
1	Always active.
2	DI1 switches.
5	func switches
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

7 LOGI

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Y2	r/w	base 1dP	424 8616	17232	Enum	*Enum_dInPRail2*	Source of the control signal for activating the second positioning output Y2. Activated Y2 = positioner control. Caution: The parameter 'positioning output Y2' must not be confused with the controller output Y2!

0	No function (switchover via interface is possible).
2	DI1 switches.
5	func switches
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
mAn	r/w	base 1dP	426 8618	17236	Enum	*Enum_dInPRail1*	Source of the control signal for auto/manual switchover. In the automatic mode, the controller is in charge. In the manual mode, the outputs can be varied independently of the process.

0	No function (switchover via interface is possible).
1	Always active.
2	DI1 switches.
5	func switches
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
C.oFF	r/w	base 1dP	427 8619	17238	Enum	*Enum_dInPRail2*	Source of the control signal for disabling all the controller outputs.Note: Forcing has priority, and remains active; alarm processing also remains active.

0	No function (switchover via interface is possible).
2	DI1 switches.
5	func switches
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Err.r	r/w	base 1dP	429 8621	17242	Enum	*Enum_dInPRail2*	Source of the control signal for resetting all stored entries in the error list (the list contains all error messages and alarms). If an alarm is still present, i.e. the source of trouble has not been remedied, stored alarms cannot be acknowledged (reset).

0	No function (switchover via interface is possible).
2	DI1 switches.
5	func switches
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

7 LOGI

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
P.run	r/w	base 1dP	432 8624	17248	Enum	*Enum_dInPRail2*	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.

Value	Description
0	No function (switchover via interface is possible).
2	DI1 switches.
5	func switches
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
I.ChG	r/w	base 1dP	434 8626	17252	Enum	*Enum_dInPRail2*	Signal source for switching the effective process value between x1 and x2.

Value	Description
0	No function (switchover via interface is possible).
2	DI1 switches.
5	func switches
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
di.Fn	r/w	base 1dP	420 8612	17224	Enum	*Enum_diFn*	Function of digital inputs (valid for all inputs)

Value	Description
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 1dP	450 8642	17284	Int	. . . ☐	Status of the digital inputs or of push-buttons (binary coded). Bit 0: Input di1 Bit 8: Status of Enter key Bit 9: Status of 'Down' key Bit 10: Status of 'Up' key
L-R	r/w	base 1dP	460 8652	17304	Int	0. . . 1 ☐	Remote operation. Remote means that all values can only be adjusted via the interface. Adjustments via the front panel are blocked.
W_W2	r/w	base 1dP	461 8653	17306	Int	0. . . 1 ☐	Signal for activating the second (safety) setpoint (SP.2=) W2. Note: Setpoint W2 is not restricted by the setpoint limits!

7 LOGI

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Wi_We	r/w	base 1dP	462 8654	17308	Int	0. . . 1	☐	Signal for activating the external setpoint value. SP.E is the external setpoint, or dependent on the device and configuration of the setpoint shift.
Y_Y2	r/w	base 1dP	463 8655	17310	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!
A-M	r/w	base 1dP	464 8656	17312	Int	0. . . 1	☐	Signal for activating manual operation. In the manual mode, the controller provides output signals independent of the process.
C.Off	r/w	base 1dP	465 8657	17314	Int	0. . . 1	☐	Signal for disabling all the controller outputs. Note: Forcing has priority; alarm processing remains active.
Err.r	r/w	base 1dP	470 8662	17324	Int	0. . . 1	☐	Signal for resetting the entire error list. The error list contains all errors that are reported, e.g. device faults and limit values. It also contains queued as well as stored errors after their correction. The reset acknowledges all errors, whereby queued errors will reappear after the next error detection (measurement).
SSR.Res	r/w	base 1dP	466 8658	17316	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.
ProG	r/w	base 1dP	467 8659	17318	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.
F.Di	r/w	base 1dP	480 8672	17344	Int	0. . . 1	☐	Forcing of digital inputs. Forcing involves the external operation of at least one input. The instrument takes over this value as input value (preset value for inputs from a superordinate system, e.g. for a function test.)
						Bit 0 Forcing of digital Input 1		
I.Chg	r/w	base 1dP	471 8663	17326	Int	0. . . 1	☐	Signal for switching the effective process value between x1 and x2. The positiv signal (=1) activates x2.
Func	r/w	base 1dP	476 8668	17336	Int	0. . . 1	☐	OR-linking of several control signals.

8 ohnE

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
B.BedEbe	r/w	base 1dP	1839 10031	20062	Int	0. . . 255	☐	Operating Levels (Parameter, Configuration, and Calibration) can be disabled here.

8 ohnE

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
B.Bedien	r/w	base 1dP	1838 10030	20060	Int	0. . . 255	☐	Used to disable various operating functions (e.g. access to the extended Operating Level).
C.Sch	r/w	base 1dP	1801 9993	19986	Float	1. . . 9999999	☑	Data defines the number of switching cycles for which the message InF.2 is generated.
C.Std	r/w	base 1dP	1800 9992	19984	Float	1. . . 9999999	☑	Data defines the number of operating hours for which the message InF.1 is generated.
D.ForcIn	r/w	base 1dP	1803 9995	19990	Int	0. . . 255	☐	The data defines the inputs to be forced: Bit 0 analog input 1 Bit 1 analog input 2 Bit 2 not used Bit 3 not used Bit 4 digital input 1 Bit 5 not used Bit 6 not used Bit 7 not used
D.ForcOut	r/w	base 1dP	1804 9996	19992	Int	0. . . 255	☐	The data defines the outputs to be forced. Bit 0 output 1 Bit 1 output 2 Bit 2 output 3 Bit 3 not used Bit 4 not used Bit 5 not used Bit 6 not used Bit 7 not used
Dis2	r/w	base 1dP	1848 10040	20080	Int	256. . . 8190	☐	Datum to be shown in display 2. The basic address of the datum that is to be displayed must be entered.
EOP1	r/w	base 1dP	1840 10032	20064	Int	256. . . 8190	☐	1st datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP2	r/w	base 1dP	1841 10033	20066	Int	256. . . 8190	☐	2nd datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP3	r/w	base 1dP	1842 10034	20068	Int	256. . . 8190	☐	3rd datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP4	r/w	base 1dP	1843 10035	20070	Int	256. . . 8190	☐	4th datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP5	r/w	base 1dP	1844 10036	20072	Int	256. . . 8190	☐	5th datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP6	r/w	base 1dP	1845 10037	20074	Int	256. . . 8190	☐	6th datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.

8 ohnE

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
EOP7	r/w	base 1dP	1846 10038	20076	Int	256. . . 8190	☐	7th datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP8	r/w	base 1dP	1847 10039	20078	Int	256. . . 8190	☐	8th datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
In.1	r/w	base 1dP	1861 10053	20106	Float	0. . . 2	☐	Input 1 for measurement value 1 (to Output 1 for display value 1). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.10	r/w	base 1dP	1879 10071	20142	Float	0. . . 2	☑	Input 10 for measurement value 10 (to Output 10 for display value 10). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.11	r/w	base 1dP	1881 10073	20146	Float	0. . . 2	☑	Input 11 for measurement value 11 (to Output 11 for display value 11). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.12	r/w	base 1dP	1883 10075	20150	Float	0. . . 2	☑	Input 12 for measurement value 12 (to Output 12 for display value 12). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.13	r/w	base 1dP	1885 10077	20154	Float	0. . . 2	☑	Input 13 for measurement value 13 (to Output 13 for display value 13). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.14	r/w	base 1dP	1887 10079	20158	Float	0. . . 2	☑	Input 14 for measurement value 14 (to Output 14 for display value 14). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.15	r/w	base 1dP	1889 10081	20162	Float	0. . . 2	☑	Input 15 for measurement value 15 (to Output 15 for display value 15). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.16	r/w	base 1dP	1891 10083	20166	Float	0. . . 2	☑	Input 16 for measurement value 16 (to Output 16 for display value 16). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.2	r/w	base 1dP	1863 10055	20110	Float	0. . . 2	☐	Input 2 for measurement value 2 (to Output 2 for display value 2). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.

8 ohnE

ConF

Name	r/w	Adr. Integer	real	Typ	Value/off	Description
In.3	r/w	base 1865 1dP 10057	20114	Float	0. . . 2 ☑	Input 3 for measurement value 3 (to Output 3 for display value 3). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.4	r/w	base 1867 1dP 10059	20118	Float	0. . . 2 ☑	Input 4 for measurement value 4 (to Output 4 for display value 4). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.5	r/w	base 1869 1dP 10061	20122	Float	0. . . 2 ☑	Input 5 for measurement value 5 (to Output 5 for display value 5). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.6	r/w	base 1871 1dP 10063	20126	Float	0. . . 2 ☑	Input 6 for measurement value 6 (to Output 6 for display value 6). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.7	r/w	base 1873 1dP 10065	20130	Float	0. . . 2 ☑	Input 7 for measurement value 7 (to Output 7 for display value 7). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.8	r/w	base 1875 1dP 10067	20134	Float	0. . . 2 ☑	Input 8 for measurement value 8 (to Output 8 for display value 8). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.9	r/w	base 1877 1dP 10069	20138	Float	0. . . 2 ☑	Input 9 for measurement value 9 (to Output 9 for display value 9). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.1	r/w	base 1862 1dP 10054	20108	Float	0. . . 2 ☐	Output 1 for display value 1 (to Input 1 for measurement value 1). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.10	r/w	base 1880 1dP 10072	20144	Float	0. . . 2 ☑	Output 10 for display value 10 (to Input 10 for measurement value 10). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.11	r/w	base 1882 1dP 10074	20148	Float	0. . . 2 ☑	Output 11 for display value 11 (to Input 11 for measurement value 11). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.

8 ohnE

• ConF

Name	r/w	Adr. Integer	real	Typ	Value/off		Description
Ou.12	r/w	base 1884 1dP 10076	20152	Float	0. . . 2	☑	Output 12 for display value 12 (to Input 12 for measurement value 12). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.13	r/w	base 1886 1dP 10078	20156	Float	0. . . 2	☑	Output 13 for display value 13 (to Input 13 for measurement value 13). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.14	r/w	base 1888 1dP 10080	20160	Float	0. . . 2	☑	Output 14 for display value 14 (to Input 14 for measurement value 14). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.15	r/w	base 1890 1dP 10082	20164	Float	0. . . 2	☑	Output 15 for display value 15 (to Input 15 for measurement value 15). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.16	r/w	base 1892 1dP 10084	20168	Float	0. . . 2	☑	Output 16 for display value 16 (to Input 16 for measurement value 16). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.2	r/w	base 1864 1dP 10056	20112	Float	0. . . 2	☐	Output 2 for display value 2 (to Input 2 for measurement value 2). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.3	r/w	base 1866 1dP 10058	20116	Float	0. . . 2	☑	Output 3 for display value 3 (to Input 3 for measurement value 3). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.4	r/w	base 1868 1dP 10060	20120	Float	0. . . 2	☑	Output 4 for display value 4 (to Input 4 for measurement value 4). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.5	r/w	base 1870 1dP 10062	20124	Float	0. . . 2	☑	Output 5 for display value 5 (to Input 5 for measurement value 5). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.6	r/w	base 1872 1dP 10064	20128	Float	0. . . 2	☑	Output 6 for display value 6 (to Input 6 for measurement value 6). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.

8 ohnE

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Ou.7	r/w	base 1dP	1874 10066	20132	Float	0. . . 2	☑	Output 7 for display value 7 (to Input 7 for measurement value 7). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.8	r/w	base 1dP	1876 10068	20136	Float	0. . . 2	☑	Output 8 for display value 8 (to Input 8 for measurement value 8). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.9	r/w	base 1dP	1878 10070	20140	Float	0. . . 2	☑	Output 9 for display value 9 (to Input 9 for measurement value 9). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
PASS	r/w	base 1dP	1850 10042	20084	Int	0. . . 9999	☑	Password. 4-digit number for the password-protected access to blocked operating functions such as e.g. the Parameter Level.
T.Dis2	r/w	base 1dP	1851 10043	20086	Text	. . .	☐	This address contains 5 bytes for the text that is to appear in Display 2. No text: 1st byte 0x00.
U.LinT	r/w	base 1dP	1860 10052	20104	Enum	*Enum_Unit*		Engineering unit of linearization table (temperature).

0	without unit
1	°C
2	°F
3	K

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
V.Mask	r/w	base 1dP	1810 10002	20004	Int	0. . . 255	☐	Definition of the visibility templates.The templates define the configurations and parameters displayed for operation (contents on request).

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Conf	r/w	base 1dP	256 8448	16896	Int	0. . . 2	☐	Start/Stop and abortion of the configuration mode 0 = End of configuration 1 = Start of configuration 2 = Abort configuration
Pb1	r/w	base 1dP	81 8273	16546	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).

8 ohnE

PArA

Name	r/w	Adr. Integer	real	Typ	Value/off		Description
SP.01	r/w	base 92 1dP 8284	16568	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.
Pb2	r/w	base 82 1dP 8274	16548	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).
Pt.01	r/w	base 93 1dP 8285	16570	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.
SP.02	r/w	base 94 1dP 8286	16572	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.
SP.2	r/w	base 79 1dP 8271	16542	Float	-1999. . . 9999	☐	Second (safety) setpoint. Ramp function as with other setpoints (effective, external). However, SP2 is not restricted by the setpoint limits.
ti1	r/w	base 83 1dP 8275	16550	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.
Pt.02	r/w	base 95 1dP 8287	16574	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.
ti2	r/w	base 84 1dP 8276	16552	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.
SP.03	r/w	base 96 1dP 8288	16576	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.
t.SP	r/w	base 80 1dP 8272	16544	Float	0. . . 9999	☐	The timer (preset) value is entered in minutes with one decimal digit (0,1 minute = 6 seconds). With an activated timer, the preset value is displayed automatically in the extended Operating Level, where it can be changed by means of the parameter t.ti.
td1	r/w	base 85 1dP 8277	16554	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.

8 ohnE

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Pt.03	r/w	base 1dP	97 8289	16578	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.
td2	r/w	base 1dP	86 8278	16556	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.
SP.04	r/w	base 1dP	98 8290	16580	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.
t1	r/w	base 1dP	87 8279	16558	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%).
Pt.04	r/w	base 1dP	99 8291	16582	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.
t2	r/w	base 1dP	88 8280	16560	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%).
HC.A	r/w	base 1dP	72 8264	16528	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.
Y.0	r/w	base 1dP	89 8281	16562	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.
oFFS	r/w	base 1dP	90 8282	16564	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.
tEmP	r/w	base 1dP	91 8283	16566	Float	0. . . 9999	☐	Constant sensor temperature. With O2 measurement, the actual oxygen content is derived from the constant sensor temperature and the EMF (electromotive force in volts) generated by the sensor.Note: A constant sensor temperature is only ensured with heated lambda sensors.

8 ohnE

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
C.InP	r	base 1dP	39 8231	16462	Float	-1999. . . 9999	☐	process value
CAH	r	base 1dP	390 8582	17164	Long	0. . .	☐	Total operating hours. Count starts with the first switch-on. Internal test routine. Is stored and displayed not more than once per hour.
CPH	r	base 1dP	394 8586	17172	Long	0. . .	☐	Operating hours of the current maintenance period. Internal test routine. Is stored and displayed not more than once per hour. Reset when the time limit message is acknowledged.
Diag	r	base 1dP	382 8574	17148	Int	0. . . 255	☐	Result of diagnosis. Any faults detected during the self-test for data, RAM, processor, and EEPROM, as well as an exceeded count for the operating hours (maintenance period) and no. of switching cycles (maintenance period) are stored. Can be reset by acknowledgement.
EE.Ver	r	base 1dP	381 8573	17146	Int	0. . . 0	☐	EEPROM version
Id.NrH	r	base 1dP	370 8562	17124	Int	0. . . 0	☐	More significant part of the device Ident number.
Id.NrL	r	base 1dP	371 8563	17126	Int	0. . . 0	☐	Less significant part of the device Ident number.
Id.NrZ	r	base 1dP	372 8564	17128	Int	0. . . 0	☐	Sequential Ident number of the device.
Int.Tmp	r	base 1dP	380 8572	17144	Int	0. . . 0	☐	Max. measured operating temperature. Internal test routine.
Oem.NrH	r	base 1dP	373 8565	17130	Int	0. . . 0	☐	More significant part of the device OEM no.
Oem.NrL	r	base 1dP	374 8566	17132	Int	0. . . 0	☐	Less significant part of the device OEM no.
SAO1	r	base 1dP	391 8583	17166	Long	0. . .	☐	Total number of switching cycles of OUT1. Internal test routine that is stored and displayed not more than once per hour.
SAO2	r	base 1dP	392 8584	17168	Long	0. . .	☐	Total number of switching cycles of OUT2. Internal test routine that is stored and displayed not more than once per hour.
SAO3	r	base 1dP	393 8585	17170	Long	0. . .	☐	Total number of switching cycles of OUT3. Internal test routine that is stored and displayed not more than once per hour.

8 ohnE

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
SPO1	r/w	base 1dP	395 8587	17174	Long	0. . .	☐	Switching cycles of OUT1 during the present maintenance period. Internal test routine that is stored and displayed not more than once per hour. Resetting is done by acknowledging the switching cycle message.
SPO2	r/w	base 1dP	396 8588	17176	Long	0. . .	☐	Switching cycles of OUT2 during the present maintenance period. Internal test routine that is stored and displayed not more than once per hour. Resetting is done by acknowledging the switching cycle message.
SPO3	r/w	base 1dP	397 8589	17178	Long	0. . .	☐	Switching cycles of OUT3 during the present maintenance period. Internal test routine that is stored and displayed not more than once per hour. Resetting is done by acknowledging the switching cycle message.
Sw.Nr	r	base 1dP	375 8567	17134	BCD	0. . . 0	☐	Digits 7 to 12 of the software order number.
T.CodeNr	r	base 1dP	360 8552	17104	Text	0. . . 0	☐	15-digit order number of the device.
UPD	r/w	base 1dP	257 8449	16898	Enum	*Enum_Aenderungsflag*		Status message indicating that parameter / configuration have been changed via the front panel.

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

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
HC	r	base 1dP	54 8246	16492	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.
L-R	r/w	base 1dP	55 8247	16494	Int	0. . . 1	☐	Remote operation. Remote means that all values can only be adjusted via the interface. Adjustments via the front panel are blocked.
Hw.Opt	r	base 1dP	200 8392	16784	Int	0. . . 65535	☐	Device options: 0000 WXYZ 0000 DCBA Z = 1: Modbus interface Y = 1: System device X = 1: Option 1 W = 1: Option 2 A = 1: OUT1 available B = 1: OUT2 available C = 1: OUT3 available D = 1: OUT3 is an analog output
SP	r/w	base 1dP	44 8236	16472	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).

8 ohnE

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
W_W2	r/w	base 1dP	56 8248	16496	Int	0. . . 1	☐	Signal for activating the second (safety) setpoint (SP.2=) W2. Note: Setpoint W2 is not restricted by the setpoint limits!
SP.d	r/w	base 1dP	45 8237	16474	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.
Sw.Op	r	base 1dP	201 8393	16786	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.
Wi_We	r/w	base 1dP	57 8249	16498	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.
Bed.V	r	base 1dP	202 8394	16788	Int	0. . . 255	☐	Operating version (numeric value). For the correct interaction of E-Tool and device, the software version and operating version must match.

8 ohnE

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
St.Cntr	r	base 1dP	35 8227	16454	Int	0. . . 65535 ☐	Status informations of the controller.f.e. switching signals, controller off or informations about selftuning. The controller sratus shows the actual adjustments of the controller.

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
t.ti	r/w	base 1dP	46 8238	16476	Float	0. . . 9999 ☐	Current timer count in minutes. Count-down timer. The run time is only visible, if the timer is active. Configuration in the extended Operating Level.
Y_Y2	r/w	base 1dP	58 8250	16500	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!
diFF	r	base 1dP	38 8230	16460	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.
Unit	r	base 1dP	203 8395	16790	Int	0. . . 255 ☐	Identification of the device.

8 ohnE

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
A-M	r/w	base 1dP	59 8251	16502	Int	0. . . 1	☐	Signal for activating manual operation. In the manual mode, the controller provides output signals independent of the process.
S.Vers	r	base 1dP	204 8396	16792	Int	100. . . 255	☐	The sub-version number is given as an additional index for precise definition of software version.
C.Off	r/w	base 1dP	60 8252	16504	Int	0. . . 1	☐	Signal for disabling all the controller outputs. Note: Forcing has priority; alarm processing remains active.
St.Ala	r	base 1dP	23 8215	16430	Int	. . .	☐	Alarm status: Bit-wise coded status of the individual alarms, e.g. exceeded limit value or Loop.

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

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Ypid	r	base 1dP	37 8229	16458	Float	-120. . . 120	☐	Output value Ypid is the output signal determined by the controller, and from which the switching pulses for the digital and analog control outputs are calculated. Ypid is also available as an analog signal. e.g. for visualization.
Ada.St	r/w	base 1dP	41 8233	16466	Enum	*Enum_AdaStart*		Starting / stopping the self-tuning function.After the start signal, the controller waits until the process reaches a stable condition (PIR) before it starts the self-tuning process. Self-tuning can be aborted manually at any time. After a successful self-tuning attempt, the controller automatically resumes normal operation.

0	'Stop' will abort the self-tuning process, and the controller returns to normal operation with the previous parameter settings.
1	Start of the self-tuning process is possible during manual or automatic controller operation.

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Err.r	r/w	base 1dP	63 8255	16510	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).

8 ohnE

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
St.Do	r	base 1dP	24 8216	16432	Int	0. . . 15 ☐	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
SSR.Res	r/w	base 1dP	61 8253	16506	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.
St.Ain	r	base 1dP	22 8214	16428	Int	0. . . 127 ☐	Bit-coded status of the analog input (fault, e.g. short circuit)
						Bit 0 Break at Input 1 Bit 1 Reversed polarity at Input 1 Bit 2 Short-circuit at Input 1 Bit 3 Not used Bit 4 Break at Input 2 Bit 5 Reversed polarity at Input 2 Bit 6 Short-circuit at Input 2 Bits 7-15 Not used	
Yman	r/w	base 1dP	40 8232	16464	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.
St.Di	r	base 1dP	25 8217	16434	Int	. . . ☐	Status of the digital inputs or of push-buttons (binary coded).
						Bit 0: Input di1 Bit 8: Status of Enter key Bit 9: Status of 'Down' key Bit 10: Status of 'Up' key	
F.Di	r/w	base 1dP	28 8220	16440	Int	0. . . 1 ☐	Forcing of digital inputs. Forcing involves the external operation of at least one input. The instrument takes over this value as input value (preset value for inputs from a superordinate system, e.g. for a function test.)
						Bit 0 Forcing of digital Input 1	
F.Do	r/w	base 1dP	29 8221	16442	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).
ProG	r/w	base 1dP	62 8254	16508	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.

8 ohnE

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
St.Prog	r	base 1dP	47 8239	16478	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.EF	r	base 1dP	36 8228	16456	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.
SP.Pr	r	base 1dP	48 8240	16480	Float	-1990. . . 9999	☐	The programmer's setpoint is displayed as the effective setpoint while the program is running.
T1.Pr	r	base 1dP	49 8241	16482	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.
I.Chg	r/w	base 1dP	64 8256	16512	Int	0. . . 1	☐	Signal for switching the effective process value between x1 and x2. The positiv signal (=1) activates x2.
T3.Pr	r	base 1dP	50 8242	16484	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	51 8243	16486	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	52 8244	16488	Float	0. . . 9999	☐	Only with running program. The remaining time of the running program segment (without hold times).
Func	r/w	base 1dP	69 8261	16522	Int	0. . . 1	☐	OR-linking of several control signals.

8 ohnE

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
SG.Pr	r	base 1dP	53 8245	16490	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.

9 ohnE1

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
T.Dis2	r/w	base 1dP	910 9102	18204	Text	0. . . 0	☐	This address contains 5 bytes for the text that is to appear in Display 2. No text: 1st byte 0x00.

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
L.1	r/w	base 1dP	73 8265	16530	Float	-1999. . . 9999	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
H.1	r/w	base 1dP	74 8266	16532	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.
t.F1	r/w	base 1dP	70 8262	16524	Float	0. . . 999	☐	Filter time constant [s]. Every input is fitted with a digital (software) low-pass filter for suppressing process-related disturbances on the input leads. Higher filter settings improve the suppression, but increase the delay of the input signals.

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.1	r	base 1dP	20 8212	16424	Float	-1999. . . 9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
Sw.Nr	r	base 1dP	908 9100	18200	BCD	0. . . 0	☐	Digits 7 to 12 of the software order number.
T.CodeNr	r	base 1dP	900 9092	18184	Text	0. . . 0	☐	15-digit order number of the device.
F.Do1	r/w	base 1dP	31 8223	16446	Enum	*Enum_Ausgang*		Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).

0	off
1	on

9 ohnE1

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.1r	r	base	2005	20394	Float	-1999. . . 9999	☐	Measurement value before the measurement value correction (unprocessed).
		1dP	10197					
F.Inp	r/w	base	26	16436	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	8218					

10 ohnE2

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
L.2	r/w	base	75	16534	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	8267					
t.F2	r/w	base	71	16526	Float	0. . . 999	☐	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	8263					
H.2	r/w	base	76	16536	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	8268					

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.2	r	base	21	16426	Float	-1999. . . 9999	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
		1dP	8213					
F.Do2	r/w	base	32	16448	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	8224					

0	off
1	on

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
In.2r	r	base	2006	20396	Float	-1999. . . 9999	☐	Measurement value before the measurement value correction (unprocessed).
		1dP	10198					
F.Inp	r/w	base	27	16438	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	8219					

11 ohnE3

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L.3	r/w	base 1dP	77 8269	16538	Float	-1999. . . 9999	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
H.3	r/w	base 1dP	78 8270	16540	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.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
F.Do3	r/w	base 1dP	33 8225	16450	Enum	*Enum_Ausgang*		Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).

0	off
1	on

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
F.Ou1	r/w	base 1dP	30 8222	16444	Float	-1999. . . 9999	☐	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.)

12 othr

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
bAud	r/w	base 1dP	290 8482	16964	Enum	*Enum_Baud*		Bit rate of the interface (only visible with OPTION). The bit rate determines the transmission speed.

0	2400 Baud
1	4800 Baud
2	9600 Baud
3	19200 Baud
4	38.400 bits/s

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Addr	r/w	base 1dP	291 8483	16966	Int	1. . . 247	☐	Address on the interface (only visible with OPTION)
PrtY	r/w	base 1dP	292 8484	16968	Enum	*Enum_Parity*		Parity of data on the interface (only visible with OPTION). Simple possibility of checking that transferred data is correct.

0	No parity, with 2 stop bits.
1	even parity
2	odd parity
3	no parity (1 stop bit)

12 othr

• ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
dELY	r/w	base 1dP	293 8485	16970	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.)
D.Unt	r/w	base 1dP	284 8476	16952	Enum	*EnumDUnit*	display unit

0	without unit
1	Temperature unit
2	O2 unit
3	%
4	bar
5	mbar
6	Pa
7	kPa
8	psi
9	l
10	l/s
11	l/min
12	Ohm
13	kOhm
14	m
15	A
16	mA
17	V
18	mV
19	kg
20	g
21	t
22	Text of phys. Unit

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
O2	r/w	base 1dP	283 8475	16950	Enum	*O2Unit*	Parameter definition for O2 measurement. With O2 measurement it is necessary to define whether the parameter is to be evaluated in ppm or %.

0	Parameter for O2 function in ppm
1	Parameter for O2 function in %

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Unit	r/w	base 1dP	280 8472	16944	Enum	*Enum_Unit_rail*	Physical unit (temperature), f.e.°C

1	°C
2	°F
3	K

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
dP	r/w	base 1dP	281 8473	16946	Enum	*Enum_dP*	Decimal point (max. no of decimals). Format of the measured value display.

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

12 othr

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
C.dEL	r/w	base 1dP	294 8486	16972	Int	0. . . 200	☐	For both interfaces, Modbus only. Additional acceptable delay time between 2 received bytes, before "end of message" is assumed. This time is needed if data is not transmitted continousely by the modem.
FrEq	r/w	base 1dP	260 8452	16904	Enum	*Enum_FrEq*		Switchover of the applied mains frequency 50 / 60 Hz, thereby better adaptation of the input filter for hum suppression.

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

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
S.IF	r/w	base 1dP	1700 9892	19784	Enum	*Enum_SIF*		activate system interface

Value	Description
0	The system bus is deactivated.
1	The system bus is activated (fieldbus communication via bus coppler).

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Pr.rd	r/w	base 1dP	1710 9902	19804	Int	0. . . 8191	☐	Addresses of the data that are to be read out of the device via process data (15 values).
Pr.wr	r/w	base 1dP	1730 9922	19844	Int	0. . . 8191	☐	Addresses of the data that are to be written into the device via process data (15 values).

12 othr

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
D.Unt	r	base 1dP	340 8532	17064	Enum	*EnumDUnit*	Effective display unit (can be used for extended Operating Level or display 2)

0	without unit
1	Temperature unit
2	O2 unit
3	%
4	bar
5	mbar
6	Pa
7	kPa
8	psi
9	l
10	l/s
11	l/min
12	Ohm
13	kOhm
14	m
15	A
16	mA
17	V
18	mV
19	kg
20	g
21	t
22	Text of phys. Unit

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
E.1	r/w	base 1dP	310 8502	17004	Enum	*Defect*	Err 1 (internal error) Contact Service.

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Bus.Status	r	base 1dP	1750 9942	19884	Int	0. . . 3 ☐	Busstatus Bit 0 = 1 Error on the HPR-bus Bit 1 = 1 Error on the external fieldbus
E.2	r/w	base 1dP	311 8503	17006	Enum	*Problem*	Err 2 (internal error, resettable) (As a process value via fieldbus interface not writable!)

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
E.3	r/w	base 1dP	329 8521	17042	Enum	*ConfErr*	configuration fault. Typical causes and suggested remedies: Missing or faulty configuration: check interactions in the configuration and parameter settings. (As a process value via fieldbus interface not writable!)

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

12 othr

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
E.4	r/w	base 1dP	328 8520	17040	Enum	*Problem*	Hardware fault.Cause: Code number and hardware are not identical. Remedy: Contact Service. (As a process value via fieldbus interface not writable!)

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
FbF.1	r/w	base 1dP	312 8504	17008	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!)

Value	Meaning
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.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Sht.1	r/w	base 1dP	313 8505	17010	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!)

Value	Meaning
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
POL.1	r/w	base 1dP	314 8506	17012	Enum	*Polarity*	Incorrect polarity at input INP1. Suggested remedy: reverse the polarity at INP1. (As a process value via fieldbus interface not writable!)

Value	Meaning
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.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
FbF.2	r/w	base 1dP	315 8507	17014	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!)

Value	Meaning
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.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Sht.2	r/w	base 1dP	316 8508	17016	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!)

Value	Meaning
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.2	r/w	base 1dP	317 8509	17018	Enum	*Polarity*	Incorrect polarity at input INP2. Suggested remedy: reverse the polarity at INP2. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting of the incorrect polarity alarm possible (Reset).
						1	An incorrect polarity fault has occurred and has been stored.
						2	Incorrect polarity. The wiring of the input circuit is not correct.
HCA	r/w	base 1dP	318 8510	17020	Enum	*HeatCurr*	Heating current alarm.Possible fault s are an open heating current circuit with current I < heating current limit, or current I > heating current limit (depending on configuration), or defective heater band.Suggested remedy: check heating current circuit, replace heater band if necessary. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting of the heating current alarm possible (Reset).
						1	A heating current fault has occurred and has been stored.
SSr	r/w	base 1dP	319 8511	17022	Enum	*Short*	Alarm message: SSr Possible causes: a current flow in the heating circuit although controller is 'off', or the SSR is defective. Suggested remedy: check heating current circuit, replace the solid-state relay, if necessary. (As a process value via fieldbus interface not writable!)
						0	No fault, resetting of the short-circuit alarm possible (Reset).
						1	A short-circuit fault has occurred and has been stored.
						2	A short-circuit fault has occurred.
LooP	r/w	base 1dP	320 8512	17024	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.

12 othr

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
AdA.H	r/w	base 1dP	321 8513	17026	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!)

Value	Description
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
AdA.C	r/w	base 1dP	322 8514	17028	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!)

Value	Description
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
Lim.1	r/w	base 1dP	323 8515	17030	Enum	*Limit*	Limit value 1 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)

0	No fault, resetting of the limit value alarm possible (Reset).
1	The limit value has been exceeded, and the fault has been stored.
2	The limit value has been exceeded; the monitored (measurement) value is outside the set limits.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.2	r/w	base 1dP	324 8516	17032	Enum	*Limit*	Limit value 2 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)

0	No fault, resetting of the limit value alarm possible (Reset).
1	The limit value has been exceeded, and the fault has been stored.
2	The limit value has been exceeded; the monitored (measurement) value is outside the set limits.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.3	r/w	base 1dP	325 8517	17034	Enum	*Limit*	Limit value 3 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)

0	No fault, resetting of the limit value alarm possible (Reset).
1	The limit value has been exceeded, and the fault has been stored.
2	The limit value has been exceeded; the monitored (measurement) value is outside the set limits.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
InF.1	r/w	base 1dP	326 8518	17036	Enum	*Time*	Message from the operating hours counter that the preset no. of hours for this maintenance period has been reached. The op-hours counter for the maintenance period is reset when this message is acknowledged. Counting the operating hours is used for preventive maintenance. - Acknowledge the error to reset it. (As a process value via fieldbus interface not writable!)

0	No signal, resetting of the time limit signal possible (Reset).
1	Operating hours - limit value (maintenance period) reached: please acknowledge.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
InF.2	r/w	base 1dP	327 8519	17038	Enum	*Switch*	Message from the switching cycle counter that the preset no. of switch cycles for this maintenance period has been reached. The cycle counter for the maintenance period is reset when this message is acknowledged. Counting the switching cycles is used for preventive maintenance. - Acknowledge the error to reset it. (As a process value via fieldbus interface not writable!)

0	No error message, resetting of the switching cycle counter possible (Reset).
1	Set limit of the switching cycle counter (maintenance period) has been reached: please acknowledge.

13 Out.1

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
O.Act	r/w	base 1dP	920 9112	18224	Enum	*Enum_OAct*	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.
						0	direct / normally open
						1	inverse / normally closed
Y.1	r/w	base 1dP	921 9113	18226	Enum	*Enum_Y1*	Output function: Controller output Y1
						0	not active
						1	This output provides the controller output Y1.
Y.2	r/w	base 1dP	922 9114	18228	Enum	*Enum_Y2*	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
						0	not active
						1	This output provides the controller output Y2.
Lim.1	r/w	base 1dP	923 9115	18230	Enum	*Enum_Lim1*	Output function: Signal limit 1
						0	not active
						1	The output is activated by an alarm from limit value 1.
Lim.2	r/w	base 1dP	924 9116	18232	Enum	*Enum_Lim2*	Output function: Signal limit 2
						0	not active
						1	The output is activated by an alarm from limit value 2.
Lim.3	r/w	base 1dP	925 9117	18234	Enum	*Enum_Lim3*	Output function: Signal limit 3
						0	not active
						1	The output is activated by an alarm from limit value 3.
LP.AL	r/w	base 1dP	927 9119	18238	Enum	*Enum_OUT_LPAL*	Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value has to change with an output signal of maximum value, else loop alarm is generated.
						0	not active
						1	The loop alarm (= open loop alarm) is assigned to this output.
HC.AL	r/w	base 1dP	928 9120	18240	Enum	*Enum_OUT_HCAL*	Output function: Signal Heat current alarm. Either break (= current I < heating current limit) can be monitored or overload (= current I > heating current limit), dependent on configuration.
						0	not active
						1	The heating current alarm is assigned to this output.

13 Out.1

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
HC.SC	r/w	base 1dP	929 9121	18242	Enum	*Enum_HCSC*	Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output is switched off.
						0	not active
						1	Output activated by an SSR fault.
timE	r/w	base 1dP	930 9122	18244	Enum	*Enum_time*	Output function: Signal Timer running. This message is generated by the setpoint processing, if a timer mode has been configured, and the time has elapsed.
						0	not active
						1	activated
P.End	r/w	base 1dP	931 9123	18246	Enum	*Enum_PEnd*	Output function: Signal Program end. This message is available when the program has been completed (only when configured as a program controller).
						0	not active
						1	This output is activated by the message 'Program end'.
FAi.1	r/w	base 1dP	932 9124	18248	Enum	*Enum_FAi1*	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
						0	not active
						1	The output sends the error message 'INP1 fault'.
FAi.2	r/w	base 1dP	933 9125	18250	Enum	*Enum_FAi2*	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
						0	not active
						1	The output sends the error message 'INP2 fault'.
InF.1	r/w	base 1dP	935 9127	18254	Enum	*Enum_Inf1*	Output function: Signal Inf.1 status. The Inf.1 signal is generated, when the preset value of the operating hours counter has been reached.
						0	not active
						1	The output is activated by the status message 'Inf.1'.
InF.2	r/w	base 1dP	936 9128	18256	Enum	*Enum_Inf2*	Output function: Signal Inf.2 status. The Inf.2 signal is generated, when the preset value of the switching cycle counter has been reached.
						0	Not active
						1	The output is activated by the status message 'Inf.2'.
Sb.Er	r/w	base 1dP	937 9129	18258	Enum	*Enum_SbErr*	Signal: error in internal system bus communication. The output is set when an error occurs in the internal system bus communication, or no communication is executed with the bus coupler.
						0	not active
						1	The output is activated by a system bus failure.

13 Out.1

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Out1	r	base 1dP	940 9132	18264	Enum	*Enum_Ausgang*	Status of the digital output

0	off
1	on

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
F.Do1	r/w	base 1dP	941 9133	18266	Enum	*Enum_Ausgang*	Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).

0	off
1	on

14 Out.2

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
O.Act	r/w	base 1dP	970 9162	18324	Enum	*Enum_OAct*	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.

0	direct / normally open
1	inverse / normally closed

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Y.1	r/w	base 1dP	971 9163	18326	Enum	*Enum_Y1*	Output function: Controller output Y1

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Y.2	r/w	base 1dP	972 9164	18328	Enum	*Enum_Y2*	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.1	r/w	base 1dP	973 9165	18330	Enum	*Enum_Lim1*	Output function: Signal limit 1

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.2	r/w	base 1dP	974 9166	18332	Enum	*Enum_Lim2*	Output function: Signal limit 2

0	not active
1	The output is activated by an alarm from limit value 2.

14 Out.2

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.3	r/w	base 1dP	975 9167	18334	Enum	*Enum_Lim3*	Output function: Signal limit 3
						0	not active
						1	The output is activated by an alarm from limit value 3.
LP.AL	r/w	base 1dP	977 9169	18338	Enum	*Enum_OUT_LPAL*	Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value has to change with an output signal of maximum value, else loop alarm is generated.
						0	not active
						1	The loop alarm (= open loop alarm) is assigned to this output.
HC.AL	r/w	base 1dP	978 9170	18340	Enum	*Enum_OUT_HCAL*	Output function: Signal Heat current alarm. Either break (= current I < heating current limit) can be monitored or overload (= current I > heating current limit), dependent on configuration.
						0	not active
						1	The heating current alarm is assigned to this output.
HC.SC	r/w	base 1dP	979 9171	18342	Enum	*Enum_HCSC*	Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output is switched off.
						0	not active
						1	Output activated by an SSR fault.
timE	r/w	base 1dP	980 9172	18344	Enum	*Enum_time*	Output function: Signal Timer running. This message is generated by the setpoint processing, if a timer mode has been configured, and the time has elapsed.
						0	not active
						1	activated
P.End	r/w	base 1dP	981 9173	18346	Enum	*Enum_PEnd*	Output function: Signal Program end. This message is available when the program has been completed (only when configured as a program controller).
						0	not active
						1	This output is activated by the message 'Program end'.
FAi.1	r/w	base 1dP	982 9174	18348	Enum	*Enum_FAi1*	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
						0	not active
						1	The output sends the error message 'INP1 fault'.
FAi.2	r/w	base 1dP	983 9175	18350	Enum	*Enum_FAi2*	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
						0	not active
						1	The output sends the error message 'INP2 fault'.

14 Out.2

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
InF.1	r/w	base 1dP	985 9177	18354	Enum	*Enum_Inf1*	Output function: Signal Inf.1 status. The Inf.1 signal is generated, when the preset value of the operating hours counter has been reached.

0	not active
1	The output is activated by the status message 'Inf.1'.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
InF.2	r/w	base 1dP	986 9178	18356	Enum	*Enum_Inf2*	Output function: Signal Inf.2 status. The Inf.2 signal is generated, when the preset value of the switching cycle counter has been reached.

0	Not active
1	The output is activated by the status message 'Inf.2'.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Sb.Er	r/w	base 1dP	987 9179	18358	Enum	*Enum_SbErr*	Signal: error in internal system bus communication. The output is set when an error occurs in the internal system bus communication, or no communication is executed with the bus coupler.

0	not active
1	The output is activated by a system bus failure.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Out2	r	base 1dP	990 9182	18364	Enum	*Enum_Ausgang*	Status of the digital output

0	off
1	on

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
F.Do2	r/w	base 1dP	991 9183	18366	Enum	*Enum_Ausgang*	Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).

0	off
1	on

15 Out.3

• ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.tYP	r/w	base 1dP	1035 9227	18454	Enum	*Enum_OtYP*	Signal type selection OUT

Value	Description
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 1dP	1020 9212	18424	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.

Value	Description
0	direct / normally open
1	inverse / normally closed

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Out.0	r/w	base 1dP	1036 9228	18456	Float	-1999. . . 9999 ☐	Lower scaling limit of the analog output (corresponds to 0%). If current and voltage signals are used as output values, the display can be scaled to the output value in the Parameter Level. The output value of the lower scaling point is indicated in the respective electrical unit (mA / V).
Out.1	r/w	base 1dP	1037 9229	18458	Float	-1999. . . 9999 ☐	Upper scaling limit of the analog output (corresponds to 100%). If current and voltage signals are used as output values, the display can be scaled to the output value in the Parameter Level. The output value of the upper scaling point is indicated in the respective electrical unit (mA / V).
O.Src	r/w	base 1dP	1038 9230	18460	Enum	*Enum_OSrc*	Signal source of the analog output (visible not with all output signal types O.TYP).

Value	Description
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.
7	measured value INP1
8	measured value INP2

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O.FAI	r/w	base 1dP	1039 9231	18462	Enum	*Enum_OFail*	fail behaviour

Value	Description
0	upscale
1	downscale

15 Out.3

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Y.1	r/w	base 1dP	1021 9213	18426	Enum	Enum_Y1	Output function: Controller output Y1
						0	not active
						1	This output provides the controller output Y1.
Y.2	r/w	base 1dP	1022 9214	18428	Enum	Enum_Y2	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
						0	not active
						1	This output provides the controller output Y2.
Lim.1	r/w	base 1dP	1023 9215	18430	Enum	Enum_Lim1	Output function: Signal limit 1
						0	not active
						1	The output is activated by an alarm from limit value 1.
Lim.2	r/w	base 1dP	1024 9216	18432	Enum	Enum_Lim2	Output function: Signal limit 2
						0	not active
						1	The output is activated by an alarm from limit value 2.
Lim.3	r/w	base 1dP	1025 9217	18434	Enum	Enum_Lim3	Output function: Signal limit 3
						0	not active
						1	The output is activated by an alarm from limit value 3.
LP.AL	r/w	base 1dP	1027 9219	18438	Enum	Enum_OUT_LPAL	Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value has to change with an output signal of maximum value, else loop alarm is generated.
						0	not active
						1	The loop alarm (= open loop alarm) is assigned to this output.
HC.AL	r/w	base 1dP	1028 9220	18440	Enum	Enum_OUT_HCAL	Output function: Signal Heat current alarm. Either break (= current I < heating current limit) can be monitored or overload (= current I > heating current limit), dependent on configuration.
						0	not active
						1	The heating current alarm is assigned to this output.
HC.SC	r/w	base 1dP	1029 9221	18442	Enum	Enum_HCSC	Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output is switched off.
						0	not active
						1	Output activated by an SSR fault.

15 Out.3

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
timE	r/w	base 1dP	1030 9222	18444	Enum	*Enum_time*	Output function: Signal Timer running. This message is generated by the setpoint processing, if a timer mode has been configured, and the time has elapsed.
						0	not active
						1	activated
P.End	r/w	base 1dP	1031 9223	18446	Enum	*Enum_PEnd*	Output function: Signal Program end. This message is available when the program has been completed (only when configured as a program controller).
						0	not active
						1	This output is activated by the message 'Program end'.
FAi.1	r/w	base 1dP	1032 9224	18448	Enum	*Enum_FAi1*	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
						0	not active
						1	The output sends the error message 'INP1 fault'.
FAi.2	r/w	base 1dP	1033 9225	18450	Enum	*Enum_FAi2*	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
						0	not active
						1	The output sends the error message 'INP2 fault'.
InF.1	r/w	base 1dP	1055 9247	18494	Enum	*Enum_Inf1*	Output function: Signal Inf.1 status. The Inf.1 signal is generated, when the preset value of the operating hours counter has been reached.
						0	not active
						1	The output is activated by the status message 'Inf.1'.
InF.2	r/w	base 1dP	1056 9248	18496	Enum	*Enum_Inf2*	Output function: Signal Inf.2 status. The Inf.2 signal is generated, when the preset value of the switching cycle counter has been reached.
						0	Not active
						1	The output is activated by the status message 'Inf.2'.
Sb.Er	r/w	base 1dP	1057 9249	18498	Enum	*Enum_SbErr*	Signal: error in internal system bus communication. The output is set when an error occurs in the internal system bus communication, or no communication is executed with the bus coupler.
						0	not active
						1	The output is activated by a system bus failure.

15 Out.3

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
Out3	r	base 1dP	1040 9232	18464	Enum	*Enum_Ausgang*		Status of the digital output
						0	off	
						1	on	
F.Do3	r/w	base 1dP	1041 9233	18466	Enum	*Enum_Ausgang*		Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
						0	off	
						1	on	
F.Ou3	r/w	base 1dP	1042 9234	18468	Float	-1999. . . 9999	☐	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.)
Ou.3P	r	base 1dP	1044 9236	18472	Float	-1999. . . 9999	☐	Value of the analog output [mA/V/Hz]

16 ProG

PArA

Name	r/w	Adr.	Integer	real	Typ	Value/off		Description
SP.01	r/w	base 1dP	1600 9792	19584	Float	-1999. . . 9999	☑	End setpoint of segment 1. This is the target setpoint that is reached at the end of the first segment. The target setpoint is approached from the previous valid setpoint (when starting the 1st segment, matching to process value!). When the program is completed, the controller continues with the last target setpoint reached.
Pt.01	r/w	base 1dP	1601 9793	19586	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.
SP.02	r/w	base 1dP	1602 9794	19588	Float	-1999. . . 9999	☑	End setpoint of segment 2. This is the target setpoint that is reached at the end of the second segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
Pt.02	r/w	base 1dP	1603 9795	19590	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.
SP.03	r/w	base 1dP	1604 9796	19592	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.

16 ProG

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Pt.03	r/w	base 1dP	1605 9797	19594	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.
SP.04	r/w	base 1dP	1606 9798	19596	Float	-1999. . . 9999	☑	End setpoint of segment 4. This is the target setpoint that is reached at the end of the fourth segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
Pt.04	r/w	base 1dP	1607 9799	19598	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.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
St.Prog	r	base 1dP	1670 9862	19724	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	1671 9863	19726	Float	-1990. . . 9999	☐	The programmer's setpoint is displayed as the effective setpoint while the program is running.
T1.Pr	r	base 1dP	1672 9864	19728	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	1673 9865	19730	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	1674 9866	19732	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.

16 ProG

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
T4.Pr	r	base 1dP	1675 9867	19734	Float	0. . . 9999	☐	Only with running program. The remaining time of the running program segment (without hold times).
SG.Pr	r	base 1dP	1676 9868	19736	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.

17 SEtP

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
SP.LO	r/w	base 1dP	800 8992	17984	Float	-1999. . . 9999	☐	Lower setpoint limit. The setpoint is raised to this value automatically, if a lower setpoint is adjusted. BUT: The (safety) setpoint W2 is not restricted by the setpoint limits! The setpoint reserve for the step function is 10% of SPHi - SPLo.
SP.Hi	r/w	base 1dP	801 8993	17986	Float	-1999. . . 9999	☐	Upper setpoint limit. The setpoint is reduced to this value automatically, if a higher setpoint is adjusted. BUT: The (safety) setpoint W2 is not restricted by the setpoint limits! The setpoint reserve for the step function is 10% of SPHi - SPLo.
SP.2	r/w	base 1dP	802 8994	17988	Float	-1999. . . 9999	☐	Second (safety) setpoint. Ramp function as with other setpoints (effective, external). However, SP2 is not restricted by the setpoint limits.
r.SP	r/w	base 1dP	803 8995	17990	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.
t.SP	r/w	base 1dP	804 8996	17992	Float	0. . . 9999	☐	The timer (preset) value is entered in minutes with one decimal digit (0,1 minute = 6 seconds). With an activated timer, the preset value is displayed automatically in the extended Operating Level, where it can be changed by means of the parameter t.ti.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
SP.EF	r	base 1dP	830 9022	18044	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.

17 SEtP

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
SP	r/w	base 1dP	840 9032	18064	Float	-1999. . . 9999	☐	Setpoint for the interface (without the additional function 'Controller off'). SetpInterface acts on the internal setpoint before the setpoint processing stage. Note: The value in RAM is always updated. To protect the EEPROM, storage of the value in the EEPROM is timed (at least one value per half hour).
SP.d	r/w	base 1dP	841 9033	18066	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.
t.ti	r/w	base 1dP	842 9034	18068	Float	0. . . 9999	☐	Current timer count in minutes. Count-down timer. The run time is only visible, if the timer is active. Configuration in the extended Operating Level.

Table Of Contents

1 Func

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Fnc.1	r/w	base 1dP	1262 9454	18908	Enum	*Enum_Fnc1Rail*	function 1 = process value processing. 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.

0	standard (process value = Inp1)
2	The process value is calculated from the difference between the two values (Inp1 - Inp2).
3	Maximum value of Inp1 and Inp2. The bigger value ist used as process value. At sensor failure the remaining actual value is used as process value.
4	Minimum value of Inp1 and Inp2. The smaller value is used as process value. At sensor failure the remaining actual value is used as process value.
7	O2 function with constant sensor temperature. The engineering unit for the O2 setting should be checked under: Other -> parameter unit (ppm / %). The sensor temperature must be defined under: Parameters -> Controller -> Sensor temperature.
8	O2 function with measured sensor temperature. The sensor temperature is required as the second process value Inp2. The engineering unit for the O2 settings (ppm / %) must be checked under 'Other | Parameter unit.'

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
tEmP	r/w	base 1dP	1236 9428	18856	Float	. —8888 ☐	Constant sensor temperature. With O2 measurement, the actual oxygen content is derived from the constant sensor temperature and the EMF (electromotive force in volts) generated by the sensor.Note: A constant sensor temperature is only ensured with heated lambda sensors.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
C.InP	r	base 1dP	1302 9494	18988	Float	,0888—8888 ☐	process value

2 InP.1

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
S.tYP	r/w	base 1dP	520 8712	17424	Enum	*Enum_StYP*	Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted

0	thermocouple type L (-100...900°C), Fe-CuNi DIN Fahrenheit: -148...1652°F
1	thermocouple type J (-100...1200°C), Fe-CuNi Fahrenheit: -148...2192°F
2	thermocouple type K (-100...1350°C), NiCr-Ni Fahrenheit: -148...2462°F
3	thermocouple type N (-100...1300°C), Nicrosil-Nisil Fahrenheit: -148...2372°F
4	thermocouple type S (0...1760°C), PtRh-Pt10% Fahrenheit: 32...3200°F
5	thermocouple type R (0...1760°C), PtRh-Pt13% Fahrenheit: 32...3200°F
6	thermocouple type T (-200...400°C), Cu-CuNi Fahrenheit: -328...752°F
7	thermocouple type C (0...2315°C), W5%Re-W26%Re Fahrenheit: 32...4199°F
8	thermocouple type D (0...2315°C), W3%Re-W25%Re Fahrenheit: 32...4199°F
9	thermocouple type E (-100...1000°C), NiCr-CuNi Fahrenheit: -148...1832°F
10	thermocouple type B (0/400...1820°C), PtRh-Pt6% Fahrenheit: 32/752...3308°F
18	Special thermocouple with a linearization characteristic selectable by the user. This enables non-linear signals to be simulated or linearized.
20	Pt100 (-200.0 ... 100.0(150.0)°C) Measuring range up to 150°C at reduced lead resistance. Fahrenheit: -328...212(302) °F
21	Pt100 (-200.0 ... 850,0 °C) Fahrenheit: -328...1562 °F
22	Pt 1000 (-200.0...850.0 °C) Fahrenheit: -328...1562 °F
23	Special : 0...4500 Ohms. For KTY 11-6 with preset special linearization (-50...150 °C or -58...302 °F).
24	Special 0...450 Ohm
25	Special : 0...1600 Ohm
26	Special : 0...160 Ohms
30	Current : 0...20 mA / 4...20 mA
40	0...10V / 2...10V
41	Special -2.5...115 mV
42	Special : -25...1150 mV
43	Special : -25...90 mV
44	Special : -500...500 mV
45	Special : -5...5 V
46	Special : -10...10 V
47	Special : -200...200 mV
50	potentiometer 0...160 Ohm
51	potentiometer 0...450 Ohm
52	potentiometer 0...1600 Ohm
53	potentiometer 0...4500 Ohm

2 InP.1

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
4wir	r/w	base 1dP	523 8715	17430	Enum	*Enum_4wire*	Connection principle for resistive inputs.

Value	Description
0	Normally, resistance and resistance thermometer measurement is in 3-wire connection, whereby the resistance of all leads is equal.
1	With measurement in 4-wire connection, the lead resistance is determined by means of reference measurement.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
S.Lin	r/w	base 1dP	521 8713	17426	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.

Value	Description
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 1dP	265 8457	16914	Enum	*Enum_Corr*	Measured value correction / scaling

Value	Description
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.

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
InL.1	r/w	base 1dP	500 8692	17384	Float	,0888—8888	☐	Input value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the lower scaling point (e.g. 4 mA) is done using the corresponding electrical value.
OuL.1	r/w	base 1dP	501 8693	17386	Float	,0888—8888	☐	Display value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the lower scaling point, e.g. 4 mA is displayed as 2 [pH].
InH.1	r/w	base 1dP	502 8694	17388	Float	,0888—8888	☐	Input value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the upper scaling point (e.g. 20 mA) is done using the corresponding electrical value.
OuH.1	r/w	base 1dP	503 8695	17390	Float	,0888—8888	☐	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].

2 InP.1

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
t.F1	r/w	base 1dP	504 8696	17392	Float	. —888	☐	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.
E.tc1	r/w	base 1dP	506 8698	17396	Float	. —0. .	☑	External temperature compensation (temperature at the junction of thermocouple/copper lead with external temperature compensation).

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.1r	r	base 1dP	540 8732	17464	Float	,0888—8888	☐	Measurement value before the measurement value correction (unprocessed).
Fail	r	base 1dP	541 8733	17466	Enum	*Enum_InpFail*		Input circuit fault: faulty or incorrectly connected sensor.

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

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.1	r	base 1dP	542 8734	17468	Float	,0888—8888	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).

3 InP.2

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
I.Fnc	r/w	base 1dP	266 8458	16916	Enum	*Enum_IFunc*		Function INP2

0	no measurement
1	measurement

3 InP.2

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
S.tYP	r/w	base 1dP	570 8762	17524	Enum	*Enum_StYP2*	Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted.

0	Thermocouple Type L (-100...900 °C), Fe-CuNi DIN Fahrenheit: -148...1652°F
1	Thermocouple Type J (-100...1200 °C), Fe-CuNi Fahrenheit: -148...2192°F
2	Thermocouple Type K (-100...1350 °C), NiCr-Ni Fahrenheit: -148...2462°F
3	Thermocouple Type N (-100...1300 °C), Nicrosil-Nisil Fahrenheit: -148...2372°F
4	Thermocouple Type S (0...1760 °C), PtRh-Pt 10% 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: 32/752 ... 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
25	Special : 0...1,6 kOhm
26	Special : 0...160 Ohm
30	Current : 0...20 mA / 4...20 mA
41	Special -2.5...115 mV
42	Special : -25...1150 mV
43	Special : -25...90 mV
44	Special : -500...500 mV
47	Special : -200...200 mV
50	Potentiometer 0...160 Ohm
51	Potentiometer 0...450 Ohm
52	Potentiometer 0...1600 Ohm
53	Potentiometer 0...4500 Ohm

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
S.Lin	r/w	base 1dP	571 8763	17526	Enum	*Enum_SLin*	Linearization (not adjustable for all sensor types S.tYP). Special linearization. The linearization table can be created with the Engineering Tool. The default characteristic is for KTY 11-6 temperature sensors.

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

3 InP.2

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Corr	r/w	base 1dP	267 8459	16918	Enum	*Enum_Corr*	Measured value correction / scaling

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

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
InL.2	r/w	base 1dP	550 8742	17484	Float	,0888—8888	☐	Input value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the lower scaling point (e.g. 4 mA) is done using the corresponding electrical value.
OuL.2	r/w	base 1dP	551 8743	17486	Float	,0888—8888	☐	Display value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the lower scaling point, e.g. 4 mA is displayed as 2 [pH].
InH.2	r/w	base 1dP	552 8744	17488	Float	,0888—8888	☐	Input value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the upper scaling point (e.g. 20 mA) is done using the corresponding electrical value.
OuH.2	r/w	base 1dP	553 8745	17490	Float	,0888—8888	☐	Display value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the upper scaling point, e.g. 20 mA is displayed as 12 [pH].
t.F2	r/w	base 1dP	554 8746	17492	Float	. —888	☐	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.
E.tc2	r/w	base 1dP	556 8748	17496	Float	. —0. .	☑	External temperature compensation (temperature at the junction of thermocouple/copper lead with external temperature compensation).

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.2	r	base 1dP	590 8782	17564	Float	,0888—8888	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).

3 InP.2

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Fail	r	base 1dP	591 8783	17566	Enum	*Enum_InpFail*	Input circuit fault: faulty or incorrectly connected sensor.

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
In.2r	r	base 1dP	592 8784	17568	Float	,0888—8888 ☐	Measurement value before the measurement value correction (unprocessed).

4 Lim

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Fnc.1	r/w	base 1dP	671 8863	17726	Enum	*Enum_Fcn1*	Function of the limit value LC. Activation of the limit value alarm (e.g. for input circuit monitoring) with or without storage.

0	No limit value monitoring.
1	measured value monitoring. The alarm signal is generated, if the limit is exceeded. If the measured value is within the limits (including hysteresis) again, this alarm signal is resetted.
2	Measured value monitoring + alarm status latch. An alarm signal is generated, if the limit is exceeded. A latched alarm signal remains latched until it is manually resetted.
3	Temperature limiter for exceeded limit: Measurement value monitoring + storage of the max. alarm limit status. A latched alarm signal remains latched until it is manually resetted.
4	Temperature limiter for exceeded limit: Measurement value monitoring + storage of the min. alarm limit status. A latched alarm signal remains latched until it is manually resetted.
5	Temperature monitoring function for exceeded max. limits. As opposed to the temperature limiting function, there is no storage.
6	Temperature monitoring function for exceeded min. limits. As opposed to the temperature limiting function, there is no storage.

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
L.1	r/w	base 1dP	650 8842	17684	Float	,0888—8888 ☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
LC	r/w	base 1dP	655 8847	17694	Float	,0888—8888 ☐	Limit value LC. The limit value LC is the main function of the temperature limiter/monitor. The alarm signal is triggered if the value rises above the limit, or if the value falls below the limit, depending on setting.
H.1	r/w	base 1dP	651 8843	17686	Float	,0888—8888 ☑	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.

4 Lim

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
HYS.1	r/w	base 1dP	652 8844	17688	Float	. —8888	☐	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.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
St.Lim	r	base 1dP	690 8882	17764	Enum	*Enum_LimStatus*	Limit value status: No alarm present or stored.

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 1dP	720 8912	17824	Enum	*Enum_Fcn*	Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.

0	No limit value monitoring.
1	measured value monitoring. The alarm signal is generated, if the limit is exceeded. If the measured value is within the limits (including hysteresis) again, this alarm signal is resetted.
2	Measured value monitoring + alarm status latch. An alarm signal is generated, if the limit is exceeded. A latched alarm signal remains latched until it is manually resetted.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Src.2	r/w	base 1dP	721 8913	17826	Enum	*Enum_SrcTB*	Source for the limit value. Selection of the value that is to be monitored by the limit, e.g. process value.

0	Process value = absolute alarm
1	Process value – Limit value LC = Relative alarm
3	Measured value of the analog input INP1
4	Measured value of the analog input INP2

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L.2	r/w	base 1dP	700 8892	17784	Float	,0888—8888	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
H.2	r/w	base 1dP	701 8893	17786	Float	,0888—8888	☑	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.

5 Lim2

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
HYS.2	r/w	base 1dP	702 8894	17788	Float	. —8888	☐	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.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
St.Lim	r	base 1dP	740 8932	17864	Enum	*Enum_LimStatus*	Limit value status: No alarm present or stored.

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

6 Lim3

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Fnc.3	r/w	base 1dP	770 8962	17924	Enum	*Enum_Fcn*	Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.

0	No limit value monitoring.
1	measured value monitoring. The alarm signal is generated, if the limit is exceeded. If the measured value is within the limits (including hysteresis) again, this alarm signal is resetted.
2	Measured value monitoring + alarm status latch. An alarm signal is generated, if the limit is exceeded. A latched alarm signal remains latched until it is manually resetted.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Src.3	r/w	base 1dP	771 8963	17926	Enum	*Enum_SrcTB*	Source for the limit value. Selection of the value that is to be monitored by the limit, e.g. process value.

0	Process value = absolute alarm
1	Process value – Limit value LC = Relative alarm
3	Measured value of the analog input INP1
4	Measured value of the analog input INP2

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L.3	r/w	base 1dP	750 8942	17884	Float	,0888—8888	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
H.3	r/w	base 1dP	751 8943	17886	Float	,0888—8888	☑	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.

6 Lim3

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
HYS.3	r/w	base 1dP	752 8944	17888	Float	. —8888 ☐	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.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
St.Lim	r	base 1dP	790 8982	17964	Enum	*Enum_LimStatus*	Limit value status: No alarm present or stored.

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

7 LOGI

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
L_r	r/w	base 1dP	421 8613	17226	Enum	*Enum_dInPRail1*	Local / remote switchover (Remote: Adjustment of all values via the front panel is blocked).

0	No function (switchover via interface is possible).
1	Always active.
2	DI1 switches.
5	func switches
7	limit 1 switches
8	limit 2 switches
9	limit 3 switches

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Err.r	r/w	base 1dP	429 8621	17242	Enum	*Enum_dInPRail3*	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).

2	DI1 switches.
6	Switch reset keys.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
di.Fn	r/w	base 1dP	420 8612	17224	Enum	*Enum_diFn*	Function of digital input (not valid for Err.r)

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 1dP	450 8642	17284	Int	—	☐	Status of the digital inputs or of push-buttons (binary coded).
						Bit 0: Input di1 Bit 8: Status of Enter key Bit 9: Status of 'Down' key Bit 10: Status of 'Up' key		
L-R	r/w	base 1dP	460 8652	17304	Int	. —0	☐	Remote operation. Remote means that all values can only be adjusted via the interface. Adjustments via the front panel are blocked.
Err.r	r/w	base 1dP	470 8662	17324	Int	. —0	☐	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).

8 ohnE

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
B.BedEbe	r/w	base 1dP	1839 10031	20062	Int	. —144	☐	Operating Levels (Parameter, Configuration, and Calibration) can be disabled here.
B.Bedien	r/w	base 1dP	1838 10030	20060	Int	. —144	☐	Used to disable various operating functions (e.g. access to the extended Operating Level).
C.Sch	r/w	base 1dP	1801 9993	19986	Float	0—8888888	☑	Data defines the number of switching cycles for which the message InF.2 is generated.
C.Std	r/w	base 1dP	1800 9992	19984	Float	0—8888888	☑	Data defines the number of operating hours for which the message InF.1 is generated.
Dis1	r/w	base 1dP	1849 10041	20082	Enum	*Enum_dis1*		Selection of the value to be shown in line 1 of the display.
						0 1		
Dis2	r/w	base 1dP	1848 10040	20080	Int	145—708.	☐	Datum to be shown in display 2. The basic address of the datum that is to be displayed must be entered.
EOP1	r/w	base 1dP	1840 10032	20064	Int	145—708.	☐	1st datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.

8 ohnE

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
EOP2	r/w	base 1dP	1841 10033	20066	Int	145—708.	☐	2nd datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP3	r/w	base 1dP	1842 10034	20068	Int	145—708.	☐	3rd datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP4	r/w	base 1dP	1843 10035	20070	Int	145—708.	☐	4th datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP5	r/w	base 1dP	1844 10036	20072	Int	145—708.	☐	5th datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP6	r/w	base 1dP	1845 10037	20074	Int	145—708.	☐	6th datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP7	r/w	base 1dP	1846 10038	20076	Int	145—708.	☐	7th datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
EOP8	r/w	base 1dP	1847 10039	20078	Int	145—708.	☐	8th datum of the extended Operating Level. The basic address of the datum that is to be displayed must be entered.
In.1	r/w	base 1dP	1861 10053	20106	Float	. —1	☐	Input 1 for measurement value 1 (to Output 1 for display value 1). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.10	r/w	base 1dP	1879 10071	20142	Float	. —1	☑	Input 10 for measurement value 10 (to Output 10 for display value 10). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.11	r/w	base 1dP	1881 10073	20146	Float	. —1	☑	Input 11 for measurement value 11 (to Output 11 for display value 11). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.12	r/w	base 1dP	1883 10075	20150	Float	. —1	☑	Input 12 for measurement value 12 (to Output 12 for display value 12). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.13	r/w	base 1dP	1885 10077	20154	Float	. —1	☑	Input 13 for measurement value 13 (to Output 13 for display value 13). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.

8 ohnE

ConF

Name	r/w	Adr. Integer	real	Typ	Value/off	Description
In.14	r/w	base 1887 1dP 10079	20158	Float	. —1 ☑	Input 14 for measurement value 14 (to Output 14 for display value 14). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.15	r/w	base 1889 1dP 10081	20162	Float	. —1 ☑	Input 15 for measurement value 15 (to Output 15 for display value 15). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.16	r/w	base 1891 1dP 10083	20166	Float	. —1 ☑	Input 16 for measurement value 16 (to Output 16 for display value 16). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.2	r/w	base 1863 1dP 10055	20110	Float	. —1 ☐	Input 2 for measurement value 2 (to Output 2 for display value 2). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.3	r/w	base 1865 1dP 10057	20114	Float	. —1 ☑	Input 3 for measurement value 3 (to Output 3 for display value 3). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.4	r/w	base 1867 1dP 10059	20118	Float	. —1 ☑	Input 4 for measurement value 4 (to Output 4 for display value 4). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.5	r/w	base 1869 1dP 10061	20122	Float	. —1 ☑	Input 5 for measurement value 5 (to Output 5 for display value 5). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.6	r/w	base 1871 1dP 10063	20126	Float	. —1 ☑	Input 6 for measurement value 6 (to Output 6 for display value 6). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.7	r/w	base 1873 1dP 10065	20130	Float	. —1 ☑	Input 7 for measurement value 7 (to Output 7 for display value 7). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
In.8	r/w	base 1875 1dP 10067	20134	Float	. —1 ☑	Input 8 for measurement value 8 (to Output 8 for display value 8). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.

8 ohnE

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.9	r/w	base 1dP	1877 10069	20138	Float	. —1	☑	Input 9 for measurement value 9 (to Output 9 for display value 9). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.1	r/w	base 1dP	1862 10054	20108	Float	. —1	☐	Output 1 for display value 1 (to Input 1 for measurement value 1). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.10	r/w	base 1dP	1880 10072	20144	Float	. —1	☑	Output 10 for display value 10 (to Input 10 for measurement value 10). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.11	r/w	base 1dP	1882 10074	20148	Float	. —1	☑	Output 11 for display value 11 (to Input 11 for measurement value 11). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.12	r/w	base 1dP	1884 10076	20152	Float	. —1	☑	Output 12 for display value 12 (to Input 12 for measurement value 12). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.13	r/w	base 1dP	1886 10078	20156	Float	. —1	☑	Output 13 for display value 13 (to Input 13 for measurement value 13). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.14	r/w	base 1dP	1888 10080	20160	Float	. —1	☑	Output 14 for display value 14 (to Input 14 for measurement value 14). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.15	r/w	base 1dP	1890 10082	20164	Float	. —1	☑	Output 15 for display value 15 (to Input 15 for measurement value 15). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.16	r/w	base 1dP	1892 10084	20168	Float	. —1	☑	Output 16 for display value 16 (to Input 16 for measurement value 16). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.2	r/w	base 1dP	1864 10056	20112	Float	. —1	☐	Output 2 for display value 2 (to Input 2 for measurement value 2). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.

8 ohnE

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Ou.3	r/w	base 1dP	1866 10058	20116	Float	. —1	☑	Output 3 for display value 3 (to Input 3 for measurement value 3). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.4	r/w	base 1dP	1868 10060	20120	Float	. —1	☑	Output 4 for display value 4 (to Input 4 for measurement value 4). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.5	r/w	base 1dP	1870 10062	20124	Float	. —1	☑	Output 5 for display value 5 (to Input 5 for measurement value 5). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.6	r/w	base 1dP	1872 10064	20128	Float	. —1	☑	Output 6 for display value 6 (to Input 6 for measurement value 6). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.7	r/w	base 1dP	1874 10066	20132	Float	. —1	☑	Output 7 for display value 7 (to Input 7 for measurement value 7). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.8	r/w	base 1dP	1876 10068	20136	Float	. —1	☑	Output 8 for display value 8 (to Input 8 for measurement value 8). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
Ou.9	r/w	base 1dP	1878 10070	20140	Float	. —1	☑	Output 9 for display value 9 (to Input 9 for measurement value 9). Special linearization is possible for certain sensor types, which is stored as a table. This linearization can be adapted with up to 15 (or version-dependent 31) segments, whereby every point of the linearization curve is defined by one input or one output.
PASS	r/w	base 1dP	1850 10042	20084	Int	. —8888	☐	Password. 4-digit number for the password-protected access to blocked operating functions such as e.g. the Parameter Level.
T.Dis2	r/w	base 1dP	1851 10043	20086	Text	—	☐	This address contains 5 bytes for the text that is to appear in Display 2. No text: 1st byte 0x00.
U.LinT	r/w	base 1dP	1860 10052	20104	Enum	*Enum_Unit*		Engineering unit of linearization table (temperature).

0	without unit
1	°C
2	°F
3	K

8 ohnE

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
V.Mask	r/w	base 1dP	1810 10002	20004	Int	. —144	☐	Definition of the visibility templates.The templates define the configurations and parameters displayed for operation (contents on request).

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Conf	r/w	base 1dP	256 8448	16896	Int	. —1	☐	Start/Stop and abortion of the configuration mode 0 = End of configuration 1 = Start of configuration 2 = Abort configuration
tEmP	r/w	base 1dP	91 8283	16566	Float	. —8888	☐	Constant sensor temperature. With O2 measurement, the actual oxygen content is derived from the constant sensor temperature and the EMF (electromotive force in volts) generated by the sensor.Note: A constant sensor temperature is only ensured with heated lambda sensors.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
C.InP	r	base 1dP	39 8231	16462	Float	,0888—8888	☐	process value
CAH	r	base 1dP	390 8582	17164	Long	. —	☐	Total operating hours. Count starts with the first switch-on. Internal test routine. Is stored and displayed not more than once per hour.
CPH	r	base 1dP	394 8586	17172	Long	. —	☐	Operating hours of the current maintenance period. Internal test routine. Is stored and displayed not more than once per hour. Reset when the time limit message is acknowledged.
Diag	r	base 1dP	382 8574	17148	Int	. —144	☐	Result of diagnosis. Any faults detected during the self-test for data, RAM, processor, and EEPROM, as well as an exceeded count for the operating hours (maintenance period) and no. of switching cycles (maintenance period) are stored. Can be reset by acknowledgement.
EE.Ver	r	base 1dP	381 8573	17146	Int	. —.	☐	EEPROM version
Id.NrH	r	base 1dP	370 8562	17124	Int	. —.	☐	More significant part of the device Ident number.
Id.NrL	r	base 1dP	371 8563	17126	Int	. —.	☐	Less significant part of the device Ident number.
Id.NrZ	r	base 1dP	372 8564	17128	Int	. —.	☐	Sequential Ident number of the device.

8 ohnE

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Int.Tmp	r	base 1dP	380 8572	17144	Int	· —·	☐	Max. measured operating temperature. Internal test routine.
Oem.NrH	r	base 1dP	373 8565	17130	Int	· —·	☐	More significant part of the device OEM no.
Oem.NrL	r	base 1dP	374 8566	17132	Int	· —·	☐	Less significant part of the device OEM no.
SAO1	r	base 1dP	391 8583	17166	Long	· —	☐	Total number of switching cycles of OUT1. Internal test routine that is stored and displayed not more than once per hour.
SAO2	r	base 1dP	392 8584	17168	Long	· —	☐	Total number of switching cycles of OUT2. Internal test routine that is stored and displayed not more than once per hour.
SAO3	r	base 1dP	393 8585	17170	Long	· —	☐	Total number of switching cycles of OUT3. Internal test routine that is stored and displayed not more than once per hour.
SPO1	r/w	base 1dP	395 8587	17174	Long	· —	☐	Switching cycles of OUT1 during the present maintenance period. Internal test routine that is stored and displayed not more than once per hour. Resetting is done by acknowledging the switching cycle message.
SPO2	r/w	base 1dP	396 8588	17176	Long	· —	☐	Switching cycles of OUT2 during the present maintenance period. Internal test routine that is stored and displayed not more than once per hour. Resetting is done by acknowledging the switching cycle message.
SPO3	r/w	base 1dP	397 8589	17178	Long	· —	☐	Switching cycles of OUT3 during the present maintenance period. Internal test routine that is stored and displayed not more than once per hour. Resetting is done by acknowledging the switching cycle message.
St.Pass	r	base 1dP	351 8543	17086	Int	· —0	☐	This signal indicates whether writing via the interface is allowed (enabling via pass code): 0 = not allowed 1 = allowed 2 = allowableness not necessary (no TB/TW unit)
Sw.Nr	r	base 1dP	375 8567	17134	BCD	· —·	☐	Digits 7 to 12 of the software order number.
T.CodeNr	r	base 1dP	360 8552	17104	Text	· —·	☐	15-digit order number of the device.
UPD	r/w	base 1dP	257 8449	16898	Enum	*Enum_Aenderungsflag*		Status message indicating that parameter / configuration have been changed via the front panel.

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

8 ohnE

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L-R	r/w	base 1dP	55 8247	16494	Int	. —0	☐	Remote operation. Remote means that all values can only be adjusted via the interface. Adjustments via the front panel are blocked.
Hw.Opt	r	base 1dP	200 8392	16784	Int	. —54424	☐	Device options: 0000 WXYZ 0000 DCBA Z = 1: Modbus interface Y = 1: System device X = 1: Option 1 W = 1: Option 2 A = 1: OUT1 available B = 1: OUT2 available C = 1: OUT3 available D = 1: OUT3 is an analog output
Sw.Op	r	base 1dP	201 8393	16786	Int	. —144	☐	Software version XY Major and Minor Release (e.g. 21 = Version 2.1). The software version specifies the firmware in the unit. For the correct interaction of E-Tool and device, it must match the operating version (OpVersion) in the E-Tool.
Bed.V	r	base 1dP	202 8394	16788	Int	. —144	☐	Operating version (numeric value). For the correct interaction of E-Tool and device, the software version and operating version must match.
Unit	r	base 1dP	203 8395	16790	Int	. —144	☐	Identification of the device.
S.Vers	r	base 1dP	204 8396	16792	Int	0. . —144	☐	The sub-version number is given as an additional index for precise definition of software version.
St.Ala	r	base 1dP	23 8215	16430	Int	—	☐	Alarm status: Bit-wise coded status of the individual alarms, e.g. exceeded limit value.
						Bit 0 Existing/stored exceeded limit 1 Bit 1 Existing/stored exceeded limit 2 Bit 2 Existing/stored exceeded limit 3 Bit 3 Not usedBit 4 Not used Bits 5 - 7 Not used Bit 8 Existing exceeded limit 1 Bit 9 Existing exceeded limit 2 Bit 10 Existing exceeded limit 3 Bits 11 - 15 Not used		
Err.r	r/w	base 1dP	63 8255	16510	Int	. —0	☐	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).
St.Do	r	base 1dP	24 8216	16432	Int	. —04	☐	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

8 ohnE

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
St.Ain	r	base 1dP	22 8214	16428	Int	. —016	Bit-coded status of the analog input (fault, e.g. short circuit)

Bit 0 Break at Input 1
Bit 1 Reversed polarity at Input 1
Bit 2 Short-circuit at Input 1
Bit 3 Not used
Bit 4 Break at Input 2
Bit 5 Reversed polarity at Input 2
Bit 6 Short-circuit at Input 2
Bits 7-15 Not used

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
St.Di	r	base 1dP	25 8217	16434	Int	—	Status of the digital inputs or of push-buttons (binary coded).

Bit 0: Input di1
Bit 8: Status of Enter key
Bit 9: Status of 'Down' key
Bit 10: Status of 'Up' key

9 ohnE1

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
T.Dis2	r/w	base 1dP	910 9102	18204	Text	. —.	This address contains 5 bytes for the text that is to appear in Display 2. No text: 1st byte 0x00.

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
LC	r/w	base 1dP	73 8265	16530	Float	,0888—8888	Limit value LC. The limit value LC is the main function of the temperature limiter/monitor. The alarm signal is triggered if the value rises above the limit, or if the value falls below the limit, depending on setting.
t.F1	r/w	base 1dP	70 8262	16524	Float	. —888	Filter time constant [s]. Every input is fitted with a digital (software) low-pass filter for suppressing process-related disturbances on the input leads. Higher filter settings improve the suppression, but increase the delay of the input signals.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
In.1	r	base 1dP	20 8212	16424	Float	,0888—8888	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).

9 ohnE1

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Sw.Nr	r	base 1dP	908 9100	18200	BCD	. —.	☐	Digits 7 to 12 of the software order number.
T.CodeNr	r	base 1dP	900 9092	18184	Text	. —.	☐	15-digit order number of the device.
In.1r	r	base 1dP	2005 10197	20394	Float	,0888—8888	☐	Measurement value before the measurement value correction (unprocessed).

10 ohnE2

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L.2	r/w	base 1dP	75 8267	16534	Float	,0888—8888	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
t.F2	r/w	base 1dP	71 8263	16526	Float	. —888	☐	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.
H.2	r/w	base 1dP	76 8268	16536	Float	,0888—8888	☑	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
In.2	r	base 1dP	21 8213	16426	Float	,0888—8888	☐	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
In.2r	r	base 1dP	2006 10198	20396	Float	,0888—8888	☐	Measurement value before the measurement value correction (unprocessed).

11 ohnE3

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
L.3	r/w	base 1dP	77 8269	16538	Float	,0888—8888	☑	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.

11 ohnE3

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
H.3	r/w	base 1dP	78 8270	16540	Float	,0888—8888	☑	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Out.3	r	base 1dP	34 8226	16452	Float	,0888—8888	☐	Value of the analog output [%]

12 othr

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
bAud	r/w	base 1dP	290 8482	16964	Enum	*Enum_Baud*		Bit rate of the interface (only visible with OPTION). The bit rate determines the transmission speed.

0	2400 Baud
1	4800 Baud
2	9600 Baud
3	19200 Baud
4	38.400 bits/s

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
Addr	r/w	base 1dP	291 8483	16966	Int	0—136	☐	Address on the interface (only visible with OPTION)
PrtY	r/w	base 1dP	292 8484	16968	Enum	*Enum_Parity*		Parity of data on the interface (only visible with OPTION). Simple possibility of checking that transferred data is correct.

0	No parity, with 2 stop bits.
1	even parity
2	odd parity
3	no parity (1 stop bit)

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
dELY	r/w	base 1dP	293 8485	16970	Int	. —1. .	☐	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.)

12 othr

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
D.Unt	r/w	base 1dP	284 8476	16952	Enum	*EnumDUnit*	display unit

0	without unit
1	Temperature unit
2	O2 unit
3	%
4	bar
5	mbar
6	Pa
7	kPa
8	psi
9	l
10	l/s
11	l/min
12	Ohm
13	kOhm
14	m
15	A
16	mA
17	V
18	mV
19	kg
20	g
21	t
22	Text of phys. Unit

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
O2	r/w	base 1dP	283 8475	16950	Enum	*O2Unit*	Parameter definition for O2 measurement. With O2 measurement it is necessary to define whether the parameter is to be evaluated in ppm or %.

0	Parameter for O2 function in ppm
1	Parameter for O2 function in %

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Unit	r/w	base 1dP	280 8472	16944	Enum	*Enum_Unit_rail*	Physical unit (temperature), f.e.°C

1	°C
2	°F
3	K

12 othr

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
dP	r/w	base 1dP	281 8473	16946	Enum	*Enum_dP*	Decimal point (max. no of decimals). Format of the measured value display.
						0	no digit behind the decimal point
						1	Display has one decimal.
						2	Display has two decimals.
						3	Display has three decimals.
dISP	r/w	base 1dP	282 8474	16948	Enum	*Enum_diSP*	Format of the measured value display, in digits. In order to ensure a steady display, the value of the last displayed digit is defined by a multiple of the total selected number of display digits.Example with a resolution of 2 decimals:The measured value '1.234' is displayed as 1.23; with a 2-digit display it is 1.24; with a 5-digit display it is 1.25, and with 10 digits it is 1.20.
						0	No display of measured value.Note: In case of a fault, the process value is displayed with the highest resolution until the fault has been remedied or the alarm has been reset.
						1	Full display resolution.
						2	Display resolution = 2 digits
						3	Display resolution = 5 digits
						4	Display resolution = 10 digits
C.dEL	r/w	base 1dP	294 8486	16972	Int	. —1. . ☐	For both interfaces, Modbus only. Additional acceptable delay time between 2 received bytes, before "end of message" is assumed. This time is needed if data is not transmitted continousely by the modem.
FrEq	r/w	base 1dP	260 8452	16904	Enum	*Enum_FrEq*	Switchover of the applied mains frequency 50 / 60 Hz, thereby better adaptation of the input filter for hum suppression.
						0	Mains frequency is 50 Hz.
						1	Mains frequency is 60 Hz.
S.IF	r/w	base 1dP	1700 9892	19784	Enum	*Enum_SIF*	activate system interface
						0	The system bus is deactivated.
						1	The system bus is activated (fieldbus communication via bus coppler).
Pr.rd	r/w	base 1dP	1710 9902	19804	Int	. —7080 ☐	Addresses of the data that are to be read out of the device via process data (15 values).
Pr.wr	r/w	base 1dP	1730 9922	19844	Int	. —7080 ☐	Addresses of the data that are to be written into the device via process data (15 values).

12 othr

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
D.Unt	r	base 1dP	340 8532	17064	Enum	*EnumDUnit*	Effective display unit (can be used for extended Operating Level or display 2)

0	without unit
1	Temperature unit
2	O2 unit
3	%
4	bar
5	mbar
6	Pa
7	kPa
8	psi
9	l
10	l/s
11	l/min
12	Ohm
13	kOhm
14	m
15	A
16	mA
17	V
18	mV
19	kg
20	g
21	t
22	Text of phys. Unit

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
E.1	r/w	base 1dP	310 8502	17004	Enum	*Defect*	Err 1 (internal error) Contact Service.

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Bus.Status	r	base 1dP	1750 9942	19884	Int	. —2 ☐	Busstatus Bit 0 = 1 Error on the HPR-bus Bit 1 = 1 Error on the external fieldbus
E.2	r/w	base 1dP	311 8503	17006	Enum	*Problem*	Err 2 (internal error, resettable) (As a process value via fieldbus interface not writable!)

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
E.3	r/w	base 1dP	329 8521	17042	Enum	*ConfErr*	configuration fault. Typical causes and suggested remedies: Missing or faulty configuration: check interactions in the configuration and parameter settings. (As a process value via fieldbus interface not writable!)

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

12 othr

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
E.4	r/w	base 1dP	328 8520	17040	Enum	*Problem*	Hardware fault.Cause: Code number and hardware are not identical. Remedy: Contact Service. (As a process value via fieldbus interface not writable!)

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
FbF.1	r/w	base 1dP	312 8504	17008	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!)

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.	

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Sht.1	r/w	base 1dP	313 8505	17010	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!)

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
POL.1	r/w	base 1dP	314 8506	17012	Enum	*Polarity*	Incorrect polarity at input INP1. Suggested remedy: reverse the polarity at INP1. (As a process value via fieldbus interface not writable!)

0	No fault, resetting of the incorrect polarity alarm possible (Reset).
1	An incorrect polarity fault has occurred and has been stored.
2	Incorrect polarity. The wiring of the input circuit is not correct.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
FbF.2	r/w	base 1dP	315 8507	17014	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!)

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.	

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Sht.2	r/w	base 1dP	316 8508	17016	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!)

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.2	r/w	base 1dP	317 8509	17018	Enum	*Polarity*	Incorrect polarity at input INP2. Suggested remedy: reverse the polarity at INP2. (As a process value via fieldbus interface not writable!)

Value	Meaning
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.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.1	r/w	base 1dP	323 8515	17030	Enum	*Limit*	Limit value 1 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)

Value	Meaning
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 1dP	324 8516	17032	Enum	*Limit*	Limit value 2 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)

Value	Meaning
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 1dP	325 8517	17034	Enum	*Limit*	Limit value 3 exceeded. Hint for trouble-shooting: check the process. (As a process value via fieldbus interface not writable!)

Value	Meaning
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
InF.1	r/w	base 1dP	326 8518	17036	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!)

Value	Meaning
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 1dP	327 8519	17038	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!)

Value	Meaning
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.

13 Out.1

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Out1	r	base 1dP	940 9132	18264	Enum	*Enum_Ausgang*	Status of the digital output

0	off
1	on

14 Out.2

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
O.Act	r/w	base 1dP	970 9162	18324	Enum	*Enum_OAct*	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.

0	direct / normally open
1	inverse / normally closed

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.1	r/w	base 1dP	973 9165	18330	Enum	*Enum_Lim1*	Output function: Signal limit 1

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.2	r/w	base 1dP	974 9166	18332	Enum	*Enum_Lim2*	Output function: Signal limit 2

0	not active
1	The output is activated by an alarm from limit value 2.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.3	r/w	base 1dP	975 9167	18334	Enum	*Enum_Lim3*	Output function: Signal limit 3

0	not active
1	The output is activated by an alarm from limit value 3.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
FAi.1	r/w	base 1dP	982 9174	18348	Enum	*Enum_FAi1*	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
FAi.2	r/w	base 1dP	983 9175	18350	Enum	*Enum_FAi2*	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.

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

14 Out.2

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
InF.1	r/w	base 1dP	985 9177	18354	Enum	*Enum_Inf1*	Output function: Signal Inf.1 status. The Inf.1 signal is generated, when the preset value of the operating hours counter has been reached.

Value	Description
0	not active
1	The output is activated by the status message 'Inf.1'.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
InF.2	r/w	base 1dP	986 9178	18356	Enum	*Enum_Inf2*	Output function: Signal Inf.2 status. The Inf.2 signal is generated, when the preset value of the switching cycle counter has been reached.

Value	Description
0	Not active
1	The output is activated by the status message 'Inf.2'.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Sb.Er	r/w	base 1dP	987 9179	18358	Enum	*Enum_SbErr*	Signal: error in internal system bus communication. The output is set when an error occurs in the internal system bus communication, or no communication is executed with the bus coupler.

Value	Description
0	not active
1	The output is activated by a system bus failure.

Signal

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Out2	r	base 1dP	990 9182	18364	Enum	*Enum_Ausgang*	Status of the digital output

Value	Description
0	off
1	on

15 Out.3

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
O.tYP	r/w	base 1dP	1035 9227	18454	Enum	*Enum_OtYP*	Signal type selection OUT

Value	Description
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

15 Out.3

ConF

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
O.Act	r/w	base 1dP	1020 9212	18424	Enum	*Enum_OAct*	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.

0	direct / normally open
1	inverse / normally closed

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Out.0	r/w	base 1dP	1036 9228	18456	Float	,0888—8888 ☐	Lower scaling limit of the analog output (corresponds to 0%). If current and voltage signals are used as output values, the display can be scaled to the output value in the Parameter Level. The output value of the lower scaling point is indicated in the respective electrical unit (mA / V).
Out.1	r/w	base 1dP	1037 9229	18458	Float	,0888—8888 ☐	Upper scaling limit of the analog output (corresponds to 100%). If current and voltage signals are used as output values, the display can be scaled to the output value in the Parameter Level. The output value of the upper scaling point is indicated in the respective electrical unit (mA / V).
O.Src	r/w	base 1dP	1038 9230	18460	Enum	*Enum_OSrc*	Signal source of the analog output (visible not with all output signal types O.TYP).

0	not used
3	process value
7	measured value INP1
8	measured value INP2

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
O.FAI	r/w	base 1dP	1039 9231	18462	Enum	*Enum_OFail*	fail behaviour

0	upscale
1	downscale

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.1	r/w	base 1dP	1023 9215	18430	Enum	*Enum_Lim1*	Output function: Signal limit 1

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

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.2	r/w	base 1dP	1024 9216	18432	Enum	*Enum_Lim2*	Output function: Signal limit 2

0	not active
1	The output is activated by an alarm from limit value 2.

Name	r/w	Adr. Integer		real	Typ	Value/off	Description
Lim.3	r/w	base 1dP	1025 9217	18434	Enum	*Enum_Lim3*	Output function: Signal limit 3

0	not active
1	The output is activated by an alarm from limit value 3.

15 Out.3

ConF

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
FAi.1	r/w	base 1dP	1032 9224	18448	Enum	*Enum_FAi1*	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.

Value	Description
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 1dP	1033 9225	18450	Enum	*Enum_FAi2*	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.

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

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
InF.1	r/w	base 1dP	1055 9247	18494	Enum	*Enum_Inf1*	Output function: Signal Inf.1 status. The Inf.1 signal is generated, when the preset value of the operating hours counter has been reached.

Value	Description
0	not active
1	The output is activated by the status message 'Inf.1'.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
InF.2	r/w	base 1dP	1056 9248	18496	Enum	*Enum_Inf2*	Output function: Signal Inf.2 status. The Inf.2 signal is generated, when the preset value of the switching cycle counter has been reached.

Value	Description
0	Not active
1	The output is activated by the status message 'Inf.2'.

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Sb.Er	r/w	base 1dP	1057 9249	18498	Enum	*Enum_SbErr*	Signal: error in internal system bus communication. The output is set when an error occurs in the internal system bus communication, or no communication is executed with the bus coupler.

Value	Description
0	not active
1	The output is activated by a system bus failure.

Signal

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Out3	r	base 1dP	1040 9232	18464	Enum	*Enum_Ausgang*	Status of the digital output

Value	Description
0	off
1	on

Name	r/w	Adr.	Integer	real	Typ	Value/off	Description
Out.3	r	base 1dP	1043 9235	18470	Float	,0888—8888 ☐	Value of the analog output [%]
Ou.3P	r	base 1dP	1044 9236	18472	Float	,0888—8888 ☐	Value of the analog output [mA/V/Hz]

16 rnG

PArA

Name	r/w	Adr. Integer		real	Typ	Value/off		Description
rnG.L	r/w	base 1dP	660 8852	17704	Float	,0888—8888	☐	Lower limit value. The lower setting limit for den limit value LC. The limit value LC is the main function of the temperature limiter / monitor.
rnG.H	r/w	base 1dP	661 8853	17706	Float	,0888—8888	☐	Upper limit value. The upper setting limit for den limit value LC. The limit value LC is the main function of the temperature limiter / monitor.

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