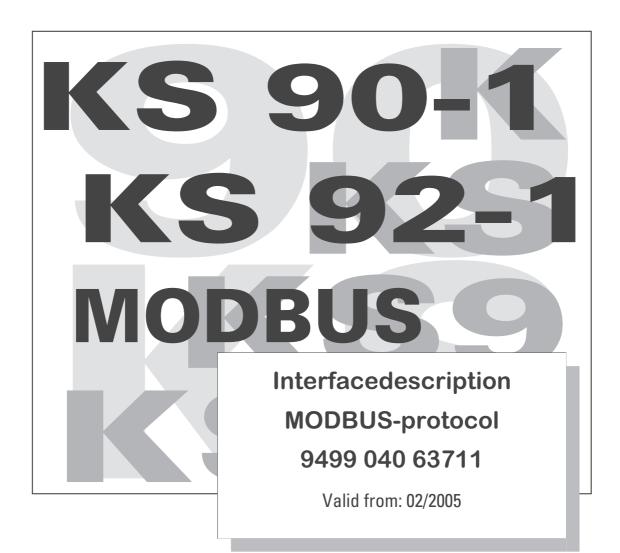
PMA Prozeß- und Maschinen-Automation GmbH



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



#### **Explanation of symbols:**



**General information** 

General warning

#### Caution: ESD-sensitive components

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## General

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

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
- ۰ 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:

#### **MODBUS Specifications** [1]

- 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:

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

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

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

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

9498 737 40633 9499 040 62918

## 2 Commissioning the interface

Instrument field bus connection is via the pins of connector B on the rear, via flat-pin connectors or via screw terminals dependent on version.

Construction of suitable cables must be done by the user.

The housing ventilation slots must not be covered.

additional protective filters or voltage limiters!

2.1	Mounting hints
-----	----------------

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



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

In plants where transient voltage peaks are susceptible to occur, the instruments must be equipped with



Caution! The instrument contains electrostatically sensitive components.



Please, follow the instructions given in the safety hints.

## 2.2 Electrical connections

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

## 2.2.1 RS 485 version (two-wire )

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

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

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



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

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

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

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

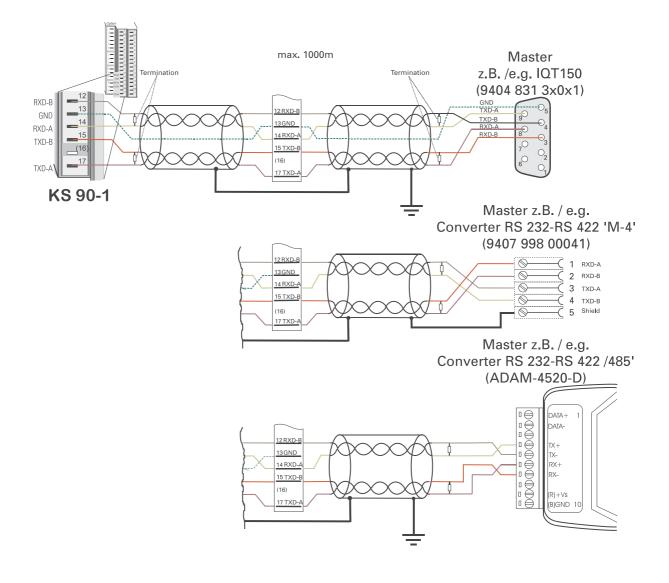
#### Notes:

- Terminating resistors between Data A and B at the cable ends (see 2.2.3 below)
- 2 Screening (see 2.2.2 below)
- **3** GND lead (see Fig. 6)

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

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

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



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

The RS 422 bus is of the RS 485 four-wire type with two pairs of conductors and a common ground. The data on the master wire pair (RXD) are received only by the slaves. The data on the slave wire pair (TXD) are received only by the master.

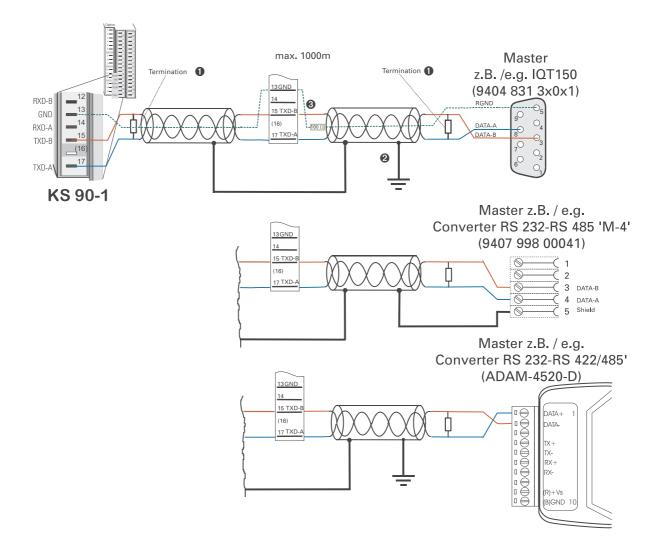
Allocation of descriptions for the four-wire MODBUS definition according to [1]:

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

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

The following cable connection methods are possible.

Fig. 2 connection example RS 485



#### 2.2.3 **Cable installation**

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

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

In particular, the following points must be considered:

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

#### 2.2.4 Screening

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

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

#### 2.2.5 **Terminating resistors**

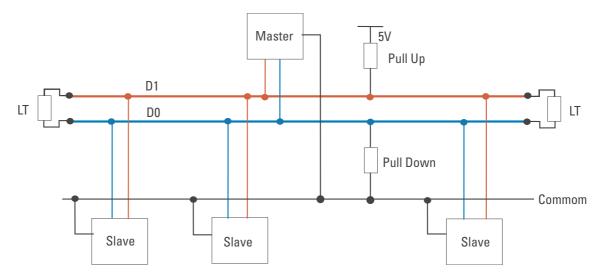
The widespread US Standard EIA RS 485 recommends fitting terminating resistors at each end of the bus cable. Terminating resistors usually have a value of approx. 120 ohms, and are connected in parallel between the data lines A and B (depending on the cable impedance; for details, see the cable manufacturer's data sheet). Their purpose is to eliminate reflections at the end of the leads, thus obtaining a good transmission guality. 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  $\pm$ 200mV between the data lines A and B, as seen by the receiver.



( Normally, an external voltage source is provided.

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



*Fig. 3 Recommended connections* 



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

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

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



i

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



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

## 2.2.6 Installation notes

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

#### - The device is not certified for installation in explosion-hazarded areas.

- Incorrect electrical connections can result in severe damage to the device.

- Please observe all safety instructions.

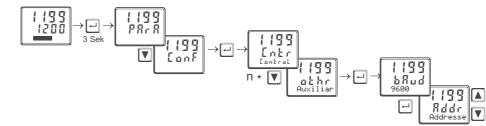
## 2.3 Bus settings

#### 2.3.1 Bus address

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

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

Fig. 4 Setting a bus address





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

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

#### 2.3.2 Transmission parameters



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

#### Baudrate (bAud)

The baudrate is the measure of data transmission speed. The devices support the following transmission speeds:

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

#### Parity / Stop bit (PrtY)

The parity bit is used to check whether an individual fault has occurred within a byte during transmission.

The device supports:

- even parity
- odd parity
- no parity

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



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

Other parameters are:

- 8 data bits
- 1 start bit
- 1 stop bit

1 or 2 stop bits can be selected when adjusting 'no parity'.

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

2.4

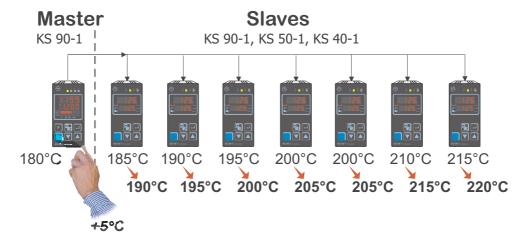
### Master operation (MASt)

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

#### Fig. 5 : Master function parameter setting

Parametrierung - Master.bct					
📲 🎥 📲 Parametrierung		<b>•</b>			
Ausgang 6 🔺	<ul> <li>Kürzel</li> </ul>	Bezeichnung	Wert	on 🔺	
🛛 🛁 💑 Logik	MASt	Modbus Master/Slave	1:Ja		
Sonstiges 🔤	Cycl	Masterzyklus [sek.]	5		
- Parameter	AdrO	Zieladresse	3180		
👆 👆 🔁	AdrU	Quellenadresse	3170		
	<ul> <li>Numb</li> </ul>	Anzahl der Daten	1	▼	

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



#### Fig. 6 : Example

## System layout



2.5

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

#### 2.5.1 Minimum configuration of a MODBUS installation

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

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

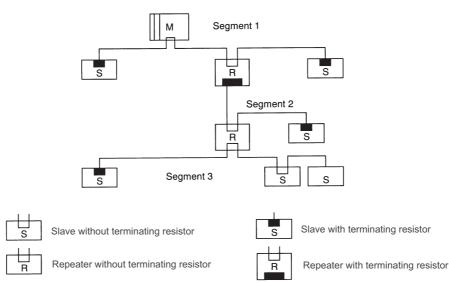
#### 2.5.2 Maximum configuration of a MODBUS installation

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



#### MODBUS devices must be connected in a line structure.

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



# 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.

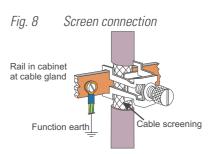
#### Fig. 7 structure

### 2.5.3 Wiring inside buildings

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

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

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<sup>2</sup> 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"

 $hef{eq: 1}$  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.

- (f) 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.
  - 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.
  - 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:

Funct	Function code Description		Explanation
hex	dez		
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	02	Starting address 650
Start address Low	8A	
No. of values	00	2 datums (2 words)
	02	
CRC	CRC-Byte1	
	CRC-Byte2	

Response:

Field name Value (hex) Explanation		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	Process data, parameters or configuration data.	
	DE	Address 650= 222	
Word 2	01	Process data, parameters or configuration data.	
	4D	Address 651= 333	
CRC	CRC-byte1		
	CRC-byte2		



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

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

#### 3.6.2 Writing a single value

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

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

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

#### Response:

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

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

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



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

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

## **3.7** Writing several values

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

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

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

## 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.



3.8

#### If a transmission error is detected, <u>no</u> 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: 80hex + 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 OF, 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)
OxOC	Reset of the counter for faulty message transmissions to this slave (parity or CRC error)
OxOD	Return transmission of the counter for messages answered with error code
0x0E	Return transmission of the message counter for this slave
OxOF	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:

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

Request:

#### **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 OB	00 00	Message counter

#### **3.9.7** Return transmission of the counter for faulty message transmissions

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

Definition of the received and returned data:

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

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

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

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

#### **3.9.9** Return transmission of the message counter for this slave

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

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

#### **3.9.10** Return transmission of the counter for unanswered messages

The slave is instructed to return the value of its counter for unanswered messages.

The counter contains the sum of all messages addressed to the slave, which were not answered because of internal events or detected errors.

Definition of the received and returned data:

Sub-function	<b>Received data field</b>	Transmitted data field
00 OF	00 00	Contents of counter for unanswered messages

#### 3.9.11 Return transmission of the counter for messages answered with NAK

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

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

#### 3.9.12 Return transmission of the counter for messages answered with Busy

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

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

#### 3.9.13 Return transmission of the parity error counter

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

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

#### 3.9.14 Return transmission of the framing error counter

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

Definition of the received and returned data:

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

#### 3.9.15 Return transmission of the counter for too long messages

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

Definition of the received and returned data:

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

# 4 MODBUS addresses, address areas, and address formats

## 4.1 Area definitions

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

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

Address area		Data transfer format	Smallest	Largest	Resolution
hex	dez.		transferable value	transferable value	
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	1638432767	Float (IEEE format)	-1.0 E+037	+1.0 E+037	+/-1.4E-045



4.2

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

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

## 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	Туре	Value/off	Description
		base					
		1dP					
— ba	/W ddress i	per nteger Ada Inte	scription of the mitted type of dress for intege eger without de	access: R = er values ecimals	read, W =	write	

- 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

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#### 6 **Address tables**

The following sections describe the address tables for:

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

#### 6.1 Notes to program addresses

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

- The currently active program can be addressed with 6100 ff.
- The start addresses of the stored programs begin with address 6200 ff for program 1, 6300 ff for program 2 and • so on (see table below)
- The program structure is equal for each program. ۰

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



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

**Address tables** 

	Signal	29
1 3	11 ohnE3	
5 6	Signal	29
	12 othr	
12	ConF	30
13	Signal	32
13	12 0	
	<u>13</u> Out.1	<u> </u>
14	ConF	36 38
14 14	Signal	30
14	14 Out.2	
	ConF	39
	Signal	40
15		
16	15 Out.3	
17	ConF	41
	Signal	43
10		
18 18	<u>16</u> Out.5	
10	ConF	44 46
17	Signal	40
	17 Out.6	
19	ConF	46
20	Signal	48
21		
	18 PAr.2	
21	PAr	49
21 24	10 0 0 0	
27	19 ProG	10
	PAr Signal	49 50
26	Signal	52
26	20 SEtP	
	PAr	53
	Signal	54
29		
	21 Tool	
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PAr	3
Signal	6

# 2 InP.1

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PAr	1
Signal	1

## 3 InP.2

ConF	14
PAr	14
Signal	14

## 4 Lim

ConF	15
PAr	16
Signal	17

# 5 Lim2

ConF	18
PAr	18
Signal	19

## 6 Lim3

ConF	10
	• •
PAr	
Signal	21

## 7 LOGI

ConF	21
Signal	 24

# 8 ohnE

PAr	26
Signal	26

## 9 ohnE1

Signal .....

10 ohnE2

Operating Version4

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#### Operating Version4

# Code Table

	Cntr										
Î	ConF										
I	Name	r/w	Adr. In	teger	real	Тур	Value/off	Description			
	SP.Fn	r/w	base 1dP 2dP 3dP	3150 11342 19534 27726	39068	Enum	Enum_SPFN	Basic configuration for setpoint processing, e.g. 'setpoint controlle switchable to external setpoint'. Configuration of special, controller-dependent setpoint functions.			
-								roller can be switched over to external set-point (->LOGI/SP.E)			
							10 controller with runner control. heated slowly maintains the	oller for setpoint profile. The program profile is definable by the user. a start-up circuit. The start-up function is a protective function, e.g. with how . To prevent destruction of high-performance heating elements, they must to remove any humidity. With activated start-up function, the controller reduced starting temperature for a defined dwell period. Subsequently, the cohes over to the main setpoint.			
							11 Setpoint contro with the start- runner control. heated slowly maintains the	ollers are switchable to external setpoint and to a second setpoint, always up function. The start-up function is a protective function, e.g. with hot . To prevent destruction of high-performance heating elements, they must to remove any humidity. With activated start-up function, the controller reduced starting temperature for a defined dwell period. Subsequently, the ches over to the main setpoint.			
	C.Fnc	r/w	base 1dP 2dP 3dP	5050 13242 21434 29626	42868	Enum	Enum_CFnc	Control behaviour (algorithm) referred to output value: e.g. 2- or 3-point controller, signaller, 3-point stepping control.			
L			501	27020			0 on/off controll	er or signaller with one output. The on/off controller or signaller switches			
							1 PID control, e.g an analog outp	lue drifts from the setpoint more than the hysteresis. g. heating, with one output: Switched as a digital output (2-point) or used but (continuous). PID controllers respond quickly to changes of the control typically do not exhibit any permanent control offset.			
								2-point controller with partial/full load switch-over. 2 digital outputs: Y1 is output and Y2 is the changeover contact for D/Y.			
							3 2 x PID control used as an ana	I, e.g. heating/cooling. Two outputs: Switched as a digital output (3-point) alog output (continuous). PID controllers respond quickly to changes of the on, and typically do not exhibit any permanent control offset.			
								ng controller, e.g. for motor actuators. Two digital outputs. No actuating nerated when the process is lined out.			
	mAn	r/w	base 1dP 2dP 3dP	5051 13243 21435 29627	42870	Enum	Enum_mAn	Enables the output value to be adjusted in manual operation. If adjustment is not enabled, the output value cannot be changed in manual operation, neither with the front keys nor via the interface.Note: This setting does not affect the auto/manual switchover function.			
L								ue cannot be changed in manual operation, neither with the front keys no			
via the interface.1The output value is to be adjusted in manual operation						ce. ue is to be adjusted in manual operation (see also LOGI/mAn).					
	C.Act	r/w	base 1dP 2dP 3dP	5052 13244 21436 29628	42872	Enum	Enum_CAct	Operating sense of the controller. Inverse operation (e.g. heating) means increased heat input when the process value falls. Direct operation (e.g. cooling) means increased heat input when t process value increases.			
<ul> <li>Inverse or opposed-sense response, e.g. heating. The controller output is increased v falling process value, and decreased with a rising process value.</li> <li>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.</li> </ul>											

# Code Table

	Cntr									
	ConF									
	Name	r/w	Adr. In	teger	real	Тур	Value/off	Description		
	FAIL	r/w	base 1dP 2dP 3dP	5053 13245 21437 29629	42874	Enum	Enum_FAIL	With the sensor break response, the operator determines the instrument's reaction to a sensor break, thus ensuring a safe process condition.		
I		<b></b>					0 controller outp	uts switched off		
							Note for three 0.01 =< Y2 =< Note for signa	Y2 (Caution: fixed parameter Y2, not controller output Y2!). -point stepping controller: With Y2 < 0.01 CLOSED is set (DY= -100%), with 99.9 no output is set (DY=0%), with Y2 > 99.9 OPEN is set (DY= +100%). Illers: With Y2 < 0.01 OFF is set, with 0.01 =< Y2 =< 99.9 status keeps ith Y2 > 99.9 ON is set.		
							2 y = mean output. The maximum permissible output can be adjusted with parameter Y To prevent determination of inadmissible values, mean value formation is only if the control deviation is lower than parameter L.Ym.			
							adjusted with	ut, manual operation enabled. The maximum permissible output can be parameter Ym.H. To prevent determination of inadmissible values, mean in is only if the control deviation is lower than parameter L.Ym.		
	rnG.L	r/w	base 1dP 2dP 3dP	5059 13251 21443 29635	42886	Float	-19999999	Lower limit for the controller's operating range. The control range independent of the measurement range. Reducing the control rang will increase the sensitivity of the self-tuning process.		
	rnG.H	r/w	base 1dP 2dP 3dP	5060 13252 21444 29636	42888	Float	-19999999	Upper limit for the controller's operating range. The control range independent of the measurement range. Reducing the control rang will increase the sensitivity of the self-tuning process.		
	SP2C	r/w	base 1dP 2dP 3dP	5054 13246 21438 29630	42876	Enum	Enum_SP2C	When switching over to the 2nd setpoint SP.2, control is performed without cooling.		
1		1					0 Standard (cooling permitted with all setpoints).			
							1 No cooling wit	th active SP.2.		
	CYCL	r/w	base 1dP 2dP 3dP	5055 13247 21439 29631	42878	Enum	Enum_CYCL	Duty cycle for 2-point and 3-point controllers. Internally, the controller calculates a continuous output value, which is converted into switching pulses for digital outputs. The user can adapt the setting to calculate various duty cycles (on/off ratio).		
							output. With v sufficiently to	htub curve'. The adjusted duty cycles t1 and t2 are valid for $\pm$ 50% control ery small and very large control outputs, the effective duty cycle is increase prevent nonsensically short operating pulses. The shortest pulses are f t1 and ¼ of t2.		
							an adjustable	ooling (standard switching behaviour for heating). Cooling only starts abov temperature value (E.H20). Cooling 'On' with fixed pulse duration (t.on). vith minimum pulse duration (t.oFF), which varies according to controller		
							characteristic of controller of	ter cooling (standard switching behaviour for heating). The cooling ensures that controller action is relatively weak between 0 and approx. 70' utput. Above that, controller action increases rapidly up to the maximum he parameter 'F.H20' can be used to alter the curve of the cooling		
							maintained ov	pulses for heating and cooling. The adjusted duty cycles t1 and t2 are er the entire output range. The parameter tp is used to adjust the minimum . Shorter pulses are added internally until a pulse of length tp can be		

С	ntr							
С	onF							
Nar	ne	r/w	Adr. In	iteger	real	Тур	Value/off	Description
tunl	Ξ	r/w	base 1dP 2dP 3dP	5056 13248 21440 29632	42880	Enum	Enum_tune	Self-tuning procedure / sequence. Choice between:step response tuning during start-up and pulse response tuning at setpoint; or pulse response tuning during start-up and at setpoint; or only step response tuning during start-up, and no tuning at setpoint (no pulse).
							The step funct range. At setp	h step function, impulse function at setpoint. ion at start up requires a control deviation of more than 10% of the control oint, with control deviation less than 10% of the control range, tuning is impulse function.
							1 At start-up wit control). Always tuning 10% of the con set-point the c	h impulse function. Setting for fast controlled systems (e.g. hot runner with impulse function. At start up, with a control deviation of more than htrol range, the control loop is optimized for a wide control range. At ontrol deviation during self-tuning is small.
								I at set-point always tune step function at start up. with step function at start up, regardless of the control deviation.
Strt		r/w	base 1dP 2dP 3dP	5057 13249 21441 29633	42882	Enum	Enum_Strt	Start of self-tuning. Self-tuning can always be started manually at the request of the operator. Here, it is possible to determine that self-tuning is started automatically under the following conditions: On power-up or when an oscillation of the process value is detected.
		I					0 no automatic s	tart (manual start via front interface)
							1 Manual or aut (oscillating of the output value	pomatic start of auto-tuning at power on or when oscillating is detected process value by more than $\pm 0.5\%$ of the control range, and simultaneously ie by more than 20%.) Note: Though the process is unchanged, at power on ne-consuming) auto-tuning is started.
Adt	0	r/w	base 1dP 2dP 3dP	5061 13253 21445 29637	42890	Enum	Enum_Adt0	Optimization of the switching cycles t1 and t2 for the DED conversion can be disabled here. In order to fine-tune the positioning action, the switching periods are changed by the self-tuning function, if automatic tuning is configured.
							0 The cycle dura obtained.	tion is determinated by auto-tuning. Thereby the best controlling results are
							bad control be	tion is not determinated by auto-tuning. An oversized cycle duration causes havior. An undersized cycle duration causes a more frequent switching,

which can raise the wearout of mechanical actuators (relay, contactor).

• PA	rA							
Name		r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
Pb1		r/w	base 1dP 2dP 3dP	5000 13192 21384 29576		Float	19999	Proportional band 1 (heating) in engineering unit, e.g. °C. Pb defines the relationship between controller output and control deviation. The smaller Pb is, the stronger is the control action for a given control deviation. If Pb is too large or too small, the control loop will oscillate (hunting).
Pb2		r/w	base 1dP 2dP 3dP	5001 13193 21385 29577		Float	19999	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).

**Operating Version4** 

# 1 Cntr

PArA	4						
Name	r/w	Adr. Integer	real	Тур	Value/off		Description
ti1	r/w	base 500 1dP 1319 2dP 2138 3dP 2957	6	Float	19999	7	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 500 1dP 1319 2dP 2138 3dP 2957	5 7	Float	19999		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 500 1dP 1319 2dP 2138 3dP 2958	8	Float	19999		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 500 1dP 1319 2dP 2138 3dP 2958	7 9	Float	19999		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 500 1dP 1319 2dP 2139 3dP 2958	0	Float	0,49999		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 500 1dP 1319 2dP 2139 3dP 2958	1	Float	0,49999		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 501 1dP 1320 2dP 2139 3dP 2959	6 8	Float	09999		Neutral zone, or switching difference of the signaller [engineering unit].Too small: unnecessarily high switching frequency.Too large: reduced controller sensitivity.With 3-point controllers this slows down the direct transition from heating to cooling. With 3-point stepping controllers, it reduces the switching operations of the actuator around setpoint.
d.SP	r/w	base 501 1dP 1320 2dP 2140 3dP 2959	0	Float	-19999999		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 500 1dP 1320 2dP 2139 3dP 2958	1 3	Float	0,19999	2	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.

0	perating	Version4
- 1		

Cntr						
PArA	4					
Name	r/w	Adr. Integer	real	Тур	Value/off	Description
tt	r/w	base 5015 1dP 13207 2dP 21399 3dP 29591		Float	39999	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 5018 1dP 13210 2dP 21402 3dP 29594	2	Float	-105105	Lower output limit [%] The range is depedant of the type of controller: 2 point controller: 0ymax+1 3 point controller: -105 ymax-1
Y.Hi	r/w	base 5019 1dP 13211 2dP 21403 3dP 29595		Float	-105105	Upper output limit [%] The range is ymin+1105
Y2	r/w	base 5017 1dP 13209 2dP 21401 3dP 29593		Float	-100100	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 5020 1dP 13212 2dP 21404 3dP 29596		Float	-105105	Offset for die positioning value [%]. This is added to the controller output, and has the most effect with P and PD controllers. (With PIE 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 5021 1dP 13213 2dP 21405 3dP 29597		Float	-105105	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 5022 1dP 13214 2dP 21406 3dP 29598		Float	19999	Max. control deviation (xw), at the start of mean value calculation [engineering unit]. When calculating the mean value, data are only taken into account if the control deviation is small enough. 'Lym' is a preset value that determines how precisely the calculated output value is matched to the setpoint.
E.H2O	r/w	base 5013 1dP 13205 2dP 21397 3dP 29589		Float	-19999999	Min. temperature for water cooling. Below the set temperature no water cooling happens
t.on	r/w	base 5010 1dP 13202 2dP 21394 3dP 29586		Float	0,199999	Impulse length for water cooling. Fixed for all values of controller output. The pause time is varied.
t.oFF	r/w	base 5011 1dP 13203 2dP 21395 3dP 29587		Float	19999	Min. pause time for water cooling. The max. effective controller output results from t.on/(t.on+t.off)·100%

# 1 Cntr

PArA							
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
F.H2O	r/w	base 1dP 2dP 3dP	5012 13204 21396 29588	42792	Float	0,19999 [	Adaptation of the (non-linear) water-cooling characteristic. If the cooling action is very strong, and causes an unfavourable transition between heating and cooling, a non-linear characteristic can reduce the cooling action considerably. Adjust FH20 = 1 for output values up to -70%; FH20 = 2 for values up to approx80%, and FH20 = 0.5 for up to approx60%.
HYS.L	r/w	base 1dP 2dP 3dP	5028 13220 21412 29604	42824	Float	09999 [	3 Switching hysteresis below the setpoint of the signaller [engineering unit].
HYS.H	r/w	base 1dP 2dP 3dP	5029 13221 21413 29605	42826	Float	09999 [	D Switching hysteresis above the setpoint of the signaller [engineering unit].

Signa	al						
Name	r/v	/ Adr. Ir	nteger	real	Тур	Value/off	Description
Tu2	r	base 1dP 2dP 3dP	5145 13337 21529 29721	43058	Float	09999	'Cooling' delay time of the loop. Tu is calculated by the self-tuning function: It is the time delay before the process reacts significantly. In effect, Tu is a dead time that is determined by the reaction of the process to a change of the control output. It is used for defining controller action.
Vmax2	r	base 1dP 2dP 3dP	5146 13338 21530 29722	43060	Float	09999	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.
Кр2	r	base 1dP 2dP 3dP	5147 13339 21531 29723	43062	Float	09999	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. In	teger	real	Тур	Value/off		Description
	St.Cntr	r	base 1dP 2dP 3dP	5100 13292 21484 29676	42968	Int	065535		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 1: Switching Bit 2: Sensor er Bit 3: Controlsig 0: automa Bit 4: Controlsig 0: Y2 not Bit 5: Controlsig 0: not act Bit 6: Controlsig 0: contr. c Bit 7: Controlsig 0: parame 1: parame Bit 8: Loopalarr 0: no alarr 1: alarm Bit 9: Soft start 0: not act 1: activ Bit 10: Rate to s 0: not act 1: activ Bit 11: Not used Bit 12-15: Interr 0 0 0 0 Automa 0 0 0 1 Selftun 0 0 1 0 Selftun 0 0 1 0 Selftun 0 0 1 1 Sensor 0 1 0 0 Not use 0 1 0 1 Manua 0 1 1 Not used 1 0 0 0 Abortio	g sigrar gna atic gna atic gna acti acti acti acti acti acti acti act	I: Manual/automatic 1: manual I: Y2 iv 1: Y2 activ I: Ext. setting of outputsignal 1: activ I: Controller off 1: contr. off II: The activ parameter set set 1 set 2 nction point functional statuses (operating state) is running faulty for operator signal)
	diFF	r	base 1dP 2dP 3dP	5104 13296 21488 29680	42976	FIDAL			Control deviation, is defined as process value minus setpoint. Positive Xw means that the process value is above the setpoint. A small control deviation indicates precise control.
	POS	r	base 1dP 2dP 3dP	5105 13297 21489 29681	42978	Float	0100		The position feedback Yp shows the actuator position with 3-point stepping controllers. If Yp is outside the limits Ymin and Ymax, the output of positioning pulses is suppressed.
	Tu1	r	base 1dP 2dP 3dP	5141 13333 21525 29717	43050	Float	09999		'Heating' delay time of the loop. Tu is calculated by the self-tuning function: It is the time delay before the process reacts significantly. In effect, Tu is a dead time that is determined by the reaction of the process to a change of the control output. It is used for defining controller action.

# 1 Cntr

Signa						
Name	r/w	Adr. Integer	real	Тур	Value/off	Description
Ypid	r	base51031dP132992dP21483dP2967	7	Float	-120120	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 5150 1dP 1334 2dP 2153 3dP 2972	1	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.
					with the prev	ort the self-tuning process, and the controller returns to normal operation ious parameter settings.
					1 Start of the s operation.	elf-tuning process is possible during manual or automatic controller
Yman	r/w	base 515 <sup>-</sup> 1dP 1334 2dP 2153 3dP 2972	5	Float	-110110	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 5152 1dP 1334 2dP 2153 3dP 2972	6	Float	-220220	Differential preset output value, which is added to the actual outp value during manual operation. Negative values reduce the output
Yinc	r/w	base 5153 1dP 1334 2dP 2153 3dP 2972	7	Enum	Enum_YInc	Increasing the output value. There are two speeds: 40 s or 10 s fo the change from 0 % to 100 %. Note: The 3-point stepping controller translates the increments as UP.
	-			•	0 Not active 1 increment ou	tput
Ydec	r/w	base 5154 1dP 13344 2dP 2153 3dP 2973	5 3	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 ou	Itput
SP.EF	r	base 510 <sup>-</sup> 1dP 1329 2dP 2148 3dP 2967	3	Float	-19999999	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 functio into account. Comparison with the effective process value leads to the control deviation, from which the necessary controller response is derived.
In.1	r	base         5102           1dP         1329           2dP         2148           3dP         2967	6	Float	-19999999	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).

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Cntr								
Signa	al							
Name	Name r/w Adr. Integer real Typ V							Description
St.Tune	r			43048	Int	065535		Status information during self-tuning, e.g. the actual condition, and possible results, warnings, and error messages.
						Bit 1 Operatin Bit 2 Result o Bit 3 - 7 Not u Bit 8 - 11 Res 0 0 0 0 No me 0 0 0 1 Succe 0 0 1 0 Succe 0 0 1 1 Error: 0 1 0 0 Error: 0 1 0 0 Error: 0 1 1 0 Error: 1 0 0 0 Error:	ig mo f con used ult of essag ssful ssful, Wror No re Turni Risk o Step Setpo	out; 0 = No; 1 = Yes de 'Self-tuning controller; 0 = Off; 1 = On troller self-tuning; 0 = OK; 1 = Fault the 'heating' attempt e / Attempt still running with risk of exceeded setpoint g operating sense sponse from process ng point too low of exceeded setpoint output too small pint reserve too small of 'cooling' attempt (same as heating attempt)
Vmax1	r	base 1dP 2dP 3dP	5142 13334 21526 29718	43052	Float	09999		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.
Кр1	r	base 1dP 2dP 3dP	5143 13335 21527 29719	43054	Float	09999		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. is calculated by the self-tuning function, and is used for defining controller action.

1	Cntr							
•	Signal							
	Name	r/w	Adr. Int	teger	real	Тур	Value/off	Description
	Msg2	r	base 1dP 2dP 3dP	5148 13340 21532 29724	43064	Enum	Enum_Msg	The result of self-tuning for 'cooling' indicates whether self-tuning was successful, and with what result.
							0 No message	/ Tuning attempt still running
								as been completed successfully. The new parameters are valid.
							Note: Self-tu	vas successful, but with a warning. The new parameters are valid. ning was aborted due to the risk of an exceeded setpoint, but useful vere determined. Possibly repeat the attempt with an increased setpoint
							Possible rem output sense	reacts in the wrong direction. edy: Reconfigure the controller (inverse <-> direct). Check the controller (inverse <-> direct).
								from the process. Perhaps the control loop is open. edy: Check sensor, connections, and process.
							Possible rem	value turning point of the step response is too low. edy: Increase the permitted step output range, i.e. increase the parameter y') or reduce the parameter Y.Lo ('cooling').
							were determ	vas aborted due to the risk of an exceeded setpoint. No useful parameters ined. edy: Repeat the attempt with an increased setpoint reserve.
							Possible rem	but change is not large enough (minimum change > 5 %). edy: Increase the permitted step output range, i.e. increase the parameter g') or reduce the parameter Y.Lo ('cooling').
							change. Acknowledgi	r is waiting. Setpoint reserve must be given before generating the step output nent of this error message leads to switch-over to automatic mode. shall be continued, change set-point, change process value, or decrease ge.
							9 Impulse tunin not closed: c connections	

				_					
	Cntr								
	Signal								
	Name	r/w	Adr. In	teger	real	Тур	Value/	off	Description
	Msg1	r	base 1dP 2dP 3dP	5144 13336 21528 29720	43056	Enum	Enum_N	lsg	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	s been completed successfully. The new parameters are valid.
							2	Note: Self-tuni	s successful, but with a warning. The new parameters are valid. ng was aborted due to the risk of an exceeded setpoint, but useful re determined. Possibly repeat the attempt with an increased setpoint
							3	Possible remed output sense (i	acts in the wrong direction. ly: Reconfigure the controller (inverse <-> direct). Check the controller nverse <-> direct).
							4		om the process. Perhaps the control loop is open. ly: Check sensor, connections, and process.
							5	Possible remed	lue turning point of the step response is too low. ly: Increase the permitted step output range, i.e. increase the parameter or reduce the parameter Y.Lo ('cooling').
							6	were determin	s aborted due to the risk of an exceeded setpoint. No useful parameters ed. ly: Repeat the attempt with an increased setpoint reserve.
							7	The step outpu Possible remed	t change is not large enough (minimum change > 5 %). ly: Increase the permitted step output range, i.e. increase the parameter or reduce the parameter Y.Lo ('cooling').
							8	change. Acknowledgme	is waiting. Setpoint reserve must be given before generating the step outputent of this error message leads to switch-over to automatic mode. hall be continued, change set-point, change process value, or decrease
							9	Impulse tuning not closed: che connections ar	
	YGrw	r/w	base 1dP 2dP 3dP	5155 13347 21539 29731	43078	Enum	Enum_Y	GrwLs	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.
L		ļ				L	0	Slow change o	f Y, from 0% to 100% in 40 seconds.
								0	

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

#### **Operating Version4**

InP		_						
	.1							
Cor	٦F							
Name	r/	w	Adr. Int	teger	real	Тур	Value/off	Description
S.tYP	r/v		base 1dP 2dP 3dP	1150 9342 17534 25726	35068	Enum	Enum_StYP	Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted
	I						0 thermocouple Fahrenheit: -1	type L (-100900°C), Fe-CuNi DIN
								type J (-1001200°C), Fe-CuNi
							2 thermocouple Fahrenheit: -1	type K (-1001350°C), NiCr-Ni 482462°F
								type N (-1001300°C), Nicrosil-Nisil
								type S (01760°C), PtRh-Pt10%
							5 thermocouple Fahrenheit: 32	type R (01760°C), PtRh-Pt13% 23200°F
								ocouple with a linearization characteristic selectable by the user. This inear signals to be simulated or linearized.
							Measuring rar	100.0(150.0)°C) nge up to 150°C at reduced lead resistance. 28212(302) °F
							21 Pt100 (-200.0 Fahrenheit: -3	
							22 Pt 1000 (-200. Fahrenheit: -3	
							23 Special : 04 For KTY 11-6 v	500 Ohms. with preset special linearization (-50150 °C or -58302 °F).
							30         Current : 020           40         010V / 210	0 mA / 420 mA
							40 01017210	,
					35070	Enum	Enum_SLin	
S.Lin	r/v		base 1dP 2dP 3dP	1151 9343 17535 25727	33070	Lindin		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.
S.Lin	r/\		1dP	9343 17535	33070		0 No special lin	linearization. The linearization table can be created with the Engineering Tool. The default characteristic is for KTY 11-6 temperature sensors.
S.Lin	r/\		1dP 2dP	9343 17535	33070		0 No special lin 1 Special linear	linearization. The linearization table can be created with the Engineering Tool. The default characteristic is for KTY 11-6 temperature sensors.
	r/ı	W	1dP 2dP	9343 17535 25727	33088		0 No special lin 1 Special linear	linearization. The linearization table can be created with the Engineering Tool. The default characteristic is for KTY 11-6 temperature sensors. earization. ization. Definition of the linearization table is possible with the Engineerin
		W	1dP 2dP 3dP base 1dP 2dP	9343 17535 25727 160 8352 16544			0 No special line 1 Special linear Tool. The defa Enum_Corr3 0 Without scalin	linearization. The linearization table can be created with the Engineering Tool. The default characteristic is for KTY 11-6 temperature sensors. earization. ization. Definition of the linearization table is possible with the Engineerin ult setting is the characteristic of the KTY 11-6 temperature sensor. Measured value correction / scaling
S.Lin Corr		W	1dP 2dP 3dP base 1dP 2dP	9343 17535 25727 160 8352 16544			0       No special linear         1       Special linear         Tool. The defa         Enum_Corr3         0       Without scalin         1       The offset cor lower input val	linearization. The linearization table can be created with the Engineering Tool. The default characteristic is for KTY 11-6 temperature sensors. earization. ization. Definition of the linearization table is possible with the Engineerin ult setting is the characteristic of the KTY 11-6 temperature sensor. Measured value correction / scaling
		W	1dP 2dP 3dP base 1dP 2dP	9343 17535 25727 160 8352 16544			0       No special linear Tool. The defa         1       Special linear Tool. The defa         Enum_Corr3       0         0       Without scalin         1       The offset cor lower input va display value.         2       Two-point cor on-line in the as input value	linearization. The linearization table can be created with the Engineering Tool. The default characteristic is for KTY 11-6 temperature sensors. earization. ization. Definition of the linearization table is possible with the Engineerin ult setting is the characteristic of the KTY 11-6 temperature sensor. Measured value correction / scaling

2	InP.1						
	PArA						
ĺ	Name	r/w	Adr. Integer	real	Тур	Value/off	Description
	InL.1	r/w	base 110 1dP 929 2dP 174 3dP 256	-	Float	-19999999	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 110 1dP 929 2dP 174 3dP 256	3 15	Float	-19999999	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 110 1dP 920 2dP 174 3dP 256	6	Float	-19999999	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 110 1dP 920 2dP 174 3dP 256	5 87	Float	-19999999	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 110 1dP 929 2dP 174 3dP 256	6 8	Float	0100	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. Ir	nteger	real	Тур	Value/off	Description
ln.1r	r	base 1dP 2dP 3dP	1170 9362 17554 25746		Float	-19999999	Measurement value before the measurement value correction (unprocessed).
Fail	r	base 1dP 2dP 3dP	1171 9363 17555 25747		Enum	Enum_InpFail	Input circuit fault: faulty or incorrectly connected sensor.
						0 no error 1 sensor break 2 Incorrect pola 4 Short circuit a	• •

In.1	r	base 1dP	1172 9364	35112	Float	-19999999	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
		2dP	17556				
		3dP	25748				
F.Inp	r/w	base	1180	35128	Float	-19999999	rorong the value for an analog input in a rorong intorves the
F.Inp	r/w	base 1dP	1180 9372	35128	Float	-19999999	external operation of an input. The instrument takes over the value
F.Inp	r/w			35128	Float	-19999999	rorong the value for an analog input in a rorong intorves the

### 3 InP.2

ConF							
Name	r/w	Adr. In	teger	real	Тур	Value/off	Description
I.Fnc	r/w	base 1dP 2dP 3dP	161 8353 16545 24737	33090	Enum	Enum_IFnc	Selection of the function assigned to the value at INP2, e.g. value at INP2 is the external setpoint.
						<ol> <li>Heating curren</li> <li>External setpo (Switchover is)</li> </ol>	bsequent input data are skipped) ti input. int SP.E or (depending on version) external setpoint shift SP.E. done via -> LOGI/SP.E). ernal positioning value Y.E (switchover via -> LOGI/Y.E)
S.tYP	r/w	base 1dP 2dP 3dP	1250 9442 17634 25826	35268	Enum	Enum_StYP2	Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted.
						30         Current : 020           31         050 mA current	) mA / 420 mA ent (AC)

	PArA
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PAIA								
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off		Description
InL.2	r/w	base		35168	Float	-19999999		Input value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the
		1dP	9392					Parameter Level. The display of the input value of the lower scaling
		2dP	17584					point (e.g. 4 mA) is done using the corresponding electrical value.
		3dP	25776					point (c.g. 1 m/) is done doing the corresponding creation value.
OuL.2	r/w	base	1201	35170	Float	-19999999		Display value of the lower scaling point. Depending on sensor type,
		1dP	9393					the input value can be scaled to the required display value in the
		2dP	17585					Parameter Level. The operator can change the display value of the
		3dP	25777					lower scaling point, e.g. 4 mA is displayed as 2 [pH].
InH.2	r/w	base	1202	35172	Float	-19999999		Input value of the upper scaling point. Depending on sensor type,
		1dP	9394					the input value can be scaled to the required display value in the
		2dP	17586					Parameter Level. The display of the input value of the upper scaling
		3dP	25778					point (e.g. 20 mA) is done using the corresponding electrical value.
OuH.2	r/w	base	1203	35174	Float	-19999999		Display value of the upper scaling point. Depending on sensor type,
	1700			55174	riuat		-	the input value can be scaled to the required display value in the
		1dP	9395					Parameter Level. The operator can change the display value of the
		2dP	17587					upper scaling point, e.g. 20 mA is displayed as 12 [pH].
		3dP	25779					

Na	ame	r/w	Adr. Inte					
			Aur. Inte	ger r	real	Тур	Value/off	Description
In	n.2	r	base	1270	35308	Float	-19999999	Measurement value after the measurement value correction (e.g.
			1dP	9462				with offset or 2-point correction, and scaling).
			2dP	17654				
			3dP	25846				

3	InP.2							
	Signal							
	Name	r/w	Adr. In	teger	real	Тур	Value/off	Description
	Fail		base 1dP 2dP 3dP	1271 9463 17655 25847	35310	Enum	Enum_InpFail	Input circuit fault: faulty or incorrectly connected sensor.
							0 no error 1 sensor break 2 Incorrect pola 4 Short circuit a	• •
	ln.2r		base 1dP 2dP 3dP	1272 9464 17656 25848	35312	Float	-19999999	Measurement value before the measurement value correction (unprocessed).
	F.Inp		base 1dP 2dP 3dP	1280 9472 17664 25856	35328	Float	-19999999	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

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

Lim							
Con	F						
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
Src.1	r/w	base 1dP 2dP 3dP	2151 10343 18535 26727	37070	Enum	Enum_Src	Source for limit value. Selection of which value is to be monitored
I					1	0 Process value	= absolute alarm
						Note: Monitor	ion xw (process value - set-point) = relative alarm ing with the effective set-point Weff. For example using a ramp it is the point, not the target set-point of the ramp.
						changes. Limit	ion Xw (= relative alarm) with suppression during start-up and setpoint t value monitoring is continued as soon as the control deviation comes rm limits again, at the latest after 10 * Tn.
						6 effective set-p	point Weff. he ramp-function changes the effective set-point untill it matches the
							iable y (controller output)
						internal set-po	
							ing with the internal set-point Wint. For example using a ramp it is the t, not the changing set-point of the ramp.
						target setpoin 11 Control deviat	t, not the changing set-point of the ramp. ion Xw (= relative alarm) with suppression during start-up and setpoint value monitoring is continued as soon as the control deviation comes with
HC.AL	r/w	base 1dP 2dP 3dP	2050 10242 18434 26626	36868	Enum	target setpoin 11 Control deviat change. Limit	t, not the changing set-point of the ramp. ion Xw (= relative alarm) with suppression during start-up and setpoint value monitoring is continued as soon as the control deviation comes with
HC.AL	r/w	1dP 2dP	10242 18434	36868	Enum	target setpoin 11 Control deviat change. Limit the alarm limit	t, not the changing set-point of the ramp. ion Xw (= relative alarm) with suppression during start-up and setpoint value monitoring is continued as soon as the control deviation comes with ts again. Activation of alarm heat current function. Either overload or break can be monitored, overload = current l > heat current limit, or break = current l < heat current limit. Short circuit is monitored in both cases.
HC.AL	r/w	1dP 2dP	10242 18434	36868	Enum	target setpoin         11       Control deviat change. Limit the alarm limit         Enum_HCAL         0       No heating cu         1       Overload and start	t, not the changing set-point of the ramp. ion Xw (= relative alarm) with suppression during start-up and setpoint value monitoring is continued as soon as the control deviation comes with ts again. 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. rrent alarm. short circuit monitoring. Overload = current I > heat current limit.
HC.AL	r/w	1dP 2dP	10242 18434	36868	Enum	target setpoin         11       Control deviat change. Limit the alarm limit         Enum_HCAL         0       No heating cu         1       Overload and start	t, not the changing set-point of the ramp. ion Xw (= relative alarm) with suppression during start-up and setpoint value monitoring is continued as soon as the control deviation comes with ts again. Activation of alarm heat current function. Either overload or breal can be monitored, overload = current I > heat current limit, or bre = current I < heat current limit. Short circuit is monitored in both cases. rrent alarm.
HC.AL	r/w	1dP 2dP 3dP	10242 18434 26626	42884		target setpoin         11       Control deviat change. Limit the alarm limit         Enum_HCAL         0       No heating cu         1       Overload and start	t, not the changing set-point of the ramp. ion Xw (= relative alarm) with suppression during start-up and setpoint value monitoring is continued as soon as the control deviation comes with ts again. Activation of alarm heat current function. Either overload or breal can be monitored, overload = current I > heat current limit, or bre = current I < heat current limit. Short circuit is monitored in both cases. rrent alarm. short circuit monitoring. Overload = current I > heat current limit.

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PAIA							
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
L.1	r/w	base 1dP 2dP 3dP	2100 10292 18484 26676		Float	-19999999	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.

4	L	im

•	PArA								
	Name r/w Adr. Integer real Typ Value/off			Value/off	Description				
	H.1	r/w	base 1dP 2dP	2101 10293 18485	36970	Float	-19999999		Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.
			3dP	26677					
	HYS.1	r/w	base 1dP 2dP 3dP	2102 10294 18486 26678	36972	Float	09999		Hysteresis of the limit value. Switching difference for upper and lower limit value. The limit value must change by this amount (rise above upper limit or fall below lower limit) before the limit value alarm is reset.
	dEL.1	r/w	base 1dP 2dP 3dP	2103 10295 18487 26679	36974	Float	09999		Delayed alarm of a limit value. The alarm is only triggered after the defined delay time. It is only indicated, and possibly stored, if it is still present after the delay time has elapsed.
	HC.A	r/w	base 1dP 2dP 3dP	2000 10192 18384 26576	36768	Float	-19999999		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.

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	SIULA

Sign <i>a</i> Name		Adr. Ir	nteger	real	Тур	Value/off		Description
St.HC	r	base 1dP 2dP 3dP	2070 10262 18454 26646	36908	Int	03		Status of the heating current alarm. Displayable are heating current short-circuit and/or heating current alarm. Depending on configuration, the heating current alarm is either an interruption of heating current (I < limit value) or heating current overload (I > limit value).
HC	r	base 1dP 2dP 3dP	2071 10263 18455 26647	36910	Float	-19999999		Measured heating current [A]. Apart from the short circuit test, and depending on configuration, an overcurrent test (current I > heating current limit) and an open circuit test (current I < heating current limit) is executed. The heating current is measured by means of a (separate) current transformer, whereby the input range can be scaled.
SSr	r	base 1dP 2dP 3dP	2072 10264 18456 26648	36912	Float	-19999999		Measured current with SSr [A]. The heating current (SSR) is short circuited, if there is a current flow even though the controller output is switched off.Suggested remedy: check heating current circuit, replace solid-state relay if necessary.
St.Lim	r	base 1dP 2dP 3dP	2170 10362 18554 26746	37108	Enum	Enum_LimStatus		Limit value status: No alarm present or stored.
<u>.</u>						0 no alarm 1 latched a	alarm	

2 A limit value has been exceeded.

5	Lim2												
•	ConF												
	Name	r/w	Adr. Inte	eger	real	Тур	Value/off	Description					
	Fnc.2	r/w	base 1dP 2dP 3dP	2250 10442 18634 26826	37268	Enum	Enum_Fcn	Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.					
							0 No limit value	monitoring.					
							1 measured value monitoring. The alarm signal is generated, if the limit is exceede measured value is within the limits (including hysteresis) again, this alarm signal resetted.						
								e monitoring + alarm status latch. An alarm signal is generated, if the limit latched alarm signal remains latched until it is manually resetted.					
	Src.2	r/w	base 1dP 2dP 3dP	2251 10443 18635 26827	37270	Enum	Enum_Src	Source for limit value. Selection of which value is to be monitored.					
	<u></u>						0 Process value	= absolute alarm					
							Note: Monitor	on xw (process value - set-point) = relative alarm ing with the effective set-point Weff. For example using a ramp it is the point, not the target set-point of the ramp.					
							changes. Limit	on Xw (= relative alarm) with suppression during start-up and setpoint value monitoring is continued as soon as the control deviation comes m limits again, at the latest after 10 * Tn.					
							6 effective set-p For example th internal (targe	e ramp-function changes the effective set-point untill it matches the					
							7 correcting vari	able y (controller output)					
							internal set-po Note: Monitor target setpoint	ing with the internal set-point Wint. For example using a ramp it is the t, not the changing set-point of the ramp.					
								ion Xw (= relative alarm) with suppression during start-up and setpoint value monitoring is continued as soon as the control deviation comes within is again.					

### • PArA

Name	r/w	Adr. In	teger	real	Тур	Value/off	Description
L.2	r/w	base 1dP 2dP 3dP	2200 10392 18584 26776	37168	Float	-19999999	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 2dP 3dP	2201 10393 18585 26777	37170	Float	-19999999	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.
HYS.2	r/w	base 1dP 2dP 3dP	2202 10394 18586 26778	37172	Float	09999	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.

# 5 Lim2

0								
•	PArA							
	Name	r/w	Adr. In	iteger	real	Тур	Value/off	Description
	dEL.2	r/w	base	2203	37174	Float	09999 🗆	Delayed alarm of a limit value. The alarm is only triggered after the
			1dP	10395				defined delay time. It is only indicated, and possibly stored, if it is
			2dP	18587				still present after the delay time has elapsed.
			3dP	26779				

### Signal

Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
St.Lim	r	base	2270	37308	Enum	Enum_LimStatus	Limit value status: No alarm present or stored.
		1dP	10462				
		2dP	18654				
		3dP	26846				
	•					0 no alarm	•
						1 latched alarn	1

2 A limit value has been exceeded.

ConF							
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
Fnc.3	r/w	base 1dP 2dP 3dP	2350 10542 18734 26926		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	e monitoring.
							ue monitoring. The alarm signal is generated, if the limit is exceeded. If the ue is within the limits (including hysteresis) again, this alarm signal is
							lue monitoring + alarm status latch. An alarm signal is generated, if the lir A latched alarm signal remains latched until it is manually resetted.

6	Lim3								
•	ConF								
	Name	r/w	Adr. In	teger	real	Тур	Value/o	off	Description
	Src.3	r/w	base 1dP 2dP 3dP	2351 10543 18735 26927	37470	Enum	Enum_Src		Source for limit value. Selection of which value is to be monitored.
							-		- absolute alarm
								Note: Monitori changing set-p	on xw (process value - set-point) = relative alarm ng with the effective set-point Weff. For example using a ramp it is the oint, not the target set-point of the ramp.
								changes. Limit	on Xw (= relative alarm) with suppression during start-up and setpoint value monitoring is continued as soon as the control deviation comes m limits again, at the latest after 10 * Tn.
								effective set-p For example th internal (target	e ramp-function changes the effective set-point untill it matches the
								•	able y (controller output)
								internal set-po Note: Monitori	e deviation xw (actual value - internal set-point) = deviation alarm to int ng with the internal set-point Wint. For example using a ramp it is the , not the changing set-point of the ramp.
									on Xw (= relative alarm) with suppression during start-up and setpoint value monitoring is continued as soon as the control deviation comes within s again.

### • PArA

PAIA								
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off		Description
L.3	r/w	base 1dP	2300 10492	37368	Float	-19999999	2	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
		2dP	18684					
		3dP	26876					
H.3	r/w	base	2301	37370	Float	-19999999		Upper limit value. The alarm is triggered if the value rises above the
		1dP	10493					limit, and is reset with upper lower limit value plus hysteresis.
		2dP	18685					
		3dP	26877					
HYS.3	r/w	base	2302	37372	Float	09999		Hysteresis of the limit value. Switching difference for upper and
		1dP	10494					lower limit value. The limit value must change by this amount (rise
		2dP	18686					above upper limit or fall below lower limit) before the limit value alarm is reset.
		3dP	26878					
dEL.3	r/w	base	2303	37374	Float	09999		Delayed alarm of a limit value. The alarm is only triggered after the
		1dP	10495					defined delay time. It is only indicated, and possibly stored, if it is
		2dP	18687					still present after the delay time has elapsed.
		3dP	26879					

# 6 Lim3

•									
•	Signal								
	Name	r/w	Adr. In	iteger	real	Тур	Value/	off	Description
	St.Lim	r	base	2370	37508	Enum	Enum_L	imStatus	Limit value status: No alarm present or stored.
			1dP	10562					
			2dP	18754					
			3dP	26946					
							0	no alarm	
							1	latched alarm	
							2	A limit value h	as been exceeded.

ConF							
Name	r/w	Adr. Inte	eger	real	Тур	Value/off	Description
L_r	r/w	base 1dP 2dP	9243 17435	34870	Enum	Enum_dInP1	Local / remote switchover (Remote: Adjustment of all values via front panel is blocked).
		3dP	25627				
							witch-over via interface is possible)
						1 always active	
						2 Digital Input D	
							only visible with OPTION) only visible with OPTION)
						5 F-key switches	
							5.
SP.2	r/w	base	1052	34872	Enum	Enum_dInP4	Source of the control signal for activating the second (safety)
		1dP	9244				setpoint (SP.2=) W2.
		2dP	17436				Note: W2 is not restricted by the setpoint limits.
		3dP	25628				
		501	20020			0 no function (sv	/ witch-over via interface is possible)
						2 Digital Input D	
							only visible with OPTION)
							only visible with OPTION)
						5 F-key switches	
SP.E	r/w	base	1053	34874	Enum	Enum_dInP1	Switching between internal set-point an external setpoint SP.E.
		1dP	9245				external SP.E is either the absolute set-point Wext or the offset
		2dP	17437				the set-point (dependent on instrument and configuration).
		3dP	25629				
		JUF	23027			0 no function (or	uitab aver via interface is possible)
						<ul><li>0 no function (sv</li><li>1 always active</li></ul>	witch-over via interface is possible)
						i aiways active	
						2 Digital Input D	N1 switches
						2 Digital Input D 3 DI2 switches (	
						3 DI2 switches (	011 switches (only visible with OPTION) (only visible with OPTION)

#### **Operating Version4**

LOGI						
ConF						
Name	r/w	Adr. Integer	real	Тур	Value/off	Description
Y2	r/w	base 1054 1dP 9246 2dP 17438 3dP 25630		Enum	Enum_dInP3	Source of the control signal for activating the second positioning output Y2. Activated Y2 = positioner control. Caution: The parameter 'positioning output Y2' must not be confused with the controller output Y2!
					<ul> <li>2 Digital Input D</li> <li>3 DI2 switches (</li> <li>4 DI3 switches (</li> <li>5 F-key switches</li> </ul>	(only visible with OPTION) (only visible with OPTION)
Y.E	r/w	base 1055 1dP 9247 2dP 17439 3dP 25631	34878	Enum	Enum_dInP2	Signal for activating the external output value. The internal output value Ypid is the controllers reaction on the process, with extern output value Y.E the controller output is controlled.
					<ul> <li>2 Digital Input D</li> <li>3 DI2 switches (</li> <li>4 DI3 switches (</li> <li>5 F-key switches</li> </ul>	(only visible with OPTION) (only visible with OPTION)
mAn	r/w	base 1056 1dP 9248 2dP 17440 3dP 25632		Enum	Enum_dlnp2	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.
	I				0 no function (sv	witch-over via interface is possible)
						ted (manual station)
					4 DI3 switches ( 5 F-key switches	(only visible with OPTION) (only visible with OPTION)
C.off	r/w	base 1057 1dP 9249 2dP 17441 3dP 25633		Enum	Enum_dInP3	Source of the control signal for disabling all the controller outputs.Note: Forcing has priority, and remains active; alarm processing also remains active.
					<ul> <li>2 Digital Input D</li> <li>3 DI2 switches (</li> <li>4 DI3 switches (</li> <li>5 F-key switches</li> </ul>	(only visible with OPTION) (only visible with OPTION)

ode T	able	Э					Operating Version4
LOGI							
ConF	-						
Name		Adr. In	teger	real	Тур	Value/off	Description
m.Loc	r/w	base 1dP 2dP 3dP	1058 9250 17442 25634	34884	Enum	Enum_dlnp4	Source of the control signal to disable the auto/manual key. If the A/M key is disabled, switchover to manual operation is not possible.
<b></b>	·						vitch-over via interface is possible)
						2 Digital Input D	
							only visible with OPTION)
						4 DI3 switches ( 5 F-key switches	only visible with OPTION)
						5 I-Key Switches	5.
Err.r	r/w	base 1dP 2dP 3dP	1059 9251 17443 25635	34886	Enum	Enum_dInP3	Source of the control signal for resetting all stored entries in the error list (the list contains all error messages and alarms). If an alarm is still present, i.e. the source of trouble has not been remedied, stored alarms cannot be acknowledged (reset).
						0 no function (sv	vitch-over via interface is possible)
						2 Digital Input D	
							only visible with OPTION)
							only visible with OPTION)
						5 F-key switches 6 Auto/manual k	s. key switches (A/M key)
booS	r/w	base 1dP 2dP 3dP	1060 9252 17444 25636	34888	Enum	Enum_dInp1	Source of the control signal for activating the boost function: The setpoint is increased by the value SP.bo for the duration t.bo. The boost function causes a brief setpoint increase, which is used to clear blocked channels from 'frozen' material in a hot runner system.
	•	•				0 no function (sv	vitch-over via interface is possible)
						1 always active	
						2 Digital Input D	
							only visible with OPTION) only visible with OPTION)
						5 F-key switches	
							,
Pid.2	r/w	base 1dP 2dP 3dP	1061 9253 17445 25637	34890	Enum	Enum_dInP4	Source of the control signal for switchover between the two parameter sets. The second parameter set is complete, and comprises Pb (= proportional band), ti (= integral action time), and (= derivative action time) for heating and for cooling. All other control parameters, e.g. the switching duty cycles, are valid for b parameter sets.
		-					vitch-over via interface is possible)
						2 Digital Input D	I1 switches
						• •	
						3 DI2 switches (	only visible with OPTION) only visible with OPTION)

F-key switches. 5

	OGI										
(	ConF										
	lame	r/w	Adr. In	teger	real	Тур	Value/off	Description			
F	P.run	r/w	base 1dP 2dP 3dP	1062 9254 17446 25638	34892	Enum	Enum_dInP6	Source of the control signal for switching the programmer between Run and Stop. On units with a simple programmer (only 1 program), a stop immediately causes a reset, followed by a new start. With units that have been defined as program controllers (several programs), the program is stopped, and then continued.			
		<ul> <li>no function</li> <li>Digital Input DI1 switches</li> <li>DI2 switches (only visible with OPTION)</li> <li>DI3 switches (only visible with OPTION)</li> <li>F-key switches.</li> </ul>									
d	li.Fn	r/w	base 1dP 2dP 3dP	1050 9242 17434 25626	34868	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'.						

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Signa										
Name	r/w	Adr. Inte	eger	real	Тур	Value/off		Description		
St.Di	r		1070 9262 17454 25646	34908	Int	07	2	Status of the digital inputs or of push-buttons (binary coded).		
Bit 0 Input 1 Bit 1 Input 2 Bit 2 Input 3 Bit 8 Status of 'F' key Bit 9 Status of 'A/M' key Bit 10 Status of 'Sel' key Bit 11 Status of 'Down' key Bit 12 Status of 'Up' key Bit 13 Status of 'Loc' key										
L-R	r/w	201	1080 9272 17464 25656	34928	Int	01 C		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	201	1081 9273 17465 25657	34930	Int	01 C	_	Signal for activating the second (safety) setpoint (SP.2=) W2. Note: Setpoint W2 is not restricted by the setpoint limits!		

LOGI							
Signa							
Name		Adr. Integ	er rea	al	Тур	Value/off	Description
Wi_We	r/w	1dP 9 2dP 17	082 34 274 7466 5658	1932	Int	01	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	1dP 9 2dP 17	083 34 275 7467 5659	1934	Int	01	Signal for activating the 2nd output value Y2. With selected Y2, the output is operated as a positioner.Caution: Do not confuse the parameter 'fixed output Y2' with the controller output Y2!
Y_Y.E	r/w	1dP 9 2dP 17	084 34 276 7468 5660	1936	Int	01	Signal for activating the external positioning value. The controller is operated as positioner.
A-M	r/w	1dP 9 2dP 17	085 34 277 7469 5661	1938	Int	01	Signal for activating manual operation. In the manual mode, the controller provides output signals independent of the process.
C.Off	r/w	1dP 9 2dP 17	086 34 278 7470 5662	1940	Int	01	Signal for disabling all the controller outputs. Note: Forcing has priority; alarm processing remains active.
L.AM	r/w	1dP 9 2dP 17	087 34 279 7471 5663	1942	Int	01	Signal for disabling manual operation. Triggers a forced switchover to automatic mode, and disables the front panel A/M key (also if other functions have been assigned to the key).
Err.r	r/w	1dP 9 2dP 17	088 34 280 7472 5664	1944	Int	01	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	1dP 9 2dP 17	089 34 281 7473 5665	1946	Int	01	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.
Boost	r/w	1dP 9 2dP 17	090 34 282 7474 5666	1948	Int	01	Signal for activating the boost function. The boost function causes a brief setpoint increase, which is used e.g. to clear blocked channels ('frozen' material) in a hot-runner system.
Set1.2	r/w	1dP 9 2dP 17	091 34 283 7475 5667	1950	Int	01	Switch-over of parameter set. The 2nd parameter set contains one complete set each of Pb (= proportional band), ti (= integral action time), and td (= derivative action time) for heating and for cooling. All other control parameters, such as switching duty cycles, are valid for both parameter sets.
Prg.R.S	r/w	1dP 9 2dP 17	092 34 284 7476 5668	1952	Int	01	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.

7	LOGI							
	Signal							
	Name	r/w	Adr. Inte	eger	real	Тур	Value/off	Description
	F.Di	r/w	base 1dP 2dP 3dP	1094 9286 17478 25670	34956	Int	07	Forcing of digital inputs. Forcing involves the external operation of at least one input. The instrument takes over this input value (preset value for inputs from a superordinate system, e.g. for a function test.)
			•				Bit 0 Forcing of dig Bit 1 Forcing of dig Bit 2 Forcing of dig Bit 3 Forcing of dig Bit 4 Forcing of dig	ital input 2 ital input 3 ital input 4

### 8 ohnE

•	PArA							
	Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
	Conf	r/w	base	1	32770	Int	02	Start/Stop and abortion of the configuration mode
			1dP	8193				0 = End of configuration
			2dP	16385				1 = Start of configuration 2 = Abort configuration
			3dP	24577				

### • Signal

Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
UPD	r/w	base 1dP 2dP 3dP	95 8287 16479 24671		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.

Hw.Opt	r	base	200	33168	Int	065535	
		1dP	8392				
		2dP	16584				
		3dP	24776				
Sw.Op	r	base	201	33170	Int	0255	Software version XY Major and Minor Release (e.g. 21 = Version
		1dP	8393				2.1). The software version specifies the firmware in the unit. For the
		2dP	16585				correct interaction of E-Tool and device, it must match the operating
		3dP	24777				version (OpVersion) in the E-Tool.
Bed.V	r	base	202	33172	Int	0255	Operating version (numeric value). For the correct interaction of
		1dP	8394				E-Tool and device, the software version and operating version must
		2dP	16586				match.
		3dP	24778				
Unit	r	base	203	33174	Int	0255	Identification of the device.
		1dP	8395				
		2dP	16587				
		3dP	24779				

8	ohnE							
•	Signal							
	Name	r/w	Adr. Integer	real	Тур	Value/off		Description
	S.Vers	r	base 204 1dP 8396 2dP 16588 3dP 24780		Int	100255		The sub-version number is given as an additional index for precise definition of software version.
	Uident	r	base 910 1dP 9102 2dP 17294 3dP 25486	34588	Text			Device identification. Via this Modbus address, up to 14 data units (28 bytes) can be defined. Bytes 1 - 15 order number of the device Bytes 16 - 19 Ident number 1 Bytes 20 + 21 Ident number 2 Bytes 22 - 25 OEM number Bytes 26 - 28 Software order number
	St.Ala	r	base 250 1dP 8442 2dP 16634 3dP 24826	33268	Int	031		Alarm status: Bit-wise coded status of the individual alarms, e.g. exceeded limit value or Loop.
						Bit 1 Existing/s Bit 2 Existing/s Bit 3 Not used Bit 4 Existing/s Bit 5 Existing/s Bit 6 Existing/s Bit 7 Not used Bit 8 Existing e Bit 9 Existing e Bit 10 Existing e Bit 11 Not used Bit 12 Existing I Bit 13 Existing I Bit 14 Existing S Bit 15 Not used	tore tore tore tore kcee kcee l loop heat	d heating current alarm d SSR alarm eded limit 1 eded limit 2 eeded limit 3 alarm ting current alarm alarm
	St.Do	r	base 251 1dP 8443 2dP 16635 3dP 24827		Int	031		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		Adr. In	teger	real	Тур	Value/off	Description
S	St.Ain	r	base 1dP 2dP 3dP	252 8444 16636 24828	33272	Int	07 C	Bit-coded status of the analog input (fault, e.g. short circuit)
							Bit 10 Short-circu Bit 11 Not used	plarity at Input 1 t at Input 1 plarity at Input 2 t at Input 2 put 3 (only KS 90) plarity at Input 3 (only KS 90) uit at Input 3 (only KS 90)
S	St.Di	r	base 1dP 2dP 3dP	253 8445 16637 24829	33274	Int	07 C	Status of the digital inputs or of push-buttons (binary coded).
							Bit 0 Input 1 Bit 1 Input 2 Bit 2 Input 3 Bit 8 Status of 'F Bit 9 Status of 'A Bit 10 Status of ' Bit 11 Status of ' Bit 12 Status of ' Bit 13 Status of '	/M <sup>°</sup> key Sel' key Down' key Up' key
F	F.Di	r/w	base 1dP 2dP 3dP	303 8495 16687 24879	33374	Int	01 C	Forcing of digital inputs. Forcing involves the external operation of at least one input. The instrument takes over this input value (preset value for inputs from a superordinate system, e.g. for a function test.)
		-					Bit 0 Forcing of d Bit 1 Forcing of d Bit 2 Forcing of d Bit 3 Forcing of d Bit 4 Forcing of d	igital input 2 igital input 3 igital input 4
F	F.Do	r/w	base 1dP 2dP 3dP	304 8496 16688 24880	33376	Int	015 C	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).

**Operating Version4** 

# 9 ohnE1

• Signa	a l						
Name	r/w	Adr. In	iteger	real	Тур	Value/off	Description
In.1	r	base 1dP 2dP 3dP	232 8424 16616 24808	33232	Float	-19999999	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
In.1r	r	base 1dP 2dP 3dP	240 8432 16624 24816	33248	Float	-19999999	Measurement value before the measurement value correction (unprocessed).
F.Inp	r/w	base 1dP 2dP 3dP	300 8492 16684 24876	33368	Float	-19999999	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.)

# 10 ohnE2

Signa	1						
Name	r/w	Adr. In	iteger	real	Тур	Value/off	Description
In.2	r	base 1dP 2dP 3dP	233 8425 16617 24809	33234	Float	-19999999	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
In.2r	r	base 1dP 2dP 3dP	241 8433 16625 24817	33250	Float	-19999999	Measurement value before the measurement value correction (unprocessed).
F.Inp	r/w	base 1dP 2dP 3dP	301 8493 16685 24877	33370	Float	-19999999	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 ohnE3

•	Signal							
	Name	r/w	Adr. In	nteger	real	Тур	Value/off	Description
	F.Out1	r/w	base	305	33378	Float	0120	Forcing value of the analog output. Forcing involves the external
			1dP	8497				operation of an output, i.e. the instrument has no influence on this
			2dP	16689				output. (Used for the operation of free outputs e.g. by a supervisory PLC.)
			3dP	24881				160.7

othr						
ConF						
Name	r/w	Adr. Integer	real	Тур	Value/off	Description
D2.Err	r/w	base 1 1dP 83 2dP 165 3dP 247	77	Enum	Enum_Disp2E	Queued faults can be displayed directly in the 2nd line of the display. In case of a fault, the display then alternates between the value of the lower display line (standard = setpoint) and the error message for the fault with the highest priority (blinking display).
					the error mess In case of a fa lower display	is not switched over in case of a fault. The fault is signalled via the LED, a sage is shown in the error list. ult, display line 2 alternates between the error message and the value of t line- The fault with the highest priority is displayed as long as it is present ed) faults must be acknowledged in order to remove them from the display.
F.Coff	r/w	base 1 1dP 83 2dP 165 3dP 247	76	Enum	Enum_Coff	The standard disabling procedure only switches off the controller outputs, whereby the alarms, displays, and other functions remain active. Alternatively, all functions can be switched off (including alarms and displays).
					value 0.0, and e.g. alarms an 1 All the control	controller functions are disabled. The analog controller outputs have the the switching outputs generate the logical state FALSE. All other function d displays, continue operating in the normal manner. ller functions are disabled. The analog outputs have the value 0.0, and the puts generate the logical state FALSE. If configured, an inversion is carried
bAud	r/w	base 18 1dP 83 2dP 165 3dP 247	64	Enum	Enum_Baud	Bit rate of the interface (only visible with OPTION). The bit rate determines the transmission speed.
	-			-	0 2400 Baud	•
					1 4800 Baud 2 9600 Baud	
					3 19200 Baud	
Addr	r/w	base 18 1dP 83 2dP 165 3dP 247	65	Int	1247	Address on the interface (only visible with OPTION)
PrtY	r/w	base 18 1dP 83 2dP 165 3dP 247	66	Enum	Enum_Parity	Parity of data on the interface (only visible with OPTION). Simple possibility of checking that transferred data is correct.
	-			1	0No parity, with1even parity2odd parity3no parity (1 str	
dELY	r/w	base 11 1dP 83 2dP 165 3dP 247	67	Int	0200	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.)

othr							
Con	-						
Name		Adr. lı	nteger	real	Тур	Value/off	Description
Unit	r/w	base 1dP 2dP 3dP	170 8362 16554 24746	33108	Enum	Enum_Unit	Physical unit (temperature), f.e.°C
	Į				1	0 without uni	t
						1 °C 2 °F	
dP	r/w	base	171	33110	Fnum	Enum_dP	Decimal point (max. no of decimals). Format of the measured va
u	1,00	1dP 2dP	8363 16555	55110		Linuin_di	display.
		3dP	24747			0 no diait beh	ind the decimal point
						1 Display has	one decimal.
							two decimals. three decimals.
LEd	r/w	base 1dP 2dP 3dP	190 8382 16574 24766	33148	Enum	Enum_Led	Meaning of the signalling LEDs. Selection of a combination of the displayable signals.
		1			1	•	outputs OUT1, OUT2, and OUT3 are displayed.
							ontroller output y1 (heating / open), alarm2, and alarm3.
						alarm?	ontroller output y1 (heating / open), controller output y2 (cooling / close),
						alarm3 3 Display of c alarm3	ontroller output yr (neating / open), controller output y2 (cooling / close), ontroller output y2 (cooling / close), controller output y1 (heating / open),
C.dEL	r/w	base 1dP 2dP 3dP	184 8376 16568 24760	33136	Int	3 Display of c alarm3	ontroller output y2 (cooling / close), controller output y1 (heating / open), For both interfaces, Modbus only. Additional acceptable delay t between 2 received bytes, before "end of message" is assumed
C.dEL FrEq		1dP 2dP	8376 16568 24760		Int Enum	3 Display of c alarm3	<ul> <li>ontroller output y2 (cooling / close), controller output y1 (heating / open),</li> <li>For both interfaces, Modbus only. Additional acceptable delay t between 2 received bytes, before "end of message" is assumed This time is needed if data is not transmitted continousely by the second second</li></ul>
		1dP 2dP 3dP base 1dP	8376 16568 24760 150 8342			3 Display of c alarm3 0200 [	<ul> <li>ontroller output y2 (cooling / close), controller output y1 (heating / open),</li> <li>For both interfaces, Modbus only. Additional acceptable delay t between 2 received bytes, before "end of message" is assumed This time is needed if data is not transmitted continousely by th modem.</li> <li>Switchover of the applied mains frequency 50 / 60 Hz, thereby</li> </ul>
		1dP 2dP 3dP base 1dP 2dP	8376 16568 24760 150 8342 16534			3 Display of c alarm3 0200 C Enum_FrEq 0 Mains frequ	<ul> <li>ontroller output y2 (cooling / close), controller output y1 (heating / open),</li> <li>For both interfaces, Modbus only. Additional acceptable delay ti between 2 received bytes, before "end of message" is assumed This time is needed if data is not transmitted continousely by th modem.</li> <li>Switchover of the applied mains frequency 50 / 60 Hz, thereby</li> </ul>
	r/w	1dP 2dP 3dP base 1dP 2dP	8376 16568 24760 150 8342 16534 24726		Enum	3 Display of c alarm3 0200 C Enum_FrEq 0 Mains frequ	<ul> <li>ontroller output y2 (cooling / close), controller output y1 (heating / open),</li> <li>For both interfaces, Modbus only. Additional acceptable delay t between 2 received bytes, before "end of message" is assumed This time is needed if data is not transmitted continousely by th modem.</li> <li>Switchover of the applied mains frequency 50 / 60 Hz, thereby better adaptation of the input filter for hum suppression.</li> </ul>
FrEq	r/w	1dP 2dP 3dP base 1dP 2dP 3dP	8376 16568 24760 150 8342 16534 24726	33068	Enum	<ul> <li>3 Display of c alarm3</li> <li>0200</li> <li>Enum_FrEq</li> <li>0 Mains frequ</li> <li>1 Mains frequ</li> </ul>	<ul> <li>ontroller output y2 (cooling / close), controller output y1 (heating / open),</li> <li>For both interfaces, Modbus only. Additional acceptable delay t between 2 received bytes, before "end of message" is assumed This time is needed if data is not transmitted continousely by th modem.</li> <li>Switchover of the applied mains frequency 50 / 60 Hz, thereby better adaptation of the input filter for hum suppression.</li> <li>Intercy is 50 Hz.</li> <li>Device works as Modbus master. The communication is executed according to the master/slave</li> </ul>
FrEq	r/w	1dP 2dP 3dP base 1dP 2dP 3dP base 1dP 2dP	8376 16568 24760 150 8342 16534 24726 185 8377 16569	33068	Enum	<ul> <li>3 Display of c alarm3</li> <li>0200</li> <li>Enum_FrEq</li> <li>0 Mains frequ</li> <li>1 Mains frequ</li> </ul>	<ul> <li>ontroller output y2 (cooling / close), controller output y1 (heating / open),</li> <li>For both interfaces, Modbus only. Additional acceptable delay t between 2 received bytes, before "end of message" is assumed This time is needed if data is not transmitted continousely by th modem.</li> <li>Switchover of the applied mains frequency 50 / 60 Hz, thereby better adaptation of the input filter for hum suppression.</li> <li>tency is 50 Hz.</li> <li>Device works as Modbus master.</li> </ul>
FrEq	r/w	1dP 2dP 3dP base 1dP 2dP 3dP 3dP	8376 16568 24760 150 8342 16534 24726 185 8377	33068	Enum	3     Display of calarm3       0200     C       Enum_FrEq     C       0     Mains frequence       1     Mains frequence       Enum_MASt     C       0     No, the unit	ontroller output y2 (cooling / close), controller output y1 (heating / open),         For both interfaces, Modbus only. Additional acceptable delay t between 2 received bytes, before "end of message" is assumed This time is needed if data is not transmitted continousely by th modem.         Switchover of the applied mains frequency 50 / 60 Hz, thereby better adaptation of the input filter for hum suppression.         tency is 50 Hz.         Device works as Modbus master.         The communication is executed according to the master/slave principle, whereby the device can be operated as master or as slave. Operation as master must be configured here.         is operated as a Modbus slave.
FrEq	r/w	1dP 2dP 3dP base 1dP 2dP 3dP base 1dP 2dP	8376 16568 24760 150 8342 16534 24726 185 8377 16569	33068	Enum	3     Display of calarm3       0200     C       Enum_FrEq     C       0     Mains frequence       1     Mains frequence       Enum_MASt     C       0     No, the unit	<ul> <li>ontroller output y2 (cooling / close), controller output y1 (heating / open),</li> <li>For both interfaces, Modbus only. Additional acceptable delay ti between 2 received bytes, before "end of message" is assumed This time is needed if data is not transmitted continousely by th modem.</li> <li>Switchover of the applied mains frequency 50 / 60 Hz, thereby better adaptation of the input filter for hum suppression.</li> <li>Intercy is 50 Hz.</li> <li>Device works as Modbus master.</li> <li>The communication is executed according to the master/slave principle, whereby the device can be operated as master or as slave. Operation as master must be configured here.</li> </ul>

# 12 othr

ConF							
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
AdrO	r/w	base 1dP 2dP 3dP	187 8379 16571 24763	33142	Int	165535 E	□ Target address to which the data specified with AdrU are output on the bus.
AdrU	r/w	base 1dP 2dP 3dP	188 8380 16572 24764	33144	Int	165535 <b>[</b>	☐ Modbus address of the data output on the bus by the Modbus master.
Numb	r/w	base 1dP 2dP 3dP	189 8381 16573 24765	33146	Int	0100 C	Quantity of data that are to be transmitted from the Modbus master.

### • Signal

Name	r/w	Adr. Ir	nteger	real	Тур	Value/c	off	Description
E.1	r/w	base 1dP 2dP	210 8402 16594 24786		Enum	Defect		Err 1 (internal error) Contact Service.
		3dP	24700			0		(D)
							No fault exists The device is c	
						2	The device is c	
E.2	r/w	base 1dP 2dP 3dP	211 8403 16595 24787		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 occ	curred and has been stored.
FbF.1	r/w	base 1dP 2dP 3dP	212 8404 16596 24788		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!)
	·					1	operator must	resetting of the sensor break alarm possible (Reset). It alarm has been triggered and stored; the fault is no longer present. The acknowledge the error message in order to delete it from the error list.
						2	Sensor break:	The sensor is defective or there is a wiring fault.
Sht.1	r/w	base 1dP 2dP 3dP	213 8405 16597 24789		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).
								fault has occurred and has been stored.
						2	A short-circuit	fault has occurred.

ZdP         16599         (As a process value via fieldbus interfa           3dP         24790         0         No fault, resetting of the incorrect polarity alarm possible           1         An incorrect polarity fault has occurred and has been store         2           2dP         16599         33198         Enum           1dP         8407         Typical causes and suggested remedie           2dP         16599         3dP         24791           3dP         24791         0         No fault, resetting of the input circuit is not corr           Virgital causes and suggested remedie         Sensor fault: replace INP2 sectores of INP; (As a process value via fieldbus interfa           0         No fault, resetting of the bases of rault alarm has been tirging and in chore the sensor fault replace INP2 sensor.           1dP         8408         216         33200         Enum         Short         Short circuit at input INP2.           1dP         8408         24792         24792         Short         Short circuit at input INP2.         Typical causes and suggested remedie           2dP         16600         3dP         24792         Short         Short circuit at input INP2.           1dP         8408         217         33202         Enum         Short         Short circuit fault has occurred and has b										othr
Name         r/w         Adr. Integer         real         Typ         Value/off         Description           POL.1         r/w         base         214         33196         Enum         Polarity         Incorrect polarity at input INP1. Suggested remedy: reverse the polarity (As a process value via fieldbus interfa           3/D         16/99         24790         0         No fault, resetting of the incorrect polarity atam possible 1         An incorrect polarity fault has occurred and has been store 2           FbF.2         r/w         base         215         33198         Enum         Break         Sensor break at input INP2. Typical causes and suggested remedie Sensor fault: replace INP2 sensor. Wiring fault: check connections of INP (As a process value via fieldbus interfa           5h1.2         r/w         base         216         33200         Enum         Short         Typical causes and suggested remedie Sensor fault: replace INP2 sensor. Wiring fault: check connections of INP (As a process value via fieldbus interfa           Sh1.2         r/w         base         216         33200         Enum         Short         Short circuit at input INP2. Typical causes and suggested remedie Sensor fault: replace INP2 sensor. Wiring fault: check connections of INP (As a process value via fieldbus interfa           20P         16600         320P         24791         32020         Enum         Short circuit fault has occurred and has										Signal
IdP       B406       Suggested remedy: reverse the polarity (As a process value via fieldbus interfa 16598         3dP       24790       0       No fault, resetting of the incorrect polarity all map possible: 1         FbF.2       r/w       base       215       33198       Enum       Break       Sensor break at input INP2. Typical causes and suggested remedie Sensor fault: replace INP2 sensor. Wring fault: check connections of INP; (As a process value via fieldbus interfa 3699         Sh1.2       r/w       base       216       33200       Enum       Sensor break at input INP2. Typical causes and suggested remedie Sensor fault: replace INP2 sensor. Wring fault: check connections of INP; (As a process value via fieldbus interfa 3699         Sh1.2       r/w       base       216       33200       Enum       Short       Short circuit at input INP2. Typical causes and suggested remedie Sensor fault: replace INP2 sensor. Wring fault: check connections of INP; (As a process value via fieldbus interfa 3699         3dP       24791       B408       Sont circuit at input INP2. Typical causes and suggested remedie Sensor fault: replace INP2 sensor. Wring fault: check connections of INP; (As a process value via fieldbus interfa 5699         3dP       24792       B408       Sont circuit at map to societ and has been stored. The sensor fault at arm has been triggered and suggested remedie Sensor fault: replace INP2 sensor. Wring fault: theck connections of INP; (As a process value via fieldbus interfa 104         3dP       24792		Description	off	Value/	Тур	real	nteger	Adr. Ir		
FbF.2       r/w       base       215       33198       Enum       Break       Sensor break at input INP2. Typical causes and suggested remedie Sensor fault: replace INP2 sensor. Wiring fault: check connections of INP2 (As a process value via fieldbus interfa         Sht.2       r/w       base       216       33200       Enum       Break       Sensor break at input INP2. Typical causes value via fieldbus interfa         Sht.2       r/w       base       216       33200       Enum       Short       The sensor fault alarm has been triggered and stored: the operator must acknowledge the error message in order to 2       Sensor break: The sensor is deficitive or there is a wiring f         Sht.2       r/w       base       216       33200       Enum       Short       Short circuit at input INP2. Typical causes and suggested remedie Sensor fault: replace INP2 sensor. Wiring fault: check connections of INP Acs a process value via fieldbus interfa         POL.2       r/w       base       217       3202       Enum       Polarity       Incorrect polarity at input INP2. Suggested remedy: reverse the polarity (As a process value via fieldbus interfa         POL.2       r/w       base       218       3204       Enum       Polarity       Incorrect polarity at input INP2. Suggested remedy: reverse the polarity (As a process value via fieldbus interfa         1dP       8409       0       No fault, resetting of the incorrect polarity at inp		Incorrect polarity at input INP1. Suggested remedy: reverse the polarity at INP1. (As a process value via fieldbus interface not writable		Polarity	Enum	33196	8406 16598	1dP 2dP	r/w	POL.1
1dP       8407       16599       16599       111: replace lauses and suggested remedie Sensor fault: replace lauble2 sensor.         3dP       24791       0       No fault,       resensor fault: replace lauble2 sensor.         1       0       No fault,       resensor fault: replace lauble2 sensor.       1         1       0       No fault,       resensor fault alarn has been triggered and stored; the operator must acknowledge the error message in order to 2       2         2       Sensor break: The sensor is defective or there is a wiring f       1       1       1         3dP       24792       2479       1       Short       Short circuit at input INP2.         3dP       24792       1       1       1       1       1       1         3dP       24792       1	tored.	polarity fault has occurred and has been stored.	An incorrect	1						
1       The sensor fault alarm has been triggered and stored: the operator must acknowledge the error message in order to 2       2       Sensor break: The sensor is defective or there is a wiring f         2       Sensor break: The sensor is defective or there is a wiring f       1       1       Policity       Short       Short circuit at input INP2.         2       Typical causes and suggested remedie Sensor fault: replace INP2 sensor.       Wiring fault: check connections of INP. (As a process value via fieldbus interfa         3       24792       0       No fault.       resetting of the short.         1       A short-circuit fault has occurred and has been stored.       2       A short-circuit fault has occurred.         POL.2       r/w       base       217       33202       Enum       Polarity       Incorrect polarity at input INP2.         Suggested remedy: reverse the polarity at input INP2.       3dP       24793       Suggested remedy: reverse the polarity (As a process value via fieldbus interfa         4       Abort       8409       2       1       A nincorrect polarity at input INP2.         2       16601       3dP       24793       33204       Enum       A short-circuit fault has occurred and has been stored.         2       1dP       8409       2       0       No fault, resetting of the incorrect polarity atarm. Possible fault s a circuit with curren	NP2.	Typical causes and suggested remedies:		Break	Enum	33198	8407 16599	1dP 2dP	r/w	FbF.2
IdP       8408       Typical causes and suggested remedie         Sensor fault: replace INP2 sensor.       Wiring fault: check connections of INP?         (As a process value via fieldbus interfa       0         No fault.       resetting of the short-circuit fault has occurred and has been stored.         2       A short-circuit fault has occurred.         POL.2       r/w       base       217         1dP       8409       24793         2dP       16601       3dP       24793         POL.2       r/w       base       217       33202         POL       1dP       8409       2dP         2dP       16601       3dP       24793         0       No fault, resetting of the incorrect polarity at input INP2.       Suggested remedy: reverse the polarity (As a process value via fieldbus interfa         4       Ation       r/w       base       218       33204       Enum         1dP       8410       2       An incorrect polarity fault has occurred and has been store       2         2dP       16602       3dP       24794       HeatCurr       Heating current larm.Possible fault so         1dP       8410       2       10       No fault, resetting of the heating current alarm possible (R 1 A heating current larm finit (dependin	he fault is no longer present. to delete it from the error lis	resetting of the sensor break alarm poss ault alarm has been triggered and stored; the fault is no longer t acknowledge the error message in order to delete it from the : The sensor is defective or there is a wiring fault.	The sensor for operator must	1						
1       A short-circuit fault has occurred and has been stored.         2       A short-circuit fault has occurred.         POL.2       r/w       base       217       33202       Enum       Polarity       Incorrect polarity at input INP2. Suggested remedy: reverse the polarity (As a process value via fieldbus interfa 3dP         0       No fault, resetting of the incorrect polarity alarm possible 1       An incorrect polarity fault has occurred and has been stored.         HCA       r/w       base       218       33204       Enum       HeatCurr       Heating current alarm.Possible fault s a circuit with current I < heating current urrent limit (depending on configuratic band.Suggested remedy: check heating heater band if necessary. (As a process value via fieldbus interfa         0       No fault, resetting of the heating current alarm possible fault s a circuit with current I < heating current current limit (depending on configuratic band.Suggested remedy: check heating heater band if necessary. (As a process value via fieldbus interfa         0       No fault, resetting of the heating current alarm possible (R 1         1       A heating current fault has occurred and has been stored.         SSr       r/w       base       219       33206       Enum       Short       Alarm message: SSr Possible causes: a current flow in the H controller is 'off', or the SSR is defectiv. Suggested remedy: check heating current solid-state relay, if necessary.	NP2.	Typical causes and suggested remedies:		Short	Enum	33200	8408 16600	1dP 2dP	r/w	Sht.2
IdP       8409       Suggested remedy: reverse the polarity (As a process value via fieldbus interfall and possible in the polarity (As a process value via fieldbus interfall and possible in the polarity fault has occurred and has been store incorrect polarity fault has occurred and has been store incorrect polarity. The wiring of the input circuit is not correct polarity. The wiring of the input circuit is interfalled.         HCA       r/w       base       218       33204       Enum       HeatCurr       Heating current larm. Possible fault is a circuit with current l < heating current larm. Possible (R in the polarity. (As a process value via fieldbus interfalled.)	t-circuit alarm possible (Rese		A short-circu	1	-					
1       An incorrect polarity fault has occurred and has been store         2       Incorrect polarity. The wiring of the input circuit is not corr         HCA       r/w       base       218       33204       Enum       HeatCurr       Heating current alarm.Possible fault s a circuit with current I < heating current incurrent limit (depending on configuration band.Suggested remedy: check heating current limit (depending on configuration band.Suggested remedy: check heating heater band if necessary. (As a process value via fieldbus interfation of the heating current alarm possible (R 1 A heating current fault has occurred and has been stored.		Incorrect polarity at input INP2. Suggested remedy: reverse the polarity at INP2. (As a process value via fieldbus interface not writable		Polarity	Enum	33202	8409 16601	1dP 2dP	r/w	POL.2
2       Incorrect polarity. The wiring of the input circuit is not corr         HCA       r/w       base       218       33204       Enum       HeatCurr       Heating current alarm.Possible fault s a circuit with current I < heating current I				0					•	
1dP       8410         2dP       16602         3dP       24794         3dP       24794         0       No fault, resetting of the heating current alarm possible (R         1       A heating current fault has occurred and has been stored.         SSr       r/w       base       219       33206       Enum       Short       Alarm message: SSr         SSr       r/w       base       219       33206       Enum       Short       Alarm message: SSr         0       1dP       8411       2dP       16603       3dP       24795       Short		5		-						
1       A heating current fault has occurred and has been stored.         SSr       r/w       base       219       33206       Enum       Short       Alarm message: SSr         1dP       8411       2dP       16603       Short       Alarm message: sort controller is 'off', or the SSR is defective solid-state relay, if necessary.	nt limit, or current I > heat ation), or defective heater ting current circuit, replace	Heating current alarm.Possible fault s are an open heat circuit with current I < heating current limit, or current current limit (depending on configuration), or defective band.Suggested remedy: check heating current circuit heater band if necessary. (As a process value via fieldbus interface not writable	r	HeatCur	Enum	33204	8410 16602	1dP 2dP	r/w	HCA
1dP8411Possible causes: a current flow in the h controller is 'off', or the SSR is defective Suggested remedy: check heating current solid-state relay, if necessary.										
	ctive. urrent circuit, replace the	Possible causes: a current flow in the heating circuit a controller is 'off', or the SSR is defective. Suggested remedy: check heating current circuit, repla		Short	Enum	33206	8411 16603	1dP 2dP	r/w	SSr
0No fault,resetting of the short-c1A short-circuit fault has occurred and has been stored.		resetting of the short-circuit alarm possi								

# 12 othr

	Signal							
I	Name	r/w	Adr. Intege	r real	Тур	Value/	off	Description
	LooP	r/w	base 2 1dP 84 2dP 166 3dP 24	12 04	)8 Enum	LoopAla	ırm	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!)
L						0	No fault, reset	ting of the loop alarm possible (Reset).
						1	A control loop	fault has occurred and has been stored.
						2	A control loop change of the	fault has occurred, there was no clear process response following a step output.
	AdA.H	r/w	base 2 1dP 84 2dP 166 3dP 24	13 05	0 Enum	Tune		Error message from "heating" self-tuning and reason for aborted tuning attempt. Hints for trouble-shooting: Check operating sense of actuator. Is the loop closed? Is there an output limit? Adapt the setpoint. Increase step output for Yopt. (As a process value via fieldbus interface not writable!)
-					·	0	no error	
						3	Possible reme	nds in the wrong direction. dy: Check the output signal sense (inverse <-> direct), and re-configure the ecessary (inverse <-> direct).
						4		rom the process. Perhaps the control loop is open. dy: Check sensor, connections, and process.
						5	Possible reme	alue turning point of the step response is too low. dy: Increase the permitted step output range, i.e. increase the parameter ) or reduce the parameter Y.Lo ('cooling').
						6		as aborted due to the risk of an exceeded setpoint. dy: Repeat the attempt with an increased setpoint reserve.
						7	Possible reme	ut change is not large enough (minimum change > 5 %). dy: Increase the permitted step output range, i.e. increase the parameter ) or reduce the parameter Y.Lo ('cooling').
						8	Possible reme	ve must be given before generating the step output change. dy: decrease set-point range, change set-point, or change process value.
						9	the control loo	oonse attempt has failed. No useful parameters were determined. Perhaps op is open. dy: Check sensor, connections, and process.

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

othr							
Signa							
Name	r/w	Adr. Int	eger	real	Тур	Value/off	Description
InF.1	r/w	base 1dP 2dP 3dP	226 8418 16610 24802		Enum	Time	Message from the operating hours counter that the preset no. of hours for this maintenance period has been reached. The op-hou counter for the maintenance period is reset when this message i acknowledged. Counting the operating hours is used for preventi 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).
						v	purs - limit value (maintenance period) reached: please acknowledge.
InF.2	r/w	base 1dP 2dP 3dP	227 8419 16611 24803	33222	Enum	Switch	Message from the switching cycle counter that the preset no. of switch cycles for this maintenance period has been reached. The cycle counter for the maintenance period is reset when this message is acknowledged. Counting the switching cycles is used for preventive maintenance Acknowledge the error to reset it. (As a process value via fieldbus interface not writable!)
						0 No error mes	ssage, resetting of the switching cycle counter possible (Reset).
						1 Set limit of t acknowledge	he switching cycle counter (maintenance period) has been reached: please e.
E.4	r/w	base 1dP 2dP 3dP	228 8420 16612 24804	33224	Enum	Problem	Hardware fault.Cause: Code number and hardware are not identical. Remedy: Contact Service. (As a process value via fieldbus interface not writable!)
<u> </u>	-					0 No fault,	resetting possible (Reset).

Out.1										
ConF										
Name	Name r/w Adr. Integer real Typ					Value/off	Description			
0.Act	r/w	base 1dP 2dP 3dP	4150 12342 20534 28726	41068	Enum	Enum_OAct 0 direct / norma	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.			
						1 inverse / normally closed				
Y.1	r/w	base 1dP 2dP 3dP	4151 12343 20535 28727	41070	Enum	Enum_Y1	Output function: Controller output Y1			
0 not active 1 This output provides the controller output Y1							ovides the controller output V1			

1 This output provides the controller output Y1.

ConF							
Name	r/w	Adr. Int	eger i	real	Тур	Value/off	Description
Y.2	r/w	base 1dP 2dP 3dP	-	41072		Enum_Y2	Output function: Controller output Y2. Caution: Do not confuse controller output Y2 with the parameter 'Fixed output Y2' !
						<ul><li>0 not active</li><li>1 This output</li></ul>	provides the controller output Y2.
Lim.1	r/w	base 1dP 2dP 3dP	4153 12345 20537 28729	41074	Enum	Enum_Lim1	Output function: Signal limit 1
						0 not active	
						1 The output	is activated by an alarm from limit value 1.
Lim.2	r/w	base 1dP 2dP 3dP	4154 12346 20538 28730	41076	Enum	Enum_Lim2	Output function: Signal limit 2
						0 not active	
						1 The output	is activated by an alarm from limit value 2.
Lim.3	r/w	base 1dP 2dP 3dP	4155 12347 20539 28731	41078	Enum	Enum_Lim3	Output function: Signal limit 3
					<u> </u>	0 not active	
						1 The output	is activated by an alarm from limit value 3.
LP.AL	r/w	base 1dP 2dP 3dP	4157 12349 20541 28733	41082	Enum	Enum_OUT_LPAL	Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value ha change with an output signal of maximum value, else loop alar generated.
					ļ	0 not active 1 The loop ala	arm (= open loop alarm) is assigned to this output.
HC.AL	r/w	base 1dP 2dP 3dP	4158 12350 20542 28734	41084	Enum	Enum_OUT_HCAL	Output function: Signal Heat current alarm. Either break (= curr < heating current limit) can be monitored or overload (= current heating current limit), dependent on configuration.
						0 not active	a current alorm is assigned to this subjut
						1 The heating	g current alarm is assigned to this output.
HC.SC	r/w	base 1dP 2dP 3dP	4159 12351 20543 28735	41086	Enum	Enum_HCSC	Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output i switched off.

# 13 Out.1

ConF									
Name	r/w	Adr. Ir	iteger	real	Тур	Value/off	Description		
P.End	r/w	base 1dP 2dP 3dP	4161 12353 20545 28737	41090	Enum	Enum_PEnd	Output function: Signal Program end. This message is available when the program has been completed (only when configured as a program controller).		
	0					0 not active			
						1 This output is	activated by the message 'Program end'.		
FAi.1	r/w	base 1dP 2dP 3dP	4162 12354 20546 28738	41092 Enu	Enum	Enum_FAi1	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.		
0 not active									
						1 The output sends the error message 'INP1 fault'.			
FAI.2	r/w	base 1dP 2dP 3dP	4163 12355 20547 28739	41094	Enum	Enum_FAi2	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.		
						0 not active			
						1 The output ser	nds the error message 'INP2 fault'.		

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

	0						
Out.	2						
Con	F						
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
0.Act	r/w	base 1dP 2dP 3dP	4250 12442 20634 28826	41268	Enum	Enum_OAct 0 direct / norma	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output Of Inverse: Active function (e.g. limit value) switches the output O
						1 inverse / norm	
Y.1	r/w	base	4251	41270	Enum	Enum_Y1	Output function: Controller output Y1
		1dP	12443				
		2dP	20635				
		3dP	28827				
						0 not active	avides the controller autout V1
						1 This output pr	ovides the controller output Y1.
Y.2	r/w	base		41272	Enum	Enum_Y2	Output function: Controller output Y2. Caution: Do not confuse
		1dP	12444				controller output Y2 with the parameter 'Fixed output Y2' !
		2dP	20636				
		3dP	28828			0 not active	
							ovides the controller output Y2.
Lim.1	r/w	base	4252	41274	Fnum	Enum_Lim1	Output function: Signal limit 1
<b>E</b> 1111.1	1,00	1dP	12445	11271	LIIGIII		
		2dP	20637				
		3dP	28829				
						0 not active	1
						1 The output is	activated by an alarm from limit value 1.
Lim.2	r/w	base	4254	41276	Enum	Enum_Lim2	Output function: Signal limit 2
		1dP	12446				
		2dP	20638				
		3dP	28830				
						0 not active	
						The output is a	activated by an alarm from limit value 2.
Lim.3	r/w	base	4255	41278	Enum	Enum_Lim3	Output function: Signal limit 3
		1dP	12447				
		2dP	20639				
		3dP	28831				
						<ul><li>0 not active</li><li>1 The output is a</li></ul>	activated by an alarm from limit value 3.
[							
LP.AL	r/w	base		41282	Enum	Enum_OUT_LPAL	Output function: Signal Interruption alarm (LOOP)
		1dP	12449				The overall control loop is monitored and the process value has change with an output signal of maximum value, else loop alar
		2dP	20641				generated.
		3dP	28833				<u> </u>
						0 not active	n (- open loop alarm) is assigned to this output
						1 The loop alarn	n (= open loop alarm) is assigned to this output.

ConF							
Name	r/w	Adr. In	teger	real	Тур	Value/off	Description
HC.AL	r/w	base 1dP 2dP 3dP	4258 12450 20642 28834	41284	Enum	Enum_OUT_HCAL	Output function: Signal Heat current alarm. Either break (= curre < heating current limit) can be monitored or overload (= current heating current limit), dependent on configuration.
						0 not active	
						1 The heating of	current alarm is assigned to this output.
HC.SC	r/w	base 1dP 2dP 3dP	4259 12451 20643 28835	41286	Enum	Enum_HCSC	Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output is switched off.
						0 not active	
						1 Output activa	ted by an SSR fault.
P.End	r/w	base 1dP 2dP 3dP	4261 12453 20645 28837	41290	Enum	Enum_PEnd	Output function: Signal Program end. This message is available when the program has been complete (only when configured as a program controller).
						0 not active	
						1 This output is	s activated by the message 'Program end'.
FAi.1	r/w	base 1dP 2dP 3dP	4262 12454 20646 28838	41292	Enum	Enum_FAi1	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
		-				0 not active	
						1 The output se	ends the error message 'INP1 fault'.
FAi.2	r/w	base 1dP 2dP 3dP	4263 12455 20647 28839	41294	Enum	Enum_FAi2	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.

•	Signal								
	Name	r/w	Adr. In	iteger	real	Тур	Value/	/off	Description
	Out2	r	base	4280	41328	Enum	Enum_/	Ausgang	Status of the digital output
			1dP	12472					
			2dP	20664					
			3dP	28856					
							0	off	
							1	on	

# 14 Out.2

•••	000.2								
•	Signal								
	Name	r/w	Adr. In	nteger	real	Тур	Value	/off	Description
	F.Do2	r/w	base 1dP 2dP 3dP	4281 12473 20665 28857		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 1	off on	

# 15 Out.3

	ConF							
I	Name	r/w	Adr. Inte	eger	real	Тур	Value/off	Description
	O.tYP	r/w	base 1dP 2dP 3dP	4370 12562 20754 28946	41508	Enum	Enum_OtYP	Signal type selection OUT
					•		0 Relay / logic	
							1 0 20 mA cor	
							2 4 20 mA cor	
							3 010 V contin 4 210 V contin	
							5 transmitter su	
								, , , , , , , , , , , , , , , , , , ,
	0.Act	r/w	base 1dP 2dP 3dP	4350 12542 20734 28926	41468	Enum	Enum_OAct	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.
							0 direct / norma	lly open
							1 inverse / norm	ally closed
[	Y.1	r/w	base	4351	41470	Fnum	Enum_Y1	Output function: Controller output Y1
		1700		12543	11170	Linam		
			2dP	20735				
			3dP	28927				
L							0 not active	
								ovides the controller output Y1.
Г								
ľ	Y.2	r/w	base		41472	Enum	Enum_Y2	Output function: Controller output Y2. Caution: Do not confuse the
				12544				controller output Y2 with the parameter 'Fixed output Y2' !
			2dP	20736				
L			3dP	28928				
							0 not active	
							1 This output pro	ovides the controller output Y2.

Operating Version4

Out.3							
ConF							
Name	r/w	Adr. Int	teger	real	Тур	Value/off	Description
Lim.1	r/w	base 1dP 2dP 3dP	-	41474	-	Enum_Lim1	Output function: Signal limit 1
		Jui	20727			0 not active	
							is activated by an alarm from limit value 1.
Lim.2	r/w	base	4354	41476	Enum	Enum_Lim2	Output function: Signal limit 2
		1dP	12546				
		2dP	20738				
		3dP	28930				
	-					0 not active	
						1 The output	is activated by an alarm from limit value 2.
Lim.3	r/w	base	4355	41478	Enum	Enum_Lim3	Output function: Signal limit 3
		1dP	12547				
		2dP	20739				
		3dP	28931				
						0 not active	
						1 The output	is activated by an alarm from limit value 3.
LP.AL	r/w	base	4357	41482	Enum	Enum_OUT_LPAL	Output function: Signal Interruption alarm (LOOP)
		1dP	12549				The overall control loop is monitored and the process value has
		2dP	20741				change with an output signal of maximum value, else loop alari generated.
		3dP	28933				yeneraleu.
						0 not active 1 The loop al	arm (= open loop alarm) is assigned to this output.
HC.AL	r/w	base	4358	41484	Enum	Enum_OUT_HCAL	Output function: Signal Heat current alarm. Either break (= curre
		1dP	12550				<pre>&lt; heating current limit) can be monitored or overload (= current</pre>
		2dP	20742				heating current limit), dependent on configuration.
		3dP	28934				
						0 not active	g current alarm is assigned to this output.
HC.SC	r/w	base	4359	41486	Enum	Enum_HCSC	Output function: Signal Solid-state relay (SSR) short circuit.
		1dP	12551				The short circuit alarm of the SSR is triggered, if a current is
		2dP	20743				detected in the heating circuit, although the controller output is switched off.
		3dP	28935			_	
						0 not active 1 Output activ	vated by an SSR fault.
	m.t.s.	la a c	10/1	41 400	<b>F</b>	Enum DEnd	Output function. Signal Program and
P.End	r/w	base	4361	41490	Enum	Enum_PEnd	Output function: Signal Program end. This message is available when the program has been complete
		1dP	12553 20745				(only when configured as a program controller).
		2dP 3dP	20745 28937				
		301	20731			0 not active	
						<ol> <li>not activo</li> </ol>	

ConF							
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
FAi.1	r/w	base 1dP 2dP 3dP	4362 12554 20746 28938	41492	Enum	Enum_FAi1	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.
						0 not active	
						1 The output se	ends the error message 'INP1 fault'.
FAi.2	r/w	base 1dP 2dP 3dP	4363 12555 20747 28939	41494	Enum	Enum_FAi2	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
	<b>I</b>					0 not active	
						1 The output se	ends the error message 'INP2 fault'.
Out.0	r/w	base 1dP 2dP 3dP	4371 12563 20755 28947	41510	Float	-19999999	Lower scaling limit of the analog output (corresponds to 0%). If current and voltage signals are used as output values, the displa can be scaled to the output value in the Parameter Level. The output value of the lower scaling point is indicated in the respect electrical unit (mA / V).
Out.1	r/w	base 1dP 2dP 3dP	4372 12564 20756 28948	41512	Float	-19999999	Upper scaling limit of the analog output (corresponds to 100%). current and voltage signals are used as output values, the displa can be scaled to the output value in the Parameter Level. The output value of the upper scaling point is indicated in the respec electrical unit (mA / V).
0.Src	r/w	base 1dP 2dP 3dP	4373 12565 20757 28949	41514	Enum	Enum_OSrc	Signal source of the analog output (visible not with all output sig types O.TYP).
						0 not used	
							tput y1 (continuous) tput y2 (continuous)
						3 process value	
						4 The effective	setpoint Weff, which is used for control. gradient changes the effective setpoint until it reaches the internal (target
						5 control devia	tion xw (process value - set-point)= relative alarm ring with the effective set-point Weff. For example using a ramp it is the

	C		n	
-		Ч		aı

Signa								
Name	r/w	Adr. In	teger	real	Тур	Value/o	off	Description
Out1	r	base	4380	41528	Enum	Enum_Au	usgang	Status of the digital output
		1dP	12572					
		2dP	20764					
		3dP	28956					
						0	off	
						1 (	on	

5	Out.3							
	Signal							
I	Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
	F.Do1	r/w	base	4381	41530	Enum	Enum_Ausgang	Forcing of this digital output. Forcing involves the external operation
			1dP	12573				of an output. The instrument has no influence on this output (use of
			2dP	20765				free outputs by superordinate system).
			3dP	28957				
-			•				0 off	
							1 on	
Г							0.400	
	F.Out1	r/w	base	4382	41532	Float	0120	Forcing value of the analog output. Forcing involves the external
			1dP	12574				operation of an output, i.e. the instrument has no influence on this
			2dP	20766				output. (Used for the operation of free outputs e.g. by a supervisory
			3dP	28958				PLC.)

# 16 Out.5

-								
	ConF							
	Name	r/w	Adr. Inte	eger	real	Тур	Value/off	Description
	0.Act	r/w	base 1dP 2dP 3dP	4550 12742 20934 29126	41868	Enum	Enum_OAct	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.
							0 direct / norma	lly open
							1 inverse / norm	ally closed
	Y.1	r/w	base 1dP 2dP 3dP	4551 12743 20935 29127	41870	Enum	Enum_Y1	Output function: Controller output Y1
							0 not active	
							1 This output pro	ovides the controller output Y1.
	Y.2	r/w		4552 12744 20936 29128	41872	Enum	Enum_Y2	Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' !
							0 not active	
							1 This output pro	ovides the controller output Y2.
	Lim.1	r/w	base 1dP 2dP 3dP	4553 12745 20937 29129	41874	Enum	Enum_Lim1	Output function: Signal limit 1
							0 not active	
							1 The output is a	activated by an alarm from limit value 1.

ConF							
Name	r/w	Adr. In	teger	real	Тур	Value/off	Description
Lim.2	r/w	base 1dP 2dP 3dP	4554 12746 20938 29130	41876	Enum	Enum_Lim2	Output function: Signal limit 2
						0 not active 1 The output	is activated by an alarm from limit value 2.
Lim.3	r/w	base 1dP 2dP 3dP	4555 12747 20939 29131	41878	Enum	Enum_Lim3	Output function: Signal limit 3
	-					0 not active	
						1 The output	is activated by an alarm from limit value 3.
LP.AL	r/w	base 1dP 2dP 3dP	4557 12749 20941 29133	41882	Enum	Enum_OUT_LPAL	Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value ha change with an output signal of maximum value, else loop ala generated.
						0 not active	
						1 The loop a	larm (= open loop alarm) is assigned to this output.
HC.AL	r/w	base 1dP 2dP 3dP	4558 12750 20942 29134	41884	Enum	Enum_OUT_HCAL	Output function: Signal Heat current alarm. Either break (= curren < heating current limit) can be monitored or overload (= curren heating current limit), dependent on configuration.
						0 not active	
						1 The heatin	g current alarm is assigned to this output.
HC.SC	r/w	base 1dP 2dP 3dP	4559 12751 20943 29135	41886	Enum	Enum_HCSC	Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output i switched off.
					Į	0 not active	
						1 Output act	ivated by an SSR fault.
P.End	r/w	base 1dP 2dP 3dP	4561 12753 20945 29137	41890	Enum	Enum_PEnd	Output function: Signal Program end. This message is available when the program has been comple (only when configured as a program controller).
	1					0 not active	
						1 This outpu	t is activated by the message 'Program end'.
FAi.1	r/w	base 1dP 2dP	4562 12754 20946	41892	Enum	Enum_FAi1	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Inpu INP1.

# 16 Out.5

ConF								
Name	r/w	Adr. Ir	nteger	real	Тур	Value/c	off	Description
FAi.2	r/w	base 1dP 2dP 3dP	4563 12755 20947 29139		Enum	Enum_FA	Ai2	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.
							not active	nde the error message 'INDO fault'

1 The output sends the error message 'INP2 fault'.

# Signal

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

# 17 Out.6

ConF

Name	r/w	Adr. Ir	nteger	real	Тур	Value/of	off Description
0.Act	r/w	base 1dP 2dP 3dP	4650 12842 21034 29226		Enum	Enum_OA	Act 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.
					•		direct / normally open inverse / normally closed

Y.1	r/w	base	4651	42070	Enum	Enum_	Y1	Output function: Controller output Y1
		1dP	12843					
		2dP	21035					
		3dP	29227					
· · · · · · · · · · · · · · · · · · ·						0	not active	<u>.</u>

1 This output provides the controller output Y1.

Out.6							
ConF							
Name	r/w	Adr. Int	teger i	eal	Тур	Value/off	Description
Y.2	r/w	base 1dP 2dP 3dP	4652 12844 21036 29228	42072	Enum	Enum_Y2	Output function: Controller output Y2. Caution: Do not confuse controller output Y2 with the parameter 'Fixed output Y2' !
						0 not active	revides the controller entruit V2
						1 This output p	rovides the controller output Y2.
Lim.1	r/w	base 1dP 2dP 3dP	4653 12845 21037 29229	42074	Enum	Enum_Lim1	Output function: Signal limit 1
						0 not active	
						1 The output is	activated by an alarm from limit value 1.
Lim.2	r/w	base 1dP 2dP 3dP	4654 12846 21038 29230	42076	Enum	Enum_Lim2	Output function: Signal limit 2
						0 not active	
						1 The output is	activated by an alarm from limit value 2.
Lim.3	r/w	base 1dP 2dP 3dP	4655 12847 21039 29231	42078	Enum	Enum_Lim3	Output function: Signal limit 3
						0 not active	
						1 The output is	activated by an alarm from limit value 3.
LP.AL	r/w	base 1dP 2dP 3dP	4657 12849 21041 29233	42082	Enum	Enum_OUT_LPAL	Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value ha change with an output signal of maximum value, else loop alar generated.
						0 not active	
						1 The loop alar	m (= open loop alarm) is assigned to this output.
HC.AL	r/w	base 1dP 2dP 3dP	4658 12850 21042 29234	42084	Enum	Enum_OUT_HCAL	Output function: Signal Heat current alarm. Either break (= curr < heating current limit) can be monitored or overload (= current heating current limit), dependent on configuration.
						0 not active	
						The heating of	current alarm is assigned to this output.
HC.SC	r/w	base 1dP 2dP 3dP	4659 12851 21043 29235	42086	Enum	Enum_HCSC	Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output i switched off.
						0 not active	
						1 Output activa	ated by an SSR fault.

# 17 Out.6

ConF							
Name	r/w	Adr. In	iteger	real	Тур	Value/off	Description
P.End	r/w	base 1dP 2dP 3dP	4661 12853 21045 29237	42090	Enum	Enum_PEnd	Output function: Signal Program end. This message is available when the program has been completed (only when configured as a program controller).
·						0 not active	
						1 This output is	activated by the message 'Program end'.
FAi.1	r/w	base 1dP 2dP 3dP	4662 12854 21046 29238	42092	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 ser	nds the error message 'INP1 fault'.
FAi.2	r/w	base 1dP 2dP 3dP	4663 12855 21047 29239	42094	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 ser	nds the error message 'INP2 fault'.

Signa	l I							
Name	r/w	Adr. In	teger	real	Тур	Value	e/off	Description
Out4	r	base 1dP 2dP 3dP	4680 12872 21064 29256		Enum	Enum_	Ausgang	Status of the digital output
						0	off	
						1	on	
F.Do4	r/w	base 1dP 2dP 3dP	4681 12873 21065 29257	42130	Enum	Enum_	Ausgang	Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
						0	off on	
							011	

18 PAr.2

Operating	Version4
oporating	101010111

PArA							
Name	ame r/w Adr. Integer real Typ						Description
Pb12	r/w	base 503 1dP 1322 2dP 214 3dP 296	4	Float	0,19999		Proportional band 1 (heating) in engineering unit (e.g. °C) of the 2nd parameter set. The Pb defines the ratio between output value and control deviation. The smaller the value of Pb is, the stronger is the control response for a specific control deviation. Too large and too small values for Pb lead to process oscillations (hunting).
Pb22	r/w	base 503 1dP 1322 2dP 214 3dP 296	3 5	Float	0,19999		Proportional band 2 (cooling) in engineering unit (e.g. °C) of the 2nd parameter set. The Pb defines the ratio between output value and control deviation. The smaller the value of Pb is, the stronger is the control response for a specific control deviation. Too large and too small values for Pb lead to process oscillations (hunting).
ti22	r/w	base 503 1dP 1322 2dP 214 3dP 296	5 7	Float	09999		Integral action time 2 (cooling) [s]. Second parameter set. Ti is the time constant of the integral portion. The smaller Ti is, the faster is the response of the integral action. Ti too small: Control tends to oscillate. Ti too large: Control is sluggish and needs a long time to line out.
ti12	r/w	base 503 1dP 1322 2dP 214 3dP 296	4 6	Float	09999	2	Integral action time 1 (heating) [s]. Second parameter set. Ti is the time constant of the integral portion. The smaller Ti is, the faster is the response of the integral action. Ti too small: Control tends to oscillate. Ti too large: Control is sluggish and needs a long time to line out.
td12	r/w	base 503 1dP 1322 2dP 214 3dP 296	6 8	Float	09999	9	Derivative action time 1 (heating) [s], second parameter set. Td is the time constant of the derivative portion. The faster the process value changes, and the larger the value of Td is, the stronger will be the derivative action. Td too small: Very little derivative action. Td too large: Control tends to oscillate.
td22	r/w	base 503 1dP 1322 2dP 214 3dP 296	7 9	Float	09999	2	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.

# 19 ProG

• P/	ArA								
Nar	me	r/w	Adr. In	nteger	real	Тур	Value/off		Description
SP.	.01	r/w	base 1dP 2dP 3dP	6100 14292 22484 30676	44968	Float	-19999999	9	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.0	01	r/w	base 1dP 2dP 3dP	6101 14293 22485 30677	44970	Float	09999		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.

# 19 ProG

•	PArA						
	Name	r/w	Adr. Integer	real	Тур	Value/off	Description
	SP.02	r/w	base 6102 1dP 14294 2dP 22486 3dP 30678	6	Float	-19999999	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 6103 1dP 14295 2dP 2248 3dP 3067	7	Float	09999	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 6104 1dP 14296 2dP 22488 3dP 30686	3	Float	-19999999	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.
	Pt.03	r/w	base 6105 1dP 14297 2dP 22489 3dP 3068	)	Float	09999	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 6106 1dP 14298 2dP 22490 3dP 30683	)	Float	-19999999	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 6107 1dP 14299 2dP 2249 3dP 3068	)	Float	09999	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.
	SP.05	r/w	base 6108 1dP 14300 2dP 22492 3dP 30684	) 2	Float	-19999999	End setpoint of segment 5. This is the target setpoint that is reached at the end of the fifth segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
	Pt.05	r/w	base 6109 1dP 1430 2dP 22493 3dP 3068	3	Float	09999	Segment time 5 defines the duration of the fifth segment. The gradient of this segment is calculated from segment time and setpoint difference (SP – segment starting setpoint).Note: The 1st segment is started at process value.
	SP.06	r/w	base 6110 1dP 14302 2dP 22494 3dP 30686	<u>2</u> 1	Float	-19999999	End setpoint of segment 6. This is the target setpoint that is reached at the end of the sixth segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.
	Pt.06	r/w	base 6111 1dP 14303 2dP 22499 3dP 3068	5	Float	09999	Segment time 6 defines the duration of the sixth segment. The gradient of this segment is calculated from segment time and setpoint difference (SP – segment starting setpoint).Note: The 1st segment is started at process value.
	SP.07	r/w	base 6112 1dP 14304 2dP 22490 3dP 3068	6	Float	-19999999	End setpoint of segment 7. This is the target setpoint that is reached at the end of the seventh segment. The target setpoint is approached from the previous valid setpoint. When the program is completed, the controller continues with the last target setpoint reached.

Drac	、 <u> </u>						
ProC							
PArA				_			
Name	r/w	Adr. Intege	real	Тур	Value/off		Description
Pt.07	r/w	base 61 1dP 143 2dP 224 3dP 306	97	Float	09999		Segment time 7 defines the duration of the seventh segment. The gradient of this segment is calculated from segment time and setpoint difference (SP – segment starting setpoint).Note: The 1s segment is started at process value.
SP.08	r/w	base 61 1dP 143 2dP 224 3dP 306	98	Float	-19999999		End setpoint of segment 8. This is the target setpoint that is reached at the end of the eighth segment. The target setpoint is approached from the previous valid setpoint. When the program completed, the controller continues with the last target setpoint reached.
Pt.08	r/w	base 61 1dP 143 2dP 224 3dP 306	99	Float	09999		Segment time 8 defines the duration of the eighth segment. The gradient of this segment is calculated from segment time and setpoint difference (SP – segment starting setpoint).Note: The 1s segment is started at process value.
SP.09	r/w	base 61 1dP 143 2dP 225 3dP 306	00	Float	-19999999	2	End setpoint of segment 9. This is the target setpoint that is reached at the end of the ninth segment. The target setpoint is approached from the previous valid setpoint. When the program completed, the controller continues with the last target setpoint reached.
Pt.09	r/w	base 61 1dP 143 2dP 225 3dP 306	0 <b>9</b> 01	Float	09999		Segment time 9 defines the duration of the ninth segment fest. T gradient of this segment is calculated from segment time and setpoint difference (SP – segment starting setpoint).Note: The 19 segment is started at process value.
SP.10	r/w	base 61 1dP 143 2dP 225 3dP 306	02	Float	-19999999	2	End setpoint of segment 10. This is the target setpoint that is reached at the end of the tenth segment. The target setpoint is approached from the previous valid setpoint. When the program completed, the controller continues with the last target setpoint reached.
Pt.10	r/w	base 61 1dP 143 2dP 225 3dP 306	03	Float	09999		Segment time 10 defines the duration of the tenth segment. The gradient of this segment is calculated from segment time and setpoint difference (SP – segment starting setpoint).Note: The 1s segment is started at process value.
b.Lo	r/w	base 61 1dP 143 2dP 225 3dP 306	12 04	Float	09999	2	Lower bandwidth limit. The bandwidth monitor is valid for all segments of an individual program. If the bandwidth is exceeded the programmer is stopped. The program continues, if the proces value returns within the defined monitoring limits.
b.Hi	r/w	base 61. 1dP 143 2dP 225 3dP 306	13 05	Float	09999		Upper bandwidth limit. The bandwidth monitor is valid for all segments of an individual program. If the bandwidth is exceeded the programmer is stopped. The program continues, if the proces value returns within the defined monitoring limits.

								Operating version4	
ProG									
Signa Name		Adr. Ir	nteger	real	Тур	Value/off		Description	
St.Prog	r	base 1dP 2dP 3dP	6170 14362 22554 30746	45108	Int	0255		The programmer's status contains bit-wise coded data, e.g. which point of the program sequence the program has reached.	
Bit 0,1,2 Type of segment 0: rising 1: falling 2: hold (dwell) Bit 3 Program 'Run' Bit 4 Program 'End' Bit 5 Program 'Reset' Bit 6 Program 'StartFlankMissing' Bit 7 Program 'BandHold + FailHold' Bit 8 Program active									
SP.Pr	r	base 1dP 2dP 3dP	6171 14363 22555 30747	45110	Float	-19999999		The programmer's setpoint is displayed as the effective setpoint while the program is running.	
T1.Pr	r	base 1dP 2dP 3dP	6172 14364 22556 30748	45112	Float	09999		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 proce value, whereby the offset is defined as the time that the controlle would have needed with the gradient beginning at the setpoint valid at program start.	
T3.Pr	r	base 1dP 2dP 3dP	6173 14365 22557 30749	45114	Float	09999		Only with running program. The remaining programmer time is given by the sum of the currently running segment plus the times the remaining program segments (without hold times).	
T2.Pr	r	base 1dP 2dP 3dP	6174 14366 22558 30750		Float	09999		Only while program is running. The net segment time correspond to the elapsed segment time.Caution: Stop times are not counted the first segment has been defined as a gradient, the start commences at process value, and the offset specified for the first segment corresponds to the time that the controller would have required with a gradient beginning at the actual process value when the program was started.	
T4.Pr	r	base 1dP 2dP 3dP	6175 14367 22559 30751	45118	Float	09999		Only with running program. The remaining time of the running program segment (without hold times).	
SG.Pr	r	base 1dP 2dP 3dP	6176 14368 22560 30752		Int	04		A program consists of one or more segments which are arranged and defined by means of the segment numbers. By means of the segment number(s), the program can be changed quickly and specifically at the required point.	

20 SEtP

SEU							
PArA	7						
Name	r/w Adr. Integer real Typ				Тур	Value/off	Description
SP.LO	r/w	base 1dP 2dP 3dP	3100 11292 19484 27676	38968	Float	-19999999	Lower setpoint limit. The setpoint is raised to this value automatically, if a lower setpoint is adjusted. BUT: The (safety) setpoint W2 is not restricted by the setpoint limits! The setpoint reserve for the step function is 10% of SPHi - SPLo.
SP.Hi	r/w	base 1dP 2dP 3dP	3101 11293 19485 27677	38970	Float	-19999999	Upper setpoint limit. The setpoint is reduced to this value automatically, if a higher setpoint is adjusted. BUT: The (safety) setpoint W2 is not restricted by the setpoint limits! The setpoint reserve for the step function is 10% of SPHi - SPLo.
SP.2	r/w	base 1dP 2dP 3dP	3102 11294 19486 27678	38972	Float	-19999999	Second (safety) setpoint. Ramp function as with other setpoints (effective, external). However, SP2 is not restricted by the setpoint limits.
r.SP	r/w	base 1dP 2dP 3dP	3103 11295 19487 27679	38974	Float	0,0199999	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.
SP.bo	r/w	base 1dP 2dP 3dP	3105 11297 19489 27681	38978	Float	-19999999	Boost increase. Increases the setpoint SP for the duration t.bo by the amount SP.bo. The boost function causes a brief setpoint increase, which is used e.g. to clear blocked channels ('frozen' material) in a hot-runner system.
t.bo	r/w	base 1dP 2dP 3dP	3106 11298 19490 27682	38980	Float	09999	Duration of the boost increase in minutes. When the boost time t.b has elapsed, the controller switches back to the standard setpoint SP. The boost function causes a brief setpoint increase, which is used e.g. to clear blocked channels ('frozen' material) in a hot-runner system.
Y.St	r/w	base 1dP 2dP 3dP	5023 13215 21407 29599	42814	Float	-120120	Reduced output value for start-up [%]. The start-up function is a protective function, e.g. with hot runner control. To prevent destruction of high-performance heating elements, they must be heated slowly to remove any humidity. With activated start-up function, the controller maintains the reduced starting temperature for a defined dwell period. Subsequently, the controller switches over to the main setpoint.
SP.St	r/w	base 1dP 2dP 3dP	3107 11299 19491 27683	38982	Float	-19999999	Setpoint for start-up function. The start-up function is a protective function, e.g. with hot runner control. To prevent destruction of high-performance heating elements, they must be heated slowly to remove any humidity. With activated start-up function, the controller maintains the reduced starting temperature for a defined dwell period. Subsequently, the controller switches over to the main setpoint.
t.St	r/w	base 1dP 2dP 3dP	3108 11300 19492 27684	38984	Float	09999	Start-up dwell period [min]. The start-up function is a protective function, e.g. with hot runner control. To prevent destruction of high-performance heating elements, they must be heated slowly to remove any humidity. With activated start-up function, the controller maintains the reduced starting temperature for a defined dwell period. Subsequently, the controller switches over to the main setpoint.

# 20 SEtP

Signal							
Name	r/w	Adr. In	teger	real	Тур	Value/off	Description
SP.EF	r	base 1dP 2dP 3dP	3170 11362 19554 27746	39108	Float	-19999999	Effective setpoint. The value reached at the end of setpoint processing, after taking W2, external setpoint, gradient, boost function, programmer settings, start-up function, and limit functions into account. Comparison with the effective process value leads to the control deviation, from which the necessary controller response is derived.
Diff	r	base 1dP 2dP 3dP	3171 11363 19555 27747	39110	Float	-19999999	Difference between the effective setpoint and setpoint 2.
SP	r/w	base 1dP 2dP 3dP	3180 11372 19564 27756	39128	Float	-19999999	Setpoint for the interface (without the additional function 'Controller off'). SetpInterface acts on the internal setpoint before the setpoint processing stage. Note: The value in RAM is always updated. To protect the EEPROM, storage of the value in the EEPROM is timed (at least one value per half hour).
SP.d	r/w	base 1dP 2dP 3dP	3181 11373 19565 27757	39130	Float	-19999999	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.

### 21 Tool

#### • ConF

Name	r/w	Adr. I	nteger	real	Тур	Value/off	Description
U.LinT	r/w base 634 34 1dP 8826 2dP 17018 3dP 25210			Enum	Enum_Unit	Engineering unit of linearization table (temperature).	
		30P	25210			0 without unit 1 °C 2 °F	

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ConF

PAr .....

#### Operating Version4

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1	Cntr										
•	ConF										
	Name	r/w	Adr. Inte	eger	real	Тур	Value/o	off	Description		
	SP.Fn	r/w	base 1dP 2dP 3dP	3150 11342 19534 27726	39068	Enum	Enum_S	PFN	Basic configuration for setpoint processing, e.g. 'setpoint controller switchable to external setpoint'. Configuration of special, controller-dependent setpoint functions.		
							1 8	Program contro Setpoint contro (switchable -> Program contro	oller can be switched over to external set-point (->LOGI/SP.E) oller for setpoint profile. The program profile is definable by the user. oller switchable to setpoint controller with external setpoint shift LOGI/SP.E). oller switchable to program controller with external setpoint shift. oller for setpoint profile, the profile can be defined by the user, switchable		
	C.tYP	r/w	base 1dP 2dP 3dP	5062 13254 21446 29638	42892	Enum	Enum_C	tүр	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.		
									roller (process value = x1)		
								An offset is ad	r (x1+oFFS)/x2. ded to the input value x1, and then the ratio is calculated from the result value x2. This ratio is used as process value.		
							2	•	lue 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 fault, control is continued with the remaining process value.				
									e of x1 and x2. The lower value is used for control. In case of a sensor fault, inued with the remaining process value.		
								Mean value (x <sup>2</sup> process value.	1 + x2) / 2. In case of a sensor fault, control is continued with the remaining		
							6	•	tween the input values: process value = x1 or process value = x2.		
	C.Fnc	r/w	base 1dP 2dP 3dP	5050 13242 21434 29626	42868	Enum	Enum_C	Fnc	Control behaviour (algorithm) referred to output value: e.g. 2- or 3-point controller, signaller, 3-point stepping control.		
			•						er or signaller with one output. The on/off controller or signaller switches if lue drifts from the setpoint more than the hysteresis.		
								an analog outp	g. heating, with one output: Switched as a digital output (2-point) or used as out (continuous). PID controllers respond quickly to changes of the control typically do not exhibit any permanent control offset.		
							2	D / Y / Off, or 2 the switching of	2-point controller with partial/full load switch-over. 2 digital outputs: Y1 is output and Y2 is the changeover contact for D/Y.		
							3	2 x PID control used as an ana control deviati	, e.g. heating/cooling. Two outputs: Switched as a digital output (3-point) or alog output (continuous). PID controllers respond quickly to changes of the on, and typically do not exhibit any permanent control offset.		
							4		ng controller, e.g. for motor actuators. Two digital outputs. No actuating erated when the process is lined out.		
								digital outputs position feedbar monitoring the	ng controller with position feedback signal Yp, e.g. for motorized valves. Two . No output signals are generated when the process is lined out. The ack signal Yp serves for displaying the actuator position, but also for e actuator if the DAC function (Digital Actuator Control) is provided.		
								controller with	ntroller with integrated positioner. This is basically a cascade. A tracking three-point stepping behaviour which operates with Yp as process value is continuous controller.		

**Operating Version4** 

Cntr													
ConF													
Name		Adr. In	teger	real	Тур	Value/o	off	Description					
mAn	r/w	base 1dP 2dP 3dP	5051 13243 21435 29627	42870	Enum	Enum_m		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.					
							<ul> <li>The output value cannot be changed in manual operation, neither with the front keys nor via the interface.</li> <li>The output value is to be adjusted in manual operation (see also LOGI/mAn).</li> </ul>						
C.Act	r/w	base 1dP 2dP 3dP	5052 13244 21436 29628	42872	Enum	Enum_C	Act	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.					
							falling process	osed-sense response, e.g. heating. The controller output is increased with a solue, and decreased with a rising process value.					
								e-sense response, e.g. cooling. The controller output is increased with a value, and decreased with a falling process value.					
FAIL	r/w	base 1dP 2dP 3dP	5053 13245 21437 29629	42874	Enum	Enum_F	AIL	With the sensor break response, the operator determines the instrument's reaction to a sensor break, thus ensuring a safe process condition.					
						<ul> <li>Note for three-point stepping controller: With Y2 &lt; 0.01 CLOSED is set (DY= -100%), with 0.01 =&lt; Y2 =&lt; 99.9 no output is set (DY=0%), with Y2 &gt; 99.9 OPEN is set (DY= +100%). Note for signallers: With Y2 &lt; 0.01 OFF is set, with 0.01 =&lt; Y2 =&lt; 99.9 status keeps unchanged, with Y2 &gt; 99.9 ON is set.</li> <li>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.</li> </ul>							
rnG.L	r/w	base 1dP 2dP 3dP	5059 13251 21443 29635	42886	Float	-1		Lower limit for the controller's operating range. The control range i independent of the measurement range. Reducing the control range will increase the sensitivity of the self-tuning process.					
rnG.H	r/w	base 1dP 2dP 3dP	5060 13252 21444 29636	42888	Float	-1		Upper limit for the controller's operating range. The control range independent of the measurement range. Reducing the control range will increase the sensitivity of the self-tuning process.					
CYCL	r/w	base 1dP 2dP 3dP	5055 13247 21439 29631	42878	Enum	Enum_C	YCL	Duty cycle for 2-point and 3-point controllers. Internally, the controller calculates a continuous output value, which is converted into switching pulses for digital outputs. The user can adapt the setting to calculate various duty cycles (on/off ratio).					
						3	output. With v sufficiently to limited to ¼ of With constant maintained ov	htub curve'. The adjusted duty cycles t1 and t2 are valid for $\pm$ 50% control ery small and very large control outputs, the effective duty cycle is increase prevent nonsensically short operating pulses. The shortest pulses are f t1 and ¼ of t2. pulses for heating and cooling. The adjusted duty cycles t1 and t2 are er the entire output range. The parameter tp is used to adjust the minimum . Shorter pulses are added internally until a pulse of length tp can be					

_			,					Operating Version4		
	Cntr									
	ConF									
	Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description		
t	tunE	r/w base 5056 42880 Enu 1dP 13248 2dP 21440 3dP 29632		Enum	Enum_tune	Self-tuning procedure / sequence. Choice between:step response tuning during start-up and pulse response tuning at setpoint; or pulse response tuning during start-up and at setpoint; or only step response tuning during start-up, and no tuning at setpoint (no pulse).				
							The step funct range. At setp	th step function, impulse function at setpoint. ion at start up requires a control deviation of more than 10% of the control oint, with control deviation less than 10% of the control range, tuning is impulse function.		
							<ol> <li>At start-up with impulse function. Setting for fast controlled systems (e.g. hot runner control).</li> <li>Always tuning with impulse function. At start up, with a control deviation of more than 10% of the control range, the control loop is optimized for a wide control range. At set-point the control deviation during self-tuning is small.</li> </ol>			
								d at set-point always tune step function at start up. with step function at start up, regardless of the control deviation.		
	Strt	r/w	base 1dP 2dP 3dP	5057 13249 21441 29633	42882	Enum	Enum_Strt	Start of self-tuning. Self-tuning can always be started manually at the request of the operator. Here, it is possible to determine that self-tuning is started automatically under the following conditions: On power-up or when an oscillation of the process value is detected.		
-						!	0 no automatic s	start (manual start via front interface)		
							1 Manual or aut (oscillating of the output value	omatic start of auto-tuning at power on or when oscillating is detected process value by more than $\pm$ 0.5% of the control range, and simultaneously ue by more than 20%.) Note: Though the process is unchanged, at power on ne-consuming) auto-tuning is started.		
	Adt0	r/w	base 1dP 2dP 3dP	5061 13253 21445 29637	42890	Enum	Enum_Adt0	Optimization of the switching cycles t1 and t2 for the DED conversion can be disabled here. In order to fine-tune the positioning action, the switching periods are changed by the self-tuning function, if automatic tuning is configured.		
-						1	obtained.	tion is determinated by auto-tuning. Thereby the best controlling results are		
							bad control be	tion is not determinated by auto-tuning. An oversized cycle duration causes havior. An undersized cycle duration causes a more frequent switching, at the wearout of mechanical actuators (relay, contactor).		

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

Operating Version4

# 1 Cntr

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

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- 1		

PArA						
Name	r/w	Adr. Integ	jer real	Тур	Value/off	Description
tt	r/w	1dP 13 2dP 2	5015 42798 3207 1399 9591	Float	3	Travel time of the actuator motor [s]. If no feedback signal is available, the controller calculates the actuator position by mean of an integrator and the adjusted motor travel time. For this reas a precise definition of the motor travel time between min and m (0% and 100%) is important.
Y.Lo	r/w	1dP 13 2dP 2	5018 42804 3210 1402 9594	Float	-105105	Lower output limit [%] The range is depedant of the type of controller: 2 point controller: 0ymax+1 3 point controller: -105 ymax-1
Y.Hi	r/w	1dP 13 2dP 2	5019 42806 3211 1403 9595	Float	-105105	Upper output limit [%] The range is ymin+1105
Y2	r/w	1dP 13 2dP 2	5017 42802 3209 1401 9593	Float	-100100	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	1dP 13 2dP 2	5020 42808 3212 1404 9596	Float	-105105	Offset for die positioning value [%]. This is added to the controll output, and has the most effect with P and PD controllers. (With controllers, the effect is compensated by the integral action.) W a control deviation = 0, the P controller generates a control outp Y0.
Ym.H	r/w	1dP 13 2dP 2	5021 42810 3213 1405 9597	Float	-105105	Limit for the mean control output value Ym in case of sensor bre [%]. The mean control output value is configurable as the respon to sensor break. The maximum mean output value = YmH.
L.Ym	r/w	1dP 13 2dP 2	5022 42812 3214 1406 9598	Float	1	Max. control deviation (xw), at the start of mean value calculation [engineering unit]. When calculating the mean value, data are only taken into acco if the control deviation is small enough. 'Lym' is a preset value to determines how precisely the calculated output value is matched the setpoint.
oFFS	r/w	1dP 13 2dP 2	5024 42816 3216 1408 9600	Float	-120120	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), the required ratio is reached.
HYS.L	r/w	1dP 13 2dP 2	5028 42824 3220 1412 9604	Float	0	Switching hysteresis below the setpoint of the signaller [engineering unit].
HYS.H	r/w	1dP 13 2dP 2	5029 42826 3221 1413 9605	Float	0	Switching hysteresis above the setpoint of the signaller [engineering unit].

# 1 Cntr

Signa									
Name	r/w	Adr. Ir	nteger	real	Тур	Valu	e/off		Description
C.InP	r	base 1dP 2dP 3dP	5102 13294 21486 29678	42972	Float	-1	C	כ	process value
Tu2	r	base 1dP 2dP 3dP	5145 13337 21529 29721	43058	Float	0	C		'Cooling' delay time of the loop. Tu is calculated by the self-tuning function: It is the time delay before the process reacts significantly. In effect, Tu is a dead time that is determined by the reaction of the process to a change of the control output. It is used for defining controller action.
Vmax2	r	base 1dP 2dP 3dP	5146 13338 21530 29722	43060	Float	0	C	כ	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.
Кр2	r	base 1dP 2dP 3dP	5147 13339 21531 29723	43062	Float	0	C		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		Adr. In	teger	real	Тур	Value/off		Description
	St.Cntr	r	base 1dP 2dP 3dP	5100 13292 21484 29676	42968	Int	065535		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 1: Switching Bit 2: Sensor ef Bit 3: Controlsi 0: automa Bit 4: Controlsi 0: Y2 not Bit 5: Controlsi 0: not act Bit 6: Controlsi 0: controlsi 0: controlsi 0: parame Bit 7: Controlsi 0: parame Bit 8: Loopalarr 0: no alar 1: alarm Bit 9: Soft start 0: not act 1: activ Bit 10: Rate to s 0: not act 1: activ Bit 11: Not used Bit 12-15: Interr 0 0 0 0 Automa 0 0 0 1 Selftun 0 0 1 0 Selftun 0 0 1 0 Selftun 0 0 1 1 Sensor 0 1 0 0 Not use 0 1 0 1 Manua 0 1 1 1 Not use 1 0 0 0 Manua 1 0 0 1 Outputs	g si rror gna atic gna atic gna act gna gna gna gna gna gna gna gna gna gna	I: Manual/automatic 1: manual I: Y2 iv 1: Y2 activ I: Ext. setting of outputsignal 1: activ I: Controller off 1: contr. off II: The activ parameter set set 1 set 2 nction point functional statuses (operating state) is running faulty for operator signal)
	diFF	r	base 1dP 2dP 3dP	5104 13296 21488 29680	42976	Float			Positive Xw means that the process value is above the setpoint. A small control deviation indicates precise control.
	POS	r	base 1dP 2dP 3dP	5105 13297 21489 29681	42978	Float	0100		The position feedback Yp shows the actuator position with 3-point stepping controllers. If Yp is outside the limits Ymin and Ymax, the output of positioning pulses is suppressed.
	Tu1	r	base 1dP 2dP 3dP	5141 13333 21525 29717	43050	Float	0		'Heating' delay time of the loop. Tu is calculated by the self-tuning function: It is the time delay before the process reacts significantly. In effect, Tu is a dead time that is determined by the reaction of the process to a change of the control output. It is used for defining controller action.

# 1 Cntr

Signa								
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off		Description
Ypid	r	base 1dP 2dP 3dP	5103 13295 21487 29679	42974	Float	-120120		Output value Ypid is the output signal determined by the controller, and from which the switching pulses for the digital and analog control outputs are calculated. Ypid is also available as an analog signal. e.g. for visualization.
Ada.St	r/w	base 1dP 2dP 3dP	5150 13342 21534 29726	43068	Enum	Enum_AdaStart		Starting / stopping the self-tuning function.After the start signal, the controller waits until the process reaches a stable condition (PIR) before it starts the self-tuning process. Self-tuning can be aborted manually at any time. After a successful self-tuning attempt, the controller automatically resumes normal operation.
								rt the self-tuning process, and the controller returns to normal operation bus parameter settings.
							ne se	If-tuning process is possible during manual or automatic controller
Yman	r/w	base 1dP 2dP 3dP	5151 13343 21535 29727	43070	Float	-110110		Absolute preset output value, which is used as output value during manual operation. Caution: With 3-point stepping controllers, Yman (evaluated the same as Dyman) is added to the actual output value as a relative shift.
dYman	r/w	base 1dP 2dP 3dP	5152 13344 21536 29728	43072	Float	-220220		Differential preset output value, which is added to the actual outpu value during manual operation. Negative values reduce the output.
Yinc	r/w	base 1dP 2dP 3dP	5153 13345 21537 29729	43074	Enum	Enum_YInc		Increasing the output value. There are two speeds: 40 s or 10 s for the change from 0 % to 100 %. Note: The 3-point stepping controller translates the increments as UP.
						0 Not active		
						1 increment	out	put
Ydec	r/w	base 1dP 2dP 3dP	5154 13346 21538 29730	43076	Enum	Enum_YDec		Decreasing the output value. There are two speeds: 40 s or 10 s for the change from 0 % to 100 %. Note: The 3-point stepping controller translates the increments as DOWN.
						0 Not active 1 decremen		nut
[	-				1			
SP.EF	r	base 1dP 2dP 3dP	5101 13293 21485 29677	42970	Float	-1		Effective setpoint. The value reached at the end of setpoint processing, after taking W2, external setpoint, gradient, boost function, programmer settings, start-up function, and limit function into account. Comparison with the effective process value leads to the control deviation, from which the necessary controller response is derived.
L					I	I		

Cntr								
Signa	al							
Name		Adr. Ir	nteger	real	Тур	Value/off		Description
St.Tune	r	base 1dP 2dP 3dP	5140 13332 21524 29716	43048	Int	065535		Status information during self-tuning, e.g. the actual condition, an possible results, warnings, and error messages.
<u> </u>					1			out; 0 = No; 1 = Yes
								de 'Self-tuning controller; $0 = Off; 1 = On$
						Bit 2 Result Bit 3 - 7 Not		roller self-tuning; 0 = OK; 1 = Fault
								the 'heating' attempt
						0000101	icssayc	e / Attempt still running
						00001 Succ		a / Attempt still running
						0 0 0 1 Succ 0 0 1 0 Succ	essful essful, v	with risk of exceeded setpoint
						0 0 0 1 Succ 0 0 1 0 Succ 0 0 1 1 Error	essful essful, v : Wrong	with risk of exceeded setpoint g operating sense
						0 0 0 1 Succ 0 0 1 0 Succ 0 0 1 1 Error 0 1 0 0 Error	essful essful, v : Wrong : No res	with risk of exceeded setpoint g operating sense sponse from process
						0 0 0 1 Succ 0 0 1 0 Succ 0 0 1 1 Error 0 1 0 0 Error 0 1 0 1 Error	essful essful, v : Wrong : No res : Turnin	with risk of exceeded setpoint g operating sense sponse from process ng point too low
						0 0 0 1 Succ 0 0 1 0 Succ 0 0 1 1 Error 0 1 0 0 Error 0 1 0 1 Error 0 1 1 0 Error	essful essful, v : Wrong : No res : Turnin : Risk of	with risk of exceeded setpoint g operating sense sponse from process ng point too low if exceeded setpoint
						0 0 0 1 Succ 0 0 1 0 Succ 0 0 1 1 Error 0 1 0 0 Error 0 1 0 1 Error 0 1 1 0 Error 0 1 1 1 Error 1 0 0 0 Error	essful essful, v : Wrong : No res : Turnin : Risk of : Step o : Setpoi	with risk of exceeded setpoint g operating sense sponse from process ng point too low of exceeded setpoint putput too small int reserve too small
						0 0 0 1 Succ 0 0 1 0 Succ 0 0 1 1 Error 0 1 0 0 Error 0 1 0 1 Error 0 1 1 0 Error 0 1 1 1 Error 1 0 0 0 Error	essful essful, v : Wrong : No res : Turnin : Risk of : Step o : Setpoi	with risk of exceeded setpoint g operating sense sponse from process ng point too low of exceeded setpoint putput too small
Vmax1	r	base	5142	43052	Float	0 0 0 1 Succ 0 0 1 0 Succ 0 0 1 1 Error 0 1 0 0 Error 0 1 0 1 Error 0 1 1 0 Error 0 1 1 1 Error 1 0 0 0 Error	essful essful, v : Wrong : No res : Turnin : Risk of : Step o : Setpoi esult of	with risk of exceeded setpoint g operating sense sponse from process ng point too low of exceeded setpoint putput too small int reserve too small
Vmax1	r	base 1dP	5142 13334	43052	Float	0 0 0 1 Succ 0 0 1 0 Succ 0 0 1 1 Error 0 1 0 0 Error 0 1 0 1 Error 0 1 1 0 Error 0 1 1 1 Error 1 0 0 0 Error Bit 12 - 15 R	essful essful, Wrong No res Turnin Risk of Step o Setpoi esult of	with risk of exceeded setpoint g operating sense sponse from process ng point too low of exceeded setpoint butput too small int reserve too small f 'cooling' attempt (same as heating attempt) Max. rate of change for 'heating', i.e. the fastest process value increase during self-tuning. Vmax is calculated by the self-tuning
Vmax1	r			43052	Float	0 0 0 1 Succ 0 0 1 0 Succ 0 0 1 1 Error 0 1 0 0 Error 0 1 0 1 Error 0 1 1 0 Error 0 1 1 1 Error 1 0 0 0 Error Bit 12 - 15 R	essful essful, : Wrong : No res : Turnin : Risk of : Step o : Setpoi esult of	with risk of exceeded setpoint g operating sense sponse from process ng point too low of exceeded setpoint butput too small int reserve too small f 'cooling' attempt (same as heating attempt) 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
Vmax1	r	1dP	13334	43052	Float	0 0 0 1 Succ 0 0 1 0 Succ 0 0 1 1 Error 0 1 0 0 Error 0 1 0 1 Error 0 1 1 0 Error 0 1 1 1 Error 1 0 0 0 Error Bit 12 - 15 R	essful essful, : Wrong : No res : Turnin : Risk of : Step o : Setpoi esult of	with risk of exceeded setpoint g operating sense sponse from process ng point too low if exceeded setpoint butput too small int reserve too small f 'cooling' attempt (same as heating attempt) 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
	r	1dP 2dP	13334 21526 29718	43052		0 0 0 1 Succ 0 0 1 0 Succ 0 0 1 1 Error 0 1 0 0 Error 0 1 0 1 Error 0 1 1 0 Error 0 1 1 1 Error 1 0 0 0 Error Bit 12 - 15 R	essful essful, : Wrong : No res : Turnin : Risk of : Step o : Setpoi esult of	with risk of exceeded setpoint g operating sense sponse from process ng point too low of exceeded setpoint butput too small int reserve too small f 'cooling' attempt (same as heating attempt) 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
Vmax1 Kp1		1dP 2dP 3dP base	13334 21526 29718 5143			0 0 0 1 Succ 0 0 1 0 Succ 0 0 1 1 Error 0 1 0 0 Error 0 1 0 1 Error 0 1 1 0 Error 0 1 1 1 Error 1 0 0 0 Error Bit 12 - 15 R	essful essful, : Wrong : No res : Turnin : Risk of : Step o : Setpoi esult of	with risk of exceeded setpoint g operating sense sponse from process ag point too low if exceeded setpoint butput too small int reserve too small f 'cooling' attempt (same as heating attempt) 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. Process gain for 'heating'. For control loops with self-regulation, process gain is the ratio determined by the change of the control
		1dP 2dP 3dP	13334 21526 29718			0 0 0 1 Succ 0 0 1 0 Succ 0 0 1 1 Error 0 1 0 0 Error 0 1 0 1 Error 0 1 1 0 Error 0 1 1 1 Error 1 0 0 0 Error Bit 12 - 15 R	essful essful, : Wrong : No res : Turnin : Risk of : Step o : Setpoi esult of	with risk of exceeded setpoint g operating sense sponse from process ng point too low if exceeded setpoint butput too small int reserve too small f 'cooling' attempt (same as heating attempt) 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.

1	Cntr							
•	Signal							
	Name	r/w	Adr. Int	teger	real	Тур	Value/off	Description
	Msg2	r	base 1dP 2dP 3dP	5148 13340 21532 29724	43064	Enum	Enum_Msg	The result of self-tuning for 'cooling' indicates whether self-tuning was successful, and with what result.
							0 No message	/ Tuning attempt still running
								as been completed successfully. The new parameters are valid.
							Note: Self-tu	vas successful, but with a warning. The new parameters are valid. ning was aborted due to the risk of an exceeded setpoint, but useful vere determined. Possibly repeat the attempt with an increased setpoint
							Possible rem output sense	reacts in the wrong direction. edy: Reconfigure the controller (inverse <-> direct). Check the controller (inverse <-> direct).
								from the process. Perhaps the control loop is open. edy: Check sensor, connections, and process.
							Possible rem	value turning point of the step response is too low. edy: Increase the permitted step output range, i.e. increase the parameter y') or reduce the parameter Y.Lo ('cooling').
							were determ	vas aborted due to the risk of an exceeded setpoint. No useful parameters ined. edy: Repeat the attempt with an increased setpoint reserve.
							Possible rem	but change is not large enough (minimum change > 5 %). edy: Increase the permitted step output range, i.e. increase the parameter g') or reduce the parameter Y.Lo ('cooling').
							change. Acknowledgi	r is waiting. Setpoint reserve must be given before generating the step output ment of this error message leads to switch-over to automatic mode. shall be continued, change set-point, change process value, or decrease ge.
							9 Impulse tunin not closed: c connections	

				_					
	Cntr								
	Signal								
	Name	r/w	Adr. In	teger	real	Тур	Value/	off	Description
	Msg1	r	base 1dP 2dP 3dP	5144 13336 21528 29720	43056	Enum	Enum_N	Лsg	The result of self-tuning for 'heating' indicates whether self-tuning was successful, and with what result.
							0		Tuning attempt still running
							1	0	s been completed successfully. The new parameters are valid.
							2	Note: Self-tuni	s successful, but with a warning. The new parameters are valid. Ing was aborted due to the risk of an exceeded setpoint, but useful are determined. Possibly repeat the attempt with an increased setpoint
							3	Possible remed	acts in the wrong direction. dy: Reconfigure the controller (inverse <-> direct). Check the controller nverse <-> direct).
							4		om the process. Perhaps the control loop is open. dy: Check sensor, connections, and process.
							5	Possible remed	Ilue turning point of the step response is too low. dy: Increase the permitted step output range, i.e. increase the parameter or reduce the parameter Y.Lo ('cooling').
							6	were determin	s aborted due to the risk of an exceeded setpoint. No useful parameters ed. Jy: Repeat the attempt with an increased setpoint reserve.
							7	Possible remed	It change is not large enough (minimum change > 5 %). dy: Increase the permitted step output range, i.e. increase the parameter or reduce the parameter Y.Lo ('cooling').
							8	change. Acknowledgme	is waiting. Setpoint reserve must be given before generating the step outputent of this error message leads to switch-over to automatic mode. hall be continued, change set-point, change process value, or decrease e.
							9	Impulse tuning not closed: che connections ar	
	YGrw	r/w	base 1dP 2dP 3dP	5155 13347 21539 29731	43078	Enum	Enum_Y	'GrwLs	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.
1							0	Slow change o	f Y, from 0% to 100% in 40 seconds.
								2	

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

2	InP.1							
•	ConF							
	Name	r/w	Adr. In	iteger	real	Тур	Value/off	Description
	I.Fnc	r/w	base	167	33102	Enum	Enum_IFnc	Selection of the function assigned to the value at INP1, e.g. value at
			1dP	8359				INP1 is the external setpoint.
			2dP	16551				
			3dP	24743				
		•	•				0 no function (si	ubsequent input data are skipped)
							1 Heating curren	nt input.
								vint SP.E or (depending on version) external setpoint shift SP.E. s done via -> LOGI/SP.E).
								back signal Yp.
							4 Second proces For process va	ss value X2. Ilue functions such as ratio, min, max, mean. Adjustment via Cntr/C.tYP.
							5 Preset for exte	ernal positioning value Y.E (switchover via -> LOGI/Y.E)
								input (replaced e.g. by limit value signalling).
							7 Process value	Х1.

	InP.1								
	ConF								
	Name	r/w	Adr. Int	eaer	real	Тур	Value/off		Description
Ē	S.tYP		base 1dP 2dP		35068	51	Enum_StYP		Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted
L			3dP	25720			0 11		
								rmocoupie i renheit: -14	ype L (-100900°C), Fe-CuNi DIN 81652°F
								rmocouple t renheit: -14	ype J (-1001200°C), Fe-CuNi 82192°F
								rmocouple t renheit: -14	уре К (-1001350°С), NiCr-Ni 82462°F
								rmocouple t renheit: -14	ype N (-1001300°C), Nicrosil-Nisil 82372°F
								rmocouple t renheit: 32.	ype S (01760°C), PtRh-Pt10% 3200°F
							Fahi	renheit: 32.	
							Fahi	renheit: -32	
							Fahi	renheit: 32.	
							Fahi	renheit: 32.	
							Fahi	renheit: -14	
							Fahi	renheit: 32/	ype B (0/4001820°C), PtRh-Pt6% /7523308°F
							ena	bles non-lir	couple with a linearization characteristic selectable by the user. This near signals to be simulated or linearized. . 100.0(150.0)°C)
							Mea	asuring ran	ge up to 150°C at reduced lead resistance. 8212(302) °F
								00 (-200.0 renheit: -32	
							Fahi	renheit: -32	
							For		ith preset special linearization (-50150 °C or -58302 °F).
								ecial 0450	
								rent : 020 10V / 210	mA / 420 mA
								cial -2.51	
								cial : -25?	
							•		0160 Ohm
							•		0450 Ohm
							•		01600 Ohm 04500 Ohm
		I							
0	S.Lin	r/w	base 1dP 2dP 3dP	1151 9343 17535 25727	35070	Enum	Enum_SLin		Linearization (not adjustable for all sensor types S.tYP). Special linearization. The linearization table can be created with the Engineering Tool. The default characteristic is for KTY 11-6 temperature sensors.
L		I					0 No :	special line	arization.
							1 Spe	ecial lineariz	ration. Definition of the linearization table is possible with the Engineeri It setting is the characteristic of the KTY 11-6 temperature sensor.

2	InP.1												
	ConF												
	Name	r/w	Adr. In	teger	real	Тур	Value	e/off	Description				
	Corr	r/w	base	160	33088	Enum	Enum_	_Corr3	Measured value correction / scaling				
			1dP	8352									
			2dP	16544									
			3dP	24736									
,								Without scalin	iq				
							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.						
							<ul> <li>Two-point correction (in CAL-Level) ist possible offline via process value transmitter or on-line in the process. Set process value for the upper and lower scaling point and confirm as input value InL or InH, then set the belonging displayed value OuL and OuH. The settings are done via the front of the device.</li> </ul>						
							<ul> <li>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.</li> </ul>						
[	In.F	r/w	base	1152	35072	Float	-1		Substitute value in case of a fault. This value is used for				
			1dP	9344					calculations, if there is a fault at the input (e.g. FAIL).				
			2dP	17536									
			3dP	25728									
			- Cui	0									

PArA						
Name	r/w	Adr. Integer	real	Тур	Value/off	Description
InL.1	r/w	base 110 1dP 929 2dP 174 3dP 256	2 34	Float	-1 C	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 110 1dP 929 2dP 174 3dP 256	93 95	Float	-1 C	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 110 1dP 920 2dP 174 3dP 256	94 36	Float	-1 [	Input value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the upper scaling point (e.g. 20 mA) is done using the corresponding electrical value.
OuH.1	r/w	base 110 1dP 920 2dP 174 3dP 256	15 37	Float	-1 [	Display value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the upper scaling point, e.g. 20 mA is displayed as 12 [pH].
t.F1	r/w	base 110 1dP 920 2dP 174 3dP 256	96 38	Float	0100 C	<b>J</b> 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 110 1dP 929 2dP 174 3dP 256	97 39	Float	0100	External temperature compensation (temperature at the junction of thermocouple/copper lead with external temperature compensation).

	Signal											
Ν	Name	r/w	Adr. Inte	eger	real	Тур	Value/off	Description				
1	n.1r		1dP 2dP	1170 9362 17554 25746	35108	Float	-1 🗆	Measurement value before the measurement value correction (unprocessed).				
F	ail	-	1dP 2dP	1171 9363 17555 25747	35110	Enum	Enum_InpFail	Input circuit fault: faulty or incorrectly connected sensor.				
							0 no error					
							<ol> <li>sensor break</li> <li>Incorrect pola</li> </ol>	rity at input				
							4 Short circuit at input.					
Г												
	n.1	r		1172 9364	35112	Float	-1 🛛	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).				
			201	17556 25748								
$\vdash$	Inp	r/w	base	1180	35128	Float	-1 🛛	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value				

# 3 InP.2

ConF										
Name	r/w	Adr. In	teger	real	Тур	Value/off	Description			
I.Fnc	r/w	base	161	33090	Enum	Enum_IFnc	Selection of the function assigned to the value at INP2, e.g. value at			
		1dP	8353				INP2 is the external setpoint.			
		2dP	16545							
		3dP	24737							
						0 no function (subsequent input data are skipped)				
						1 Heating curren	nt input.			
							int SP.E or (depending on version) external setpoint shift SP.E. done via -> LOGI/SP.E).			
						3 Position feedb	ack signal Yp.			
						<ul> <li>Second process value X2.</li> <li>For process value functions such as ratio, min, max, mean. Adjustment via Cntr/C.tYP.</li> <li>Preset for external positioning value Y.E (switchover via -&gt; LOGI/Y.E)</li> </ul>				
						6 No controller i	nput (replaced e.g. by limit value signalling).			
						7 Process value	Х1.			
	Name	Name r/w	Name r/w Adr. In I.Fnc r/w base 1dP 2dP	Name r/w Adr. Integer I.Fnc r/w base 161 1dP 8353 2dP 16545	Name r/w Adr. Integer real I.Fnc r/w base 161 33090 1dP 8353 2dP 16545	Name r/w Adr. Integer real Typ I.Fnc r/w base 161 33090 Enum 1dP 8353 2dP 16545	Namer/wAdr. IntegerrealTypValue/offI.Fncr/wbase16133090EnumEnum_IFnc1dP83532dP16545AA2dP165453dP24737Image: Constraint of the state			

InP.	2									
Con	F									
Name	r/w	Adr. Integer	real	Тур	Value/off	Description				
S.tYP	r/w	base 125 1dP 944 2dP 1765 3dP 2585	34	Enum	Enum_StYP2	Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted.				
					30 Current : 020	) mA / 420 mA				
					31050 mA current (AC)50Potentiometer 0160 Ohm51Potentiometer 0450 Ohm52Potentiometer 01600 Ohm53Potentiometer 04500 Ohm					
Corr	r/w	base 16 1dP 835 2dP 165 3dP 2473	6	Enum	Enum_Corr	Measured value correction / scaling				
<u> </u>	I				0 Without scalir	ng				
					lower input va	rection (in the CAL Level) can be done on-line in the process. If InL shows the lue of the scaling point, then OuL must be adjusted to the corresponding Adjustments are made via the front panel keys of the device only.				
					in the process input value Inl	tion (in CAL-Level) ist possible offline via process value transmitter or on-line . Set process value for the upper and lower scaling point and confirm as . or InH, then set the belonging displayed value OuL and OuH. The settings he front of the device.				
					<ul> <li>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 th engineering tool.</li> </ul>					
In.F	r/w	base 125 1dP 944 2dP 1765 3dP 2585	86	Float	-1 🗹	Substitute value in case of a fault. This value is used for calculations, if there is a fault at the input (e.g. FAIL).				

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

3 InP.2

•	PArA								
	Name	Name r/w Adr. Integer real Typ Value/off		Value/off		Description			
	OuH.2	r/w	base 1dP 2dP 3dP	1203 9395 17587 25779	35174	Float	-1 [		Display value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the upper scaling point, e.g. 20 mA is displayed as 12 [pH].
	t.F2	r/w	base 1dP 2dP 3dP	1204 9396 17588 25780	35176	Float	0100 [		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

Signa	d I								
Name	r/w	Adr. Inte	eger	real	Тур	Valu	e/off		Description
In.2	r	base 1dP 2dP 3dP	1270 9462 17654 25846	35308	Float	-1			Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
Fail	r	base 1dP 2dP 3dP	1271 9463 17655 25847	35310	Enum	Enum	_InpFail		Input circuit fault: faulty or incorrectly connected sensor.
		•				0	no error		
						1	sensor bre	eak	
						2	Incorrect p	oolar	ity at input.
						4	Short circu	uit a	t input.
In.2r	r	base 1dP 2dP 3dP	1272 9464 17656 25848	35312	Float	-1		0	Measurement value before the measurement value correction (unprocessed).
F.Inp	r/w	base 1dP	1280 9472	35328	Float	-1			Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value

2dP

3dP

17664

25856

at this input like a measurement value (preset value for inputs from

a superordinate system, e.g. for a function test.)

4	InP.3											
•	ConF											
	Name	r/w	Adr. In	iteger	real	Тур	Value/	off	Description			
	I.Fnc	r/w	base	166	33100	Enum	Enum_IF	nc	Selection of the function assigned to the value at INP3, e.g. value at			
			1dP	8358					INP3 is the external setpoint.			
			2dP	16550								
			3dP	24742								
							0 no function (s		ibsequent input data are skipped)			
							1	Heating current input.				
							2		int SP.E or (depending on version) external setpoint shift SP.E. done via -> LOGI/SP.E).			
							3	Position feedb	ack signal Yp.			
							4	Second proces				
									lue functions such as ratio, min, max, mean. Adjustment via Cntr/C.tYP.			
							5		ernal positioning value Y.E (switchover via -> LOGI/Y.E)			
							6		nput (replaced e.g. by limit value signalling).			
							7	Process value	X1.			

	P.3								
C.c	onF								
Nam		r/w	Adr. In	teger	roal	Тур	Value/	off	Description
		1/ VV	Aut. III	-		1	1		
S.tYI	P	r/w	base 1dP 2dP 3dP	1350 9542 17734 25926	35468	Enum	Enum_S	itYP3	Sensor type selection. For sensors with signals of resistance transducer, current or voltage measuring, scaling can be adjusted
		I				1	0	thermocouple Fahrenheit: -14	type L (-100900°C), Fe-CuNi DIN 481652°F
							1		type J (-1001200°C), Fe-CuNi
							2		type K (-1001350°C), NiCr-Ni
							3	thermocouple Fahrenheit: -14	type N (-1001300°C), Nicrosil-Nisil 482372°F
							4	thermocouple Fahrenheit: 32	type S (01760°C), PtRh-Pt10% 3200°F
							5	thermocouple Fahrenheit: 32	type R (01760°C), PtRh-Pt13% 3200°F
							6	Fahrenheit: -32	
							7	thermocouple Fahrenheit: 32	type C (02315°C), W5%Re-W26%Re 4199°F
							8	thermocouple Fahrenheit: 32	type D (02315°C), W3%Re-W25%Re 4199°F
							9	thermocouple Fahrenheit: -14	type E (-1001000°C), NiCr-CuNi 481832°F
							10	thermocouple Fahrenheit: 32	type B (0/1001820°C), PtRh-Pt6% (212)3308°F
							18	enables non-li	ocouple with a linearization characteristic selectable by the user. This near signals to be simulated or linearized.
							20	Measuring ran	100.0(150.0)°C) nge at reduced lead resistance up to 150°C. 28212(302)°F
							21	Pt100 (-200.0 . Fahrenheit: -32	850,0 °C)
							22	Pt 1000 (-200.0 Fahrenheit: -32	0850.0 °C)
							23	Special: 045	
							24	Special: 045	50 Ohms
							30		) mA / 420 mA
							41	Special : -2,5	
							42 50	Special : -25 Potentiometer	
							50 51	Potentiometer	
							52		:0460 Ohms
							53		:04500 Ohms
S.Lir	1	r/w	base	1351	35470	Enum	Enum_S		Linearization (not adjustable for all sensor types S.tYP). Special
			1dP	9543					linearization. The linearization table can be created with the
			2dP	17735					Engineering Tool. The default characteristic is for KTY 11-6
			3dP	25927					temperature sensors.
			341	,_,			0	No special line	
							1		zation. Definition of the linearization table is possible with the Engineeri

Special linearization. Definition of the linearization table is possible with the Engineering Tool. The default setting is the characteristic of the KTY 11-6 temperature sensor.

4	InP.3							
	ConF							
	Name	r/w	Adr. In	iteger	real	Тур	Value/off	Description
	Corr	r/w	base	165	33098	Enum	Enum_Corr3	Measured value correction / scaling
			1dP	8357				
			2dP	16549				
			3dP	24741				
							0 Without scalin	•
							lower input va	rection (in the CAL Level) can be done on-line in the process. If InL shows the lue of the scaling point, then OuL must be adjusted to the corresponding Adjustments are made via the front panel keys of the device only.
							on-line in the pas input value	rection (in CAL-Level) ist possible offline via process value transmitter or process. Set process value for the upper and lower scaling point and confirm InL or InH, then set the belonging displayed value OuL and OuH. The proversion via the front of the device.
								rA-level). The input values for the upper (InL, OuL) and lower scaling point visible at the parameter level. Adjustment is made via front operation or the ol.
	In.F	r/w	base	1352	35472	Float	-1 🗹	Substitute value in case of a fault. This value is used for
			1dP	9544				calculations, if there is a fault at the input (e.g. FAIL).
			2dP	17736				
			3dP	25928				

PArA							
Name	r/w	Adr. Integer	real	Тур	Value/off		Description
InL.3	r/w	base 130 1dP 949 2dP 1768 3dP 2587	2	Float	-1		Input value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the lower scaling point (e.g. 4 mA) is done using the corresponding electrical value.
OuL.3	r/w	base 130 1dP 949 2dP 1768 3dP 2587	3	Float	-1		Display value of the lower scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the lower scaling point, e.g. 4 mA is displayed as 2 [pH].
InH.3	r/w	base 130. 1dP 949 2dP 1768 3dP 2587	4	Float	-1		Input value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The display of the input value of the upper scaling point (e.g. 20 mA) is done using the corresponding electrical value.
OuH.3	r/w	base 130 1dP 949 2dP 1768 3dP 2587	5	Float	-1		Display value of the upper scaling point. Depending on sensor type, the input value can be scaled to the required display value in the Parameter Level. The operator can change the display value of the upper scaling point, e.g. 20 mA is displayed as 12 [pH].
t.F3	r/w	base 130 1dP 949 2dP 1768 3dP 2588	5 3	Float	0 ,		Filter time constant [s]. Every input is fitted with a digital (software) low-pass filter for suppressing process-related disturbances on the input leads. Higher filter settings improve the suppression, but increase the delay of the input signals.
E.tc3	r/w	base 130 1dP 949 2dP 1768 3dP 2588	7 9	Float	0100	2	External temperature compensation (temperature at the junction of thermocouple/copper lead with external temperature compensation).

Sig	gnal						
Name	е	r/w	Adr. Integer	real	Тур	Value/off	Description
In.3		-	base 137 1dP 956 2dP 1775 3dP 2594	2 4	Float	-1 🛛	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
Fail		r	base 137 1dP 956 2dP 1775 3dP 2594	3 5	Enum	Enum_InpFail	Input circuit fault: faulty or incorrectly connected sensor.
						0 no error 1 sensor break 2 Incorrect polar 4 Short circuit at	• •
In.3r		r	base 137 1dP 956 2dP 1779 3dP 2594	4	Float	-1 🔲	Measurement value before the measurement value correction (unprocessed).
F.Inp	)	r/w	base 138 1dP 957 2dP 1776 3dP 2599	2	Float	-1 🔲	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)

# 5 Lim

•	ConF									
	Name r/w Adr. Integer real Typ				Тур	Value/off		Description		
	Fnc.1	r/w	base 1dP 2dP 3dP	2150 10342 18534 26726		Enum	Enum_Fo	cn	Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.	
I							0 No limit value		monitoring.	
								e monitoring. The alarm signal is generated, if the limit is exceeded. If the e is within the limits (including hysteresis) again, this alarm signal is		
							2 Measured value monitoring + alarm status latch. An alarm signal is generated, if the is exceeded. A latched alarm signal remains latched until it is manually resetted.			
						3 Signal monitoring for rate of change (per minute).		ing for rate of change (per minute).		
4					4	Signal monitor	ing for rate of change (per minute) + storage of the alarm status.			

L	im								
С	onF								
Na	ime	r/w	Adr. Int	teger	real	Тур	Value/	off	Description
Sr	c.1	r/w	base 1dP 2dP 3dP	2151 10343 18535 26727	37070	Enum	Enum_S	irc	Source for limit value. Selection of which value is to be monitored.
<u> </u>						ļ	0	Process value	= absolute alarm
							1	control deviati Note: Monitori changing set-p	on xw (process value - set-point) = relative alarm ing with the effective set-point Weff. For example using a ramp it is the point, not the target set-point of the ramp.
							2	changes. Limit	ion Xw (= relative alarm) with suppression during start-up and setpoint value monitoring is continued as soon as the control deviation comes m limits again, at the latest after 10 * Tn.
							3	Measured valu	ue of the analog input INP1.
							4		ue of the analog input INP2.
							5		ue of the analog input INP3.
							6	effective set-p For example th internal (target	ne ramp-function changes the effective set-point untill it matches the
							7		able y (controller output)
							8	internal set-po Note: Monitor	e deviation xw (actual value - internal set-point) = deviation alarm to int ing with the internal set-point Wint. For example using a ramp it is the t, not the changing set-point of the ramp.
							9	Difference x1 -	- x2 (e.g. in combination with the process value function "Mean value", detecting aged thermocouples), difference between first and second proces
							11	Control deviati	ion Xw (= relative alarm) with suppression during start-up and setpoint value monitoring is continued as soon as the control deviation comes within is again.
HC	C.AL	r/w	base 1dP 2dP 3dP	2050 10242 18434 26626	36868	Enum	Enum_H	ICAL	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 cur	
							1		short circuit monitoring. Overload = current I > heat current limit.
							2	Break and sho	rt circuit monitoring. Break = current I < heat current limit.
LP	AL	r/w	base 1dP 2dP 3dP	5058 13250 21442 29634	42884	Enum	Enum_L	PAL	Monitoring of control loop interruption (not possible with 3-point stepping controller, not possible with signaller)
							0	switched off /	
							1	process variab Possible remed	generated, if with Y=100% there is no corresponding reaction of the le within the time of 2 x ti. dial action: Check heating or cooling circuit, check sensor and replace it, if eck controller and switching

#### **Operating Version4**

below the limit when the heating is switched off. The heating

and the current range can be adapted.

current is measured by means of a current transformer (accessory),

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

#### Signal

3dP

26576

Signal					Typ					
Name	r/w	Adr. Inte	eger	real	Тур	Value/of	f	Description		
St.HC	r	base 1dP 2dP 3dP	2070 10262 18454 26646	36908	Int	03	C	Status of the heating current alarm. Displayable are heating current short-circuit and/or heating current alarm. Depending on configuration, the heating current alarm is either an interruption of heating current (I < limit value) or heating current overload (I > limit value).		
HC	r	base 1dP 2dP 3dP	2071 10263 18455 26647		Float	-1		Measured heating current [A]. Apart from the short circuit test, and depending on configuration, an overcurrent test (current I > heating current limit) and an open circuit test (current I < heating current limit) is executed. The heating current is measured by means of a (separate) current transformer, whereby the input range can be scaled.		
SSr	r	base 1dP 2dP 3dP	2072 10264 18456 26648		Float	-1	C	Measured current with SSr [A]. The heating current (SSR) is short circuited, if there is a current flow even though the controller output is switched off.Suggested remedy: check heating current circuit, replace solid-state relay if necessary.		
St.Lim	r	base 1dP 2dP 3dP	2170 10362 18554 26746		Enum	Enum_Lim	Status	Limit value status: No alarm present or stored.		
		,					o alarm atched aları	n		

2 A limit value has been exceeded.

6	Lim2								
•	ConF								
	Name	r/w	Adr. Inte	eger	real	Тур	Value/	off	Description
	Fnc.2	r/w	2dP	2250 10442 18634 26826	37268	Enum	Enum_F	cn	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		e monitoring. The alarm signal is generated, if the limit is exceeded. If the e is within the limits (including hysteresis) again, this alarm signal is
							2	is exceeded. A	e monitoring + alarm status latch. An alarm signal is generated, if the limit latched alarm signal remains latched until it is manually resetted.
							3	0	ing for rate of change (per minute).
							4	Signal monitor	ing for rate of change (per minute) + storage of the alarm status.
	Src.2	r/w	2dP	2251 10443 18635 26827	37270	Enum	Enum_S	irc	Source for limit value. Selection of which value is to be monitored.
			SUP	20027			0	Drocoss value	= absolute alarm
							1	control deviati Note: Monitor	on xw (process value - set-point) = relative alarm ing with the effective set-point Weff. For example using a ramp it is the point, not the target set-point of the ramp.
							2	changes. Limit within the alar	on Xw (= relative alarm) with suppression during start-up and setpoint value monitoring is continued as soon as the control deviation comes m limits again, at the latest after 10 * Tn.
							3		ie of the analog input INP1.
							4		e of the analog input INP2.
							5		e of the analog input INP3.
							6	effective set-p For example th internal (target	e ramp-function changes the effective set-point untill it matches the
									able y (controller output)
							8	internal set-po Note: Monitori	e deviation xw (actual value - internal set-point) = deviation alarm to int ing with the internal set-point Wint. For example using a ramp it is the c, not the changing set-point of the ramp.
							9		x2 (e.g. in combination with the process value function "Mean value", detecting aged thermocouples), difference between first and second process
							11		on Xw (= relative alarm) with suppression during start-up and setpoint value monitoring is continued as soon as the control deviation comes within s again.

PArA

ł	PAra								
Ν	lame	r/w	Adr. Ir	nteger	real	Тур	Valu	ue/off	Description
L	2	r/w	base 1dP 2dP	2200 10392 18584		Float	-1		Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
			3dP	26776					

6	Lim2							
•	PArA							
	Name	r/w	Adr. In	teger	real	Тур	Value/off	Description
	H.2		base 1dP 2dP 3dP	2201 10393 18585 26777	37170	Float	-1	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.
	HYS.2		base 1dP 2dP 3dP	2202 10394 18586 26778	37172	Float	0	Hysteresis of the limit value. Switching difference for upper and lower limit value. The limit value must change by this amount (rise above upper limit or fall below lower limit) before the limit value alarm is reset.
	dEL.2	r/w	base 1dP	2203 10395	37174	Float	0	Delayed alarm of a limit value. The alarm is only triggered after the defined delay time. It is only indicated, and possibly stored, if it is

#### • Signal

2dP

3dP

18587

26779

Name	r/w	Adr. Ir	nteger	real	Тур	Value/	off	Description
St.Lim	r	base	2270	37308	Enum	Enum_L	imStatus	Limit value status: No alarm present or stored.
		1dP	10462					
		2dP	18654					
		3dP	26846					
						0	no alarm	
						1	latched alarm	
						2	A limit value h	as been exceeded.

still present after the delay time has elapsed.

#### 7 Lim3

•	ConF								
	Name	r/w	Adr. In	teger	real	Тур	Value/o	off	Description
	Fnc.3	nc.3 r/w base 2350 37468 Enur 1dP 10542 2dP 18734 3dP 26926		Enum	Enum_Fc	n	Activation and adjustment of the limit value alarm (e.g. for input circuit monitoring), e.g. with/without storage.		
		3dP 26926			0 1	No limit value	monitoring.		
							I		e monitoring. The alarm signal is generated, if the limit is exceeded. If the e is within the limits (including hysteresis) again, this alarm signal is
									e monitoring + alarm status latch. An alarm signal is generated, if the limit latched alarm signal remains latched until it is manually resetted.
							3	Signal monitor	ing for rate of change (per minute).
				4	Signal monitor	ing for rate of change (per minute) + storage of the alarm status.			

7	Lim3								
•	ConF								
	Name	r/w	Adr. Int	eger	real	Тур	Value/o	ff	Description
	Src.3	r/w	base 1dP 2dP 3dP	2351 10543 18735 26927	37470	Enum	Enum_Sro	C	Source for limit value. Selection of which value is to be monitored.
							0 F	Process value =	= absolute alarm
							1	Note: Monitori	on xw (process value - set-point) = relative alarm ng with the effective set-point Weff. For example using a ramp it is the oint, not the target set-point of the ramp.
							C	changes. Limit	on Xw (= relative alarm) with suppression during start-up and setpoint value monitoring is continued as soon as the control deviation comes m limits again, at the latest after 10 * Tn.
							3 N	Measured valu	e of the analog input INP1.
									e of the analog input INP2.
									e of the analog input INP3.
							F	effective set-pe For example th nternal (target	e ramp-function changes the effective set-point untill it matches the
							7 c	correcting varia	able y (controller output)
							i ז	nternal set-po Note: Monitori	e deviation xw (actual value - internal set-point) = deviation alarm to int ng with the internal set-point Wint. For example using a ramp it is the , not the changing set-point of the ramp.
							9 [ a	Difference x1 -	x2 (e.g. in combination with the process value function "Mean value", detecting aged thermocouples), difference between first and second process
							C		on Xw (= relative alarm) with suppression during start-up and setpoint /alue monitoring is continued as soon as the control deviation comes within s again.

PArA						
Name	r/w	Adr. Intege	real	Тур	Value/off	Description
L.3	r/w	base 23 1dP 104 2dP 186 3dP 268	34	Float	-1 🗹	Lower limit value. The alarm is triggered if the value falls below the limit, and is reset with lower limit value plus hysteresis.
H.3	r/w	base 23 1dP 104 2dP 186 3dP 268	93 35	Float	-1 🗹	Upper limit value. The alarm is triggered if the value rises above the limit, and is reset with upper lower limit value plus hysteresis.
HYS.3	r/w	base 23 1dP 104 2dP 186 3dP 268	36	Float	0	Hysteresis of the limit value. Switching difference for upper and lower limit value. The limit value must change by this amount (rise above upper limit or fall below lower limit) before the limit value alarm is reset.
dEL.3	r/w	base 23 1dP 104 2dP 186 3dP 268	95 37	Float	0	Delayed alarm of a limit value. The alarm is only triggered after the defined delay time. It is only indicated, and possibly stored, if it is still present after the delay time has elapsed.

## 7 Lim3

'													
•	Signal												
	Name	r/w	Adr. In	teger	real	Тур	Value/	off	Description				
	St.Lim	r	base	2370	37508	Enum	Enum_L	imStatus	Limit value status: No alarm present or stored.				
			1dP	10562									
			2dP	18754									
			3dP	26946									
							0	no alarm					
							1	latched alarm					
							2	A limit value h	as been exceeded.				

#### 8 LOGI ConF r/w Adr. Integer real Description Name Тур Value/off L\_r r/w base 1051 34870 Enum Enum\_dlnP1 Local / remote switchover (Remote: Adjustment of all values via the front panel is blocked). 1dP 9243 2dP 17435 3dP 25627 0 no function (switch-over via interface is possible) 1 always active 2 **Digital Input DI1 switches** 3 DI2 switches (only visible with OPTION) DI3 switches (only visible with OPTION) 4 5 F-key switches. SP.2 r/w base 1052 34872 Enum Enum\_dlnP4 Source of the control signal for activating the second (safety) setpoint (SP.2=) W2. 9244 1dP Note: W2 is not restricted by the setpoint limits. 17436 2dP 25628 3dP 0 no function (switch-over via interface is possible) 2 **Digital Input DI1 switches** 3 DI2 switches (only visible with OPTION) DI3 switches (only visible with OPTION) 4 5 F-key switches. SP.E 1053 34874 Enum Enum\_dlnP1 Switching between internal set-point an external setpoint SP.E. The r/w base external SP.E is either the absolute set-point Wext or the offset to 1dP 9245 the set-point (dependent on instrument and configuration). 2dP 17437 3dP 25629 0 no function (switch-over via interface is possible) 1 always active Digital Input DI1 switches 2 3 DI2 switches (only visible with OPTION) 4 DI3 switches (only visible with OPTION) 5 F-key switches.

#### **Operating Version4**

LC	GI						
Сс	onF						
Nam	ie	r/w	Adr. Integer	real	Тур	Value/off	Description
Y2		r/w	base 1054 1dP 9246 2dP 17438 3dP 25630	3	Enum	Enum_dInP3	Source of the control signal for activating the second positioning output Y2. Activated Y2 = positioner control. Caution: The parameter 'positioning output Y2' must not be confused with the controller output Y2!
							vitch-over via interface is possible)
						4 DI3 switches ( 5 F-key switches	only visible with OPTION) only visible with OPTION)
Y.E		r/w	base 1055 1dP 9247 2dP 17439 3dP 25631		Enum	Enum_dInP2	Signal for activating the external output value. The internal output value Ypid is the controllers reaction on the process, with external output value Y.E the controller output is controlled.
						0 no function (sv	witch-over via interface is possible)
						<ul> <li>2 Digital Input D</li> <li>3 DI2 switches (</li> <li>4 DI3 switches (</li> <li>5 F-key switches</li> </ul>	only visible with OPTION) only visible with OPTION)
mAr	1	r/w	base 1056 1dP 9248 2dP 17440 3dP 25632	)	Enum	Enum_dInp2	Source of the control signal for auto/manual switchover. In the automatic mode, the controller is in charge. In the manual mode, the outputs can be varied independently of the process.
	I				1	0 no function (sv	witch-over via interface is possible)
							ted (manual station)
						4 DI3 switches ( 5 F-key switches	only visible with OPTION) only visible with OPTION)
C.oF	F	r/w	base 1057 1dP 9249 2dP 17441 3dP 25633		Enum	Enum_dInP3	Source of the control signal for disabling all the controller outputs.Note: Forcing has priority, and remains active; alarm processing also remains active.
						<ul> <li>2 Digital Input D</li> <li>3 DI2 switches (</li> <li>4 DI3 switches (</li> <li>5 F-key switches</li> </ul>	only visible with OPTION) only visible with OPTION)

ode T	able	È					Operating Version4
LOGI							
ConF							
Name	r/w	Adr. Integ	ger r	real	Тур	Value/off	Description
m.Loc	r/w	1dP 2dP 1	1058 9250 17442 25634	34884	Enum	Enum_dlnp4	Source of the control signal to disable the auto/manual key. If the A/M key is disabled, switchover to manual operation is not possible.
							witch-over via interface is possible)
						2 Digital Input D	
							only visible with OPTION)
							only visible with OPTION)
						5 F-key switches	), 
Err.r	r/w	1dP 2dP 1	1059 9251 17443 25635	34886	Enum	Enum_dInP3	Source of the control signal for resetting all stored entries in the error list (the list contains all error messages and alarms). If an alarm is still present, i.e. the source of trouble has not been remedied, stored alarms cannot be acknowledged (reset).
						0 no function (sv	witch-over via interface is possible)
						2 Digital Input D	
							only visible with OPTION)
							only visible with OPTION)
						5 F-key switches	
						6 Auto/manual l	key switches (A/M key)
Pid.2	r/w	1dP 2dP 1	1061 9253 17445 25637	34890	Enum	Enum_dInP4	Source of the control signal for switchover between the two parameter sets. The second parameter set is complete, and comprises Pb (= proportional band), ti (= integral action time), and td (= derivative action time) for heating and for cooling. All other control parameters, e.g. the switching duty cycles, are valid for both parameter sets.
	•					0 no function (sv	witch-over via interface is possible)
						2 Digital Input D	
							only visible with OPTION)
							only visible with OPTION)
						5 F-key switches	
P.run	r/w	1dP 2dP 1	1062 9254 17446 25638	34892	Enum	Enum_dInP6	Source of the control signal for switching the programmer between Run and Stop. On units with a simple programmer (only 1 program), a stop immediately causes a reset, followed by a new start. With units that have been defined as program controllers (several programs), the program is stopped, and then continued.
						0 no function	
						2 Digital Input D	
							only visible with OPTION)
						4 DI3 switches (	only visible with OPTION)

P.oFF	r/w	base	1063	34894	Enum	Enum_c	dInP5	Source of the control signal for switching off the programmer (if the	
		1dP	9255					programmer is switched off, the internal setpoint becomes	
		2dP	17447					effective).	
		3dP	25639						
		-			•	0	no function		
						2	Digital Input D	DI1 switches	
						3	DI2 switches (	(only visible with OPTION)	
						4	DI3 switches (	(only visible with OPTION)	

	logi												
	ConF												
١	Name	r/w	Adr. In	teger	real	Тур	Value/off	Description					
	I.Chg	r/w	base 1dP 2dP 3dP	1064 9256 17448 25640	34896	Enum	Enum_dInP4	Signal source for switching the effective process value between the first process value X1 and second process value X2.					
							<ul> <li>0 no function (switch-over via interface is possible)</li> <li>2 Digital Input DI1 switches</li> <li>3 DI2 switches (only visible with OPTION)</li> </ul>						
								only visible with OPTION)					
							5 F-key switches	S.					
	di.Fn	r/w	base 1dP 2dP 3dP	1050 9242 17434 25626	34868	Enum	Enum_diFn	Function of digital inputs (valid for all inputs)					
			•					Off': A permanent positive signal switches this function 'On', which is 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. Int	eger	real	Тур	Value/off		Description		
	St.Di	r	base	1070	34908	Int	07		Status of the digital inputs or of push-buttons (binary coded).		
			1dP	9262							
			2dP	17454							
			3dP	25646							
							Bit 1 Input 2 Bit 2 Input 3 Bit 8 Status of Bit 9 Status of Bit 10 Status o Bit 11 Status o Bit 12 Status o Bit 13 Status o				
	L-R	r/w	base 1dP 2dP 3dP	1080 9272 17464 25656	34928	Int	01		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 2dP 3dP	1081 9273 17465 25657	34930	Int	01		Signal for activating the second (safety) setpoint (SP.2=) W2. Note: Setpoint W2 is not restricted by the setpoint limits!		

#### Operating Version4

Signa							
Name		Adr In	teger	real	Тур	Value/off	Description
Wi_We	-	base 1dP 2dP 3dP	-	34932		01	Signal for activating the external setpoint value. SP.E is the external setpoint, or dependent on the device and configuration of the setpoint shift.
Y_Y2	r/w	base 1dP 2dP 3dP	1083 9275 17467 25659	34934	Int	01	Signal for activating the 2nd output value Y2. With selected Y2, output is operated as a positioner.Caution: Do not confuse the parameter 'fixed output Y2' with the controller output Y2!
Y_Y.E	r/w	base 1dP 2dP 3dP	1084 9276 17468 25660	34936	Int	01	Signal for activating the external positioning value. The controlle operated as positioner.
A-M	r/w	base 1dP 2dP 3dP	1085 9277 17469 25661	34938	Int	01	Signal for activating manual operation. In the manual mode, the controller provides output signals independent of the process.
C.Off	r/w	base 1dP 2dP 3dP	1086 9278 17470 25662	34940	Int	01	Signal for disabling all the controller outputs. Note: Forcing has priority; alarm processing remains active.
L.AM	r/w	base 1dP 2dP 3dP	1087 9279 17471 25663	34942	Int	01	Signal for disabling manual operation. Triggers a forced switchow to automatic mode, and disables the front panel A/M key (also if other functions have been assigned to the key).
Err.r	r/w	base 1dP 2dP 3dP	1088 9280 17472 25664	34944	Int	01	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 reapp after the next error detection (measurement).
SSR.Res	r/w	base 1dP 2dP 3dP	1089 9281 17473 25665	34946	Int	01	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 machine.
Set1.2	r/w	base 1dP 2dP 3dP	1091 9283 17475 25667	34950	Int	01	Switch-over of parameter set. The 2nd parameter set contains or complete set each of Pb (= proportional band), ti (= integral action time), and td (= derivative action time) for heating and for cooling All other control parameters, such as switching duty cycles, are valid for both parameter sets.
Prg.R.S	r/w	base 1dP 2dP 3dP	1092 9284 17476 25668	34952	Int	01	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, a then continued.
Prg.Res	r/w	base 1dP 2dP 3dP	1093 9285 17477 25669	34954	Int	01	Programmer reset switches the programmer off, and sets it back the starting condition. Reset stops the currently active program, a activates the internal setpoint. A newly selected program becom the active program.

8	logi							
•	Signal							
	Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
	F.Di	r/w	base 1dP 2dP 3dP	1094 9286 17478 25670	34956	Int	07 C	Forcing of digital inputs. Forcing involves the external operation of at least one input. The instrument takes over this input value (preset value for inputs from a superordinate system, e.g. for a function test.)
	igital input 1 igital input 2 igital input 3 igital input 4 igital input 5							
	I.Chg	r/w	base 1dP 2dP 3dP	1095 9287 17479 25671	34958	Int	01 C	Signal for switching the effective process value between the first process value X1 and second process value X2.

9	ohnE								
•	ConF								
	Name	ame r/w Adr. Integer real Typ					Value/c	off	Description
	CDis3	r/w	base 1dP 2dP 3dP	126 8318 16510 24702	33020	Enum	Enum_Co	ontrDis3	Display 3 of controller Operating Level (only visible with Engineering Tool), e.g. text only, value display or bargraph. If text only is selected, this is fixed in the display. With the other settings, entering a text causes the display to switch cyclically from one to the other.
							0	No value / onl	y a fixed text.
								value display	
							2	Output value a	is a bargraph.
							3	Control deviati	ion as a bargraph.
							4	Process value	as a bargraph.
ſ								_	
	ContStdS	r/w	base	120	33008	Float	1		This address consists of 2 float data transferred always together:
			1dP	8312					1st data defines the number of operating hours after reaching InF.1
			2dP	16504					will be set.
			3dP	24696					2nd data defines the number of duty cycles after reaching InF.2 will be set.

ode Ta	able	5						Operating Version4
ohnE								
ConF								
Name	r/w	Adr. In	teger	real	Тур	Value/off		Description
DigForc	r/w	base 1dP 2dP 3dP	121 8313 16505 24697	33010	Int	0255	Ŋ	This address consists of 2 bytes, which can only be transmitted together: 1st datum defines which inputs are to be forced. Bit 0 = analog Input 1 Bit 1 = analog Input 2 Bit 2 = analog Input 3 Bit 3 = not used Bit 4 = digital Input 1 Bit 5 = digital Input 2 Bit 6 = digital Input 3 Bit 7 = not used 2nd datum defines which outputs are to be forced. Bit 0 = Output 1 Bit 1 = Output 2 Bit 2 = Output 3 Bit 3 = Output 4 Bit 4 = Output 5 Bit 5 = Output 6
ErwBedie	r/w	base 1dP 2dP 3dP	124 8316 16508 24700	33016	Int	09000		This address consists of 9 words. The words can only be transmitted together. The first 8 words describe the data to be displayed in the extended Operating Level. The 9th word define the datum to be shown in the 2nd display value (instead of the setpoint). The basic address is to be entered as the value.
Lin	r/w	base 1dP 2dP 3dP	139 8331 16523 24715	33046	Float		Ŋ	16 float values for linearization table with 16 entries structure: input1, output1 input2, output2  Input values must be strictly monotonous rising. Starting from
LocBedie	r/w	base 1dP 2dP 3dP	123 8315 16507 24699	33014	Int	0255		input3 a switching off value can be given. This address consists of 2 rsp. 3 bytes defining the release of operating levels. They can olny be transferred together. byte 1 blocking of operating level standard device: byte 2 blocking of operating level programmer: byte 2 blocking of programmer level byte 3 blocking of operating level (content on request)
Pass	r/w	base 1dP 2dP 3dP	125 8317 16509 24701	33018	Int	0	N	Password. 4-digit number for the password-protected access to blocked operating functions such as e.g. the Calibrating Level.
PDis3	r/w	base 1dP 2dP 3dP	130 8322 16514 24706	33028	Int	05		Display 3 of the programmer Operating Level. Selection from a combination of important (time) counters for displaying the programuts, e.g. segment number or remaining program time.
T.dis3	r/w	base 1dP 2dP 3dP	900 9092 17284 25476	34568	Text	0255		This address contains 8 bytes for the text that is to appear in Display 3.No text: 1st byte 0x00.

# 9 ohnE

ConF							
Name	r/w	Adr. Inte	eger	real	Тур	Value/off	Description
T.Inf	r/w		901 9093 17285 25477	34570	Text	0255	This address contains 16 bytes. Bytes 1 – 8: user-defined text for message Inf.1 Bytes 9 – 16: user-defined text for message Inf.2 No text: 1st byte 0x00
T.Prog	r/w		902 9094 17286 25478	34572	Text	0255	This address contains 128 bytes. These data contain the user-defined texts for the programs. Bytes 1 - 8 user-defined text for program 1 Bytes 9 - 16 user-defined text for program 2 Bytes 17 - 24 user-defined text for program 3 Bytes 25 - 32 user-defined text for program 4 Bytes 33 - 40 user-defined text for program 5 Bytes 41 - 48 user-defined text for program 6 Bytes 49 - 56 user-defined text for program 7 Bytes 57 - 64 user-defined text for program 8 Bytes 65 - 72 user-defined text for program 9 Bytes 73 - 80 user-defined text for program 10 Bytes 81 - 88 user-defined text for program 11 Bytes 89 - 96 user-defined text for program 13 Bytes 105 - 112 user-defined text for program 14 Bytes 113 - 120 user-defined text for program 16
Tdis3	r/w		128 8320 16512 24704	33024	Int	260	Display cycle for Display 3 in seconds. If a value or a bargraph is shown in Display 3, an additional text can be selected. The text is displayed briefly after every cycle time instead of the value or bargraph.
ValuDis3	r/w		127 8319 16511 24703	33022	Int	09000	Address, which defines the display value in Display 3.
VisibelM	r/w		903 9095 17287 25479	34574	Int	0255	This address consists of 55 bytes, which define the visibility mask. They can be transferred only together. The mask defines the configurations and parameter represented in the operation (contents on request).

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•	$\mathbf{P}$	А	Д

PAIA							
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
Conf	r/w	base 1dP 2dP 3dP	1 8193 16385 24577		Int	02 [	Start/Stop and abortion of the configuration mode 0 = End of configuration 1 = Start of configuration 2 = Abort configuration

#### Operating Version4

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ohnE						
Signa Name		Adr. Integer	real	Тур	Value/off	Description
UPD	r/w	base 0 1dP 820 2dP 164 3dP 246	79	Enum	Enum_Aenderungsflag	Status message indicating that parameter / configuration have been changed via the front panel.
						been made via the front panel keys, which must be processed.
Hw.Opt	r	base 20 1dP 83 2dP 165 3dP 247	34	Int	065535 🗹	
Sw.Op	r	base 20 1dP 83 2dP 165 3dP 247	35	Int	0255	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 20 1dP 83 2dP 165 3dP 247	36	Int	0255	Operating version (numeric value). For the correct interaction of E-Tool and device, the software version and operating version must match.
Unit	r	base 20 1dP 83 2dP 165 3dP 247	37	Int	0255	Identification of the device.
S.Vers	r	base 20 1dP 83 2dP 165 3dP 247	38	Int	100255	The sub-version number is given as an additional index for precise definition of software version.
Uident	r	base 9 1dP 910 2dP 172 3dP 254	94	Text		Device identification. Via this Modbus address, up to 14 data units (28 bytes) can be defined. Bytes 1 - 15 order number of the device Bytes 16 - 19 Ident number 1 Bytes 20 + 21 Ident number 2 Bytes 22 - 25 OEM number Bytes 26 - 28 Software order number
IntUnitD	r	base 9 <sup>2</sup> 1dP 910 2dP 172 3dP 254	95	Text		Internal device data

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ohnE							
Signa	al						
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
St.Ala	r	base 1dP 2dP 3dP	250 8442 16634 24826	33268	Int	031 🛛	Alarm status: Bit-wise coded status of the individual alarms, exceeded limit value or Loop.
						Bit 1 Existing/sto Bit 2 Existing/sto Bit 3 Not used Bit 4 Existing/sto Bit 5 Existing/sto Bit 6 Existing/sto Bit 7 Not used Bit 8 Existing exc Bit 9 Existing exc Bit 10 Existing exc Bit 11 Not used Bit 12 Existing for Bit 13 Existing he Bit 14 Existing SS Bit 15 Not used	red heating current alarm red SSR alarm eeded limit 1 eeded limit 2 ceeded limit 3 op alarm ating current alarm R alarm
St.Do	r	base 1dP 2dP 3dP	251 8443 16635 24827	33270	Int	031	Status of the digital outputsBit 0digital output 1Bit 1digital output 2Bit 2digital output 3Bit 3digital output 4Bit 4digital output 5Bit 5digital output 6
St.Ain	r	base 1dP 2dP 3dP	252 8444 16636 24828		Int	07	
						Bit 0 Break at Inp Bit 1 Reversed po Bit 2 Short circuit Bit 3 Not used Bit 4 Break at Inp Bit 5 Reversed po Bit 6 Short-circuit Bit 7 Not used Bit 8 Break at Inp Bit 9 Reversed po	larity at Input 1 at Input 1 ut 2 larity at Input 2 at Input 2

# Bit 10 Short-circuit at Input 3 (only KS 90) Bit 11 Not used

Сс	ode Ta	ble	è						Operating Version4
9	ohnE								
	Signal								
	Name	r/w	Adr. Int	eger	real	Тур	Value/off		Description
	St.Di	r	base 1dP 2dP 3dP	253 8445 16637 24829	33274	Int	07		Status of the digital inputs or of push-buttons (binary coded).
Bit 1 Input 2 Bit 2 Input 3 Bit 8 Status of 'F' key Bit 9 Status of 'A/M' key Bit 10 Status of 'Sel' key Bit 11 Status of 'Down' key Bit 12 Status of 'Up' key Bit 13 Status of 'Loc' key								٨ <sup>٢</sup> key ٤l' key ɔwn' key ɔ' key	
	F.Di	r/w	base 1dP 2dP 3dP	303 8495 16687 24879	33374	Int	01		Forcing of digital inputs. Forcing involves the external operation of at least one input. The instrument takes over this input value (preset value for inputs from a superordinate system, e.g. for a function test.)
Bit 0 Forcing of digital input 1 Bit 1 Forcing of digital input 2 Bit 2 Forcing of digital input 3 Bit 3 Forcing of digital input 4 Bit 4 Forcing of digital input 5								ital input 2 ital input 3 ital input 4	
	F.Do	r/w	base 1dP 2dP 3dP	304 8496 16688 24880	33376	Int	015		Forcing of digital outputs. Forcing involves the external operation or at least one output. The instrument has no influence on this output (use of free outputs by superordinate system).

## 10 ohnE1

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

# 11 ohnE2

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

#### 12 ohnE3

Signal							
Name	r/w	Adr. In	teger	real	Тур	Value/off	Description
In.3	r	base 1dP 2dP 3dP	234 8426 16618 24810	33236	Float	-1	Measurement value after the measurement value correction (e.g. with offset or 2-point correction, and scaling).
ln.3r	r	base 1dP 2dP 3dP	242 8434 16626 24818	33252	Float	-1	Measurement value before the measurement value correction (unprocessed).
F.Inp	r/w	base 1dP 2dP 3dP	302 8494 16686 24878	33372	Float	-1	Forcing the value for an analog input INP. Forcing involves the external operation of an input. The instrument takes over the value at this input like a measurement value (preset value for inputs from a superordinate system, e.g. for a function test.)
F.Out1	r/w	base 1dP 2dP 3dP	305 8497 16689 24881	33378	Float	0120	Forcing value of the analog output. Forcing involves the external operation of an output, i.e. the instrument has no influence on this output. (Used for the operation of free outputs e.g. by a supervisory PLC.)

# 13 ohnE4

•	Signal							
	Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
	F.Out2	r/w	base	306	33380	Float	0120	Forcing value of the analog output. Forcing involves the external
			1dP	8498				operation of an output, i.e. the instrument has no influence on this
			2dP	16690				output. (Used for the operation of free outputs e.g. by a supervisory PLC.)
			3dP	24882				16.)

ConF							
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
bAud	r/w	base 1dP 2dP 3dP	180 8372 16564 24756	33128	Enum	Enum_Baud	Bit rate of the interface (only visible with OPTION). The bit rate determines the transmission speed.
						0 2400 Baud	
						1 4800 Baud 2 9600 Baud	
						3 19200 Baud	
Addr	r/w	base 1dP 2dP 3dP	181 8373 16565 24757	33130	Int	1247	Address on the interface (only visible with OPTION)
PrtY	r/w	base 1dP 2dP 3dP		33132	Enum	Enum_Parity	Parity of data on the interface (only visible with OPTION). Simple possibility of checking that transferred data is correct.
							ith 2 stop bits.
						1 even parity	
						2 odd parity	
						<ul><li>2 odd parity</li><li>3 no parity (1 st</li></ul>	stop bit)
		haaa	102	22124	Int	3 no parity (1 s	-
dELY	r/w	base 1dP 2dP 3dP	183 8375 16567 24759	33134	Int		-
	r/w	1dP 2dP	8375 16567 24759	33134 33158		3 no parity (1 s	Response delay [ms] (only visible with OPTION). Additional delay time before the received message may be answered on the Modbus. (Might be necessary, if the same line is used for transmit/receive.)
dp.Ad		1dP 2dP 3dP base 1dP 2dP	8375 16567 24759 195 8387 16579 24771	33158 33160	Int	3 no parity (1 s	<ul> <li>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.)</li> <li>Address of the device on the PROFIBUS. The address identifies t device clearly.</li> </ul>
dp.Ad	r/w	1dP 2dP 3dP base 1dP 2dP 3dP base 1dP 2dP	8375 16567 24759 195 8387 16579 24771 196 8388 16580	33158 33160	Int	3 no parity (1 s 0200 C 0126 C Enum_BackupControl	<ul> <li>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.)</li> <li>Address of the device on the PROFIBUS. The address identifies t device clearly.</li> <li>behaviour as backup controller. The control function is done by t master. The instrument provides the display, reads the measured values and outputs the correcting variable. If bus communication the master) fails, the controller changes to normal operation.</li> </ul>
dp.Ad	r/w	1dP 2dP 3dP base 1dP 2dP 3dP base 1dP 2dP	8375 16567 24759 195 8387 16579 24771 196 8388 16580	33158 33160	Int	3 no parity (1 s 0200 C 0126 C Enum_BackupControl 0 The backup f 1 With backup f	<ul> <li>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.)</li> <li>Address of the device on the PROFIBUS. The address identifies t device clearly.</li> <li>behaviour as backup controller. The control function is done by t master. The instrument provides the display, reads the measured values and outputs the correcting variable. If bus communication the master) fails, the controller changes to normal operation.</li> </ul>
dELY dp.Ad bc.uP	r/w	1dP 2dP 3dP base 1dP 2dP 3dP base 1dP 2dP	8375 16567 24759 195 8387 16579 24771 196 8388 16580 24772	33158 33160 33108	Int	3 no parity (1 s 0200 C 0126 C Enum_BackupControl 0 The backup f 1 With backup functional. If	<ul> <li>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.)</li> <li>Address of the device on the PROFIBUS. The address identifies t device clearly.</li> <li>behaviour as backup controller. The control function is done by t master. The instrument provides the display, reads the measured values and outputs the correcting variable. If bus communication the master) fails, the controller changes to normal operation.</li> </ul>

othr						
ConF						
Name	r/w	Adr. Integer	real	Тур	Value/off	Description
dP	r/w	base 17 1dP 836 2dP 1655 3dP 2474	3 5	Enum	Enum_dP	Decimal point (max. no of decimals). Format of the measured valu display.
					· · · · · · · · · · · · · · · · · · ·	d the decimal point
					1 Display has or	
					2 Display has tw	
					3 Display has th	iree decimais.
LEd	r/w	base 19 1dP 838 2dP 1657 3dP 2476	2 4	Enum	Enum_Led	Meaning of the signalling LEDs. Selection of a combination of the displayable signals.
	1				10 The digital out	tputs OUT1, OUT2, OUT3, and OUT4 are displayed.
					•	troller output y1 (heating / open), alarm1, alarm2, alarm3
					12 Display of con alarm1, alarm	troller output y1 (heating / open), controller output y2 (cooling / close), 2
						troller output y2 (cooling / close), controller output y1 (heating / open),
					20 Display of con	troller output y1 (heating / open), controller output y2 (cooling / close), ar
					21 Display of con	er outputs Track, Track2. Itroller output y2 (cooling / close), controller output y1 (heating / open), ar
						er outputs Track1, Track2.
					22 Display of the	programmer outputs Track1, Track2, Track3, and Track4.
dISP	r/w	base 17 1dP 836 2dP 1655 3dP 2474	6	Int	010	Brightness of the display.
C.dEL	r/w	base 18 1dP 837 2dP 1656 3dP 2476	8	Int	0200	For both interfaces, Modbus only. Additional acceptable delay tir 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 15 1dP 834 2dP 1653 3dP 2472	2 4	Enum	Enum_FrEq	Switchover of the applied mains frequency 50 / 60 Hz, thereby better adaptation of the input filter for hum suppression.
					0 Mains frequer	· ·
					1 Mains frequer	ncy is 60 Hz.
MASt	r/w	base 18 1dP 837 2dP 1656	7 9	Enum	Enum_MASt	Device works as Modbus master. The communication is executed according to the master/slave principle, whereby the device can be operated as master or as slave. Operation as master must be configured here.
		3dP 2476	1			
					0 No the unit is	a paratad as a Madhus alaya

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

# 14 othr

С	ConF							
Nar	me	r/w	Adr. Int	teger	real	Тур	Value/off	Description
Сус	cl	r/w	base 1dP 2dP 3dP	186 8378 16570 24762	33140	Int	0200	Cycle time (in seconds) during which the Modbus master transmits its message on the bus.
Adı	rO	r/w	base 1dP 2dP 3dP	187 8379 16571 24763	33142	Int	165535	Target address to which the data specified with AdrU are output on the bus.
Adı	rU		base 1dP 2dP 3dP	188 8380 16572 24764	33144	Int	165535	Modbus address of the data output on the bus by the Modbus master.
Nu	mb		base 1dP 2dP 3dP	189 8381 16573 24765	33146	Int	0100	Quantity of data that are to be transmitted from the Modbus master.
dp.	ra		base 1dP 2dP 3dP	197 8389 16581 24773	33162	Int	091 1	Addresses of the data that are to be read out of the device via the PROFIBUS (57 values).
dp.	wr		base 1dP 2dP 3dP	198 8390 16582 24774	33164	Int	091 1	Addresses of the data that are to be written into the device via the PROFIBUS (57 values).

## • Signal

Name	r/w	Adr. In	nteger	real	Тур	Value/off	Description
E.1	r/w	base	210	33188	Enum	Defect	Err 1 (internal error)
		1dP	8402				Contact Service.
		2dP	16594				
		3dP	24786				
						0 No fault exists	s (Reset).
						2 The device is	defective.
E.2	r/w	base	211	33190	Enum	Problem	Err 2 (internal error, resettable)
E.2	r/w	base 1dP	211 8403	33190	Enum	Problem	Err 2 (internal error, resettable) (As a process value via fieldbus interface not writable!)
E.2	r/w			33190	Enum	Problem	
E.2	r/w	1dP	8403	33190	Enum	Problem	
E.2	r/w	1dP 2dP	8403 16595	33190	Enum	Problem 0 No fault,	

	the							
C	othr							
S	Signal							
	ame	r/w	Adr. Int	eger	real	Тур	Value/	/off Description
FI	bF.1	r/w	base 1dP 2dP 3dP	212 8404 16596 24788	33192	Enum	Break	Sensor break at input INP1. Typical causes and suggested remedies: Sensor fault: replace INP1 sensor. Wiring fault: check connections of INP1. (As a process value via fieldbus interface not writable!)
							0 1 2	No fault,resetting of the sensor break alarm possible (Reset).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.Sensor break: The sensor is defective or there is a wiring fault.
S	ht.1	r/w	base 1dP 2dP 3dP	213 8405 16597 24789	33194	Enum	Short	Short circuit at input INP1. Typical causes and suggested remedies: Sensor fault: replace INP1 sensor. Wiring fault: check connections of INP1. (As a process value via fieldbus interface not writable!)
							0 1 2	No fault,resetting of the short-circuit alarm possible (Reset).A short-circuit fault has occurred and has been stored.A short-circuit fault has occurred.
Ρ	OL.1	r/w	base 1dP 2dP 3dP	214 8406 16598 24790	33196	Enum	Polarity	Incorrect polarity at input INP1. Suggested remedy: reverse the polarity at INP1. (As a process value via fieldbus interface not writable!)
							0 1 2	No fault, resetting of the incorrect polarity alarm possible (Reset). An incorrect polarity fault has occurred and has been stored. Incorrect polarity. The wiring of the input circuit is not correct.
FI	bF.2	r/w	base 1dP 2dP 3dP	215 8407 16599 24791	33198	Enum	Break	Sensor break at input INP2. Typical causes and suggested remedies: Sensor fault: replace INP2 sensor. Wiring fault: check connections of INP2. (As a process value via fieldbus interface not writable!)
							0 1 2	No fault,resetting of the sensor break alarm possible (Reset).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.Sensor break: The sensor is defective or there is a wiring fault.
S	ht.2	r/w	base 1dP 2dP 3dP	216 8408 16600 24792	33200	Enum	Short	Short circuit at input INP2. Typical causes and suggested remedies: Sensor fault: replace INP2 sensor. Wiring fault: check connections of INP2. (As a process value via fieldbus interface not writable!)
_							0 1 2	No fault,       resetting of the short-circuit alarm possible (Reset).         A short-circuit fault has occurred and has been stored.       A short-circuit fault has occurred.
P	OL.2	r/w	base 1dP 2dP 3dP	217 8409 16601 24793	33202	Enum	Polarity	Incorrect polarity at input INP2. Suggested remedy: reverse the polarity at INP2. (As a process value via fieldbus interface not writable!)
_		_					0 1 2	No fault, resetting of the incorrect polarity alarm possible (Reset). An incorrect polarity fault has occurred and has been stored. Incorrect polarity. The wiring of the input circuit is not correct.

al							
	Adr. Ir	nteger	real	Тур	Value/	off	Description
r/w	base 1dP 2dP 3dP	-	33204		HeatCur	r	Heating current alarm.Possible fault s are an open heating curre 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		ting of the heating current alarm possible (Reset).
					1	A heating curr	ent fault has occurred and has been stored.
r/w	base 1dP 2dP 3dP	219 8411 16603 24795	33206	Enum	Short		Alarm message: SSr Possible causes: a current flow in the heating circuit although controller is 'off', or the SSR is defective. Suggested remedy: check heating current circuit, replace the solid-state relay, if necessary. (As a process value via fieldbus interface not writable!)
					0	No fault,	resetting of the short-circuit alarm possible (Reset).
					1		fault has occurred and has been stored. fault has occurred.
r/w	base 1dP 2dP 3dP	220 8412 16604 24796	33208	Enum	LoopAla	rm	Alarm message: LooP Possible causes: faulty or incorrectly connected input circuit, or output not connected correctly. Suggested remedy: check heating or cooling circuit, check sense function and replace if necessary, check controller and output switching actuator. (As a process value via fieldbus interface not writable!)
					0	No fault, reset	ting of the loop alarm possible (Reset).
					1 2	A control loop	fault has occurred and has been stored. fault has occurred, there was no clear process response following a ste output.
r/w	base 1dP 2dP 3dP	221 8413 16605 24797		Enum	Tune		Error message from "heating" self-tuning and reason for aborted tuning attempt. Hints for trouble-shooting: Check operating sense of actuator. Is loop closed? Is there an output limit? Adapt the setpoint. Increasing step output for Yopt. (As a process value via fieldbus interface not writable!)
					0	no error	
					3	Possible reme controller if ne	nds in the wrong direction. dy: Check the output signal sense (inverse <-> direct), and re-configure th cessary (inverse <-> direct).
					4		rom the process. Perhaps the control loop is open.
						Possible reme	dy: Check sensor, connections, and process.
					5	The process va Possible reme Y.Hi ('heating')	lue turning point of the step response is too low. dy: Increase the permitted step output range, i.e. increase the parameter or reduce the parameter Y.Lo ('cooling').
					5 6	The process va Possible reme Y.Hi ('heating') Self-tuning wa	lue turning point of the step response is too low. dy: Increase the permitted step output range, i.e. increase the parameter or reduce the parameter Y.Lo ('cooling'). Is aborted due to the risk of an exceeded setpoint.
						The process va Possible remeer Y.Hi ('heating') Self-tuning wa Possible remeer The step outpu Possible remeer Y.Hi ('heating')	lue turning point of the step response is too low. dy: Increase the permitted step output range, i.e. increase the parameter or reduce the parameter Y.Lo ('cooling').
	r/w r/w	r/wAdr. Inr/wbase 1dP 2dP 3dPr/wbase 1dP 2dP 3dPr/wbase 1dP 2dP 3dPr/wbase 1dP 2dP 3dPr/wbase 1dP 2dP 3dPr/wbase 1dP 2dP 2dP 3dP	r/w       Adr. Integer         r/w       base       218         1dP       8410         2dP       16602         3dP       24794         r/w       base       219         1dP       8411         2dP       16603         3dP       24795         r/w       base       219         1dP       8411         2dP       16603         3dP       24795         r/w       base       220         1dP       8412         2dP       16604         3dP       24796         idP       8412         2dP       16604         3dP       24796         idP       8413         2dP       16604         3dP       24796	r/w       Adr. Integer       real         r/w       base       218       33204         1dP       8410       2dP       16602         2dP       16602       3dP       24794         r/w       base       219       33206         1dP       8411       8411       33206         1dP       8411       2dP       16603         2dP       16603       3dP       24795         3dP       24795       33208         1dP       8412       33208         3dP       24796       33208         1dP       8413       33210         1dP       8413       33210         1dP       8413       33210         1dP       8413       33210         1dP       8413       349         2dP       16605       33210	r/w       Adr. Integer       real       Typ         r/w       base       218       33204       Enum         1dP       8410       2       16602       3         2dP       16602       3dP       24794       1         3dP       24794       33206       Enum         1dP       8411       33206       Enum         1dP       8411       33206       Enum         1dP       8411       33206       Enum         1dP       8411       3409       24795       1         3dP       24795       33208       Enum         1dP       8412       1       1         2dP       16603       1       1         3dP       24795       33208       Enum         1dP       8412       1       1         2dP       16604       1       1         3dP       24796       1       1         1dP       8412       1       1         2dP       16604       1       1         1dP       8413       3       1         1dP       8413       1       1         2dP <td< td=""><td>r/w       Adr. Integer       real       Typ       Value/         r/w       base       218       33204       Enum       HeatCur         1dP       8410       2dP       16602       Integer       Integer       Integer         2dP       16602       3dP       24794       Integer       Integer       Integer       Integer         r/w       base       219       33206       Enum       Short       Integer       Inte</td><td>r/w       Adr. Integer       real       Typ       Value/off         r/w       base       218       33204       Enum       HeatCurr         1dP       8410       2dP       16602       0       No fault, reset         2dP       16602       33206       Enum       0       No fault, reset         1       A heating curre         r/w       base       219       33206       Enum       Short         1dP       8411       2dP       16603       Short       Independent         2dP       16603       3dP       24795       Enum       Short       Independent         1dP       8411       2dP       16603       A short-circuit       A short-circuit         2dP       16604       3dP       24795       Independent       Independent       Independent         1dP       8412       2dP       16604       Independent       Independent       Independent       Independent         3dP       24796       Independent       Independent       Independent       Independent       Independent         1dP       8413       2dP       16605       Independent       Independent       Independent         1dP</td></td<>	r/w       Adr. Integer       real       Typ       Value/         r/w       base       218       33204       Enum       HeatCur         1dP       8410       2dP       16602       Integer       Integer       Integer         2dP       16602       3dP       24794       Integer       Integer       Integer       Integer         r/w       base       219       33206       Enum       Short       Integer       Inte	r/w       Adr. Integer       real       Typ       Value/off         r/w       base       218       33204       Enum       HeatCurr         1dP       8410       2dP       16602       0       No fault, reset         2dP       16602       33206       Enum       0       No fault, reset         1       A heating curre         r/w       base       219       33206       Enum       Short         1dP       8411       2dP       16603       Short       Independent         2dP       16603       3dP       24795       Enum       Short       Independent         1dP       8411       2dP       16603       A short-circuit       A short-circuit         2dP       16604       3dP       24795       Independent       Independent       Independent         1dP       8412       2dP       16604       Independent       Independent       Independent       Independent         3dP       24796       Independent       Independent       Independent       Independent       Independent         1dP       8413       2dP       16605       Independent       Independent       Independent         1dP

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

<u> </u>								
Signa								
Name	r/w	Adr. Inte	eger	real	Тур	Value/	Description	
InF.1	r/w	base 1dP 2dP 3dP	226 8418 16610 24802	33220	Enum	Time	Message from the operating hours cound hours for this maintenance period has a counter for the maintenance period is r acknowledged. Counting the operating maintenance Acknowledge the error (As a process value via fieldbus interfa-	been reached. The op-h eset when this messag hours is used for preve to reset it. ce not writable!)
						0 1	o signal, resetting of the time lin perating hours - limit value (maintenance period) reached	nit signal possible (Reset) : please acknowledge.
InF.2	r/w	base 1dP 2dP 3dP	227 8419 16611 24803	33222	Enum	Switch	Message from the switching cycle cours switch cycles for this maintenance perio cycle counter for the maintenance perio message is acknowledged. Counting the for preventive maintenance Acknowle (As a process value via fieldbus interface)	od has been reached. T od is reset when this e switching cycles is u edge the error to reset ce not writable!)
						0	o error message, resetting of the switching cycle counte et limit of the switching cycle counter (maintenance peric knowledge.	
E.4	r/w	base 1dP 2dP 3dP	228 8420 16612 24804	33224	Enum	Problem	Hardware fault.Cause: Code number ar identical. Remedy: Contact Service. (As a process value via fieldbus interfa	
	-	-					o fault, resetting possible (Rese fault has occurred and has been stored.	et).
FbF.3	r/w	base 1dP 2dP 3dP	400 8592 16784 24976	33568	Enum	Break3	Sensor break at input INP3. Typical causes and suggested remedies Sensor fault: replace INP3 sensor. Wiring fault: check connections of INP3 (As a process value via fieldbus interfa	3.
						0 1	o fault, resetting of the sensor break alarm possible (Res	-+)
							the sensor fault alarm has been triggered and stored; the forerator must acknowledge the error message in order to a subject to the sense basely. The sense is defeative at these is a wiking for the sense basely.	ault is no longer present. delete it from the error lis
								ault is no longer present. delete it from the error lis
Sht.3	r/w	base 1dP 2dP 3dP	401 8593 16785 24977	33570	Enum		berator must acknowledge the error message in order to o ensor break: The sensor is defective or there is a wiring fa Short circuit at input INP3. Typical causes and suggested remedies Sensor fault: replace INP3 sensor. Wiring fault: check connections of INP3 (As a process value via fieldbus interface)	iault is no longer present. delete it from the error lis ault. 5: 5: 6. ce not writable!)
Sht.3	r/w	1dP 2dP	8593 16785	33570	Enum	2 Short3 0 1	berator must acknowledge the error message in order to o ensor break: The sensor is defective or there is a wiring fa Short circuit at input INP3. Typical causes and suggested remedies Sensor fault: replace INP3 sensor. Wiring fault: check connections of INP3 (As a process value via fieldbus interface)	iault is no longer present. delete it from the error lis ault. 5: 5: 6. ce not writable!)
Sht.3 POL.3		1dP 2dP	8593 16785 24977	33570		2 Short3 0 1	berator must acknowledge the error message in order to o ensor break: The sensor is defective or there is a wiring fa Short circuit at input INP3. Typical causes and suggested remedies Sensor fault: replace INP3 sensor. Wiring fault: check connections of INP3 (As a process value via fieldbus interfator) o fault, resetting of the short-circuit fault has occurred and has been stored.	iault is no longer present. delete it from the error lis ault. 5: 5: 6: 6: 7: 7: 7: 7: 7: 7: 7: 7: 7: 7: 7: 7: 7:

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Name		Adr. In	iteger	real	Тур	Value/off	Description				
E.3	r/w	base 1dP 2dP 3dP	403 8595 16787 24979	33574	Enum	ConfErr	configuration fault. Typical causes and suggested remedies: Missing or faulty configuration: check interactions in the configuration and parameter settings. (As a process value via fieldbus interface not writable!)				
						0 No configura 2 There is a con the parameter	nfiguration error. The configuration is missing or wrong, or it does not mat				
dAc	r/w	base 1dP 2dP 3dP	404 8596 16788 24980	33576	Enum	Enum_DacAlarm	DAC alarm, possibly with cause. On all controllers with position feedback Yp, the actuator can be monitored for incorrect operation, e.g. defective motor or excess play due to wear. In all cases, the controller changes into manual operation and switches the outputs off. (As a process value via fieldbus interface not writable!)				
						After solving error list. The	cked - check the drive for blockage the technical problem the DAC errror can be acknowledged in the reafter the controller works again in normal operation mode. od of operation - rong phasing, defect motor capacitor				
						After solving error list. The	the technical problem the DAC errror can be acknowledged in the reafter the controller works again in normal operation mode.				
						After solving					
						After solving	rror - manual calibration necessary the technical problem the DAC errror can be acknowledged in the				
							reafter the controller works again in normal operation mode.				
E.5	r/w	base 1dP 2dP 3dP	410 8602 16794 24986	33588	Enum	E5	PROFIBUS fault. Problem (1): The fault occurrence has been stored. The fault is no longer present, but has not yet been acknowledged.				
E.5	r/w	1dP 2dP	8602 16794	33588	Enum	E5 0 No fault,	PROFIBUS fault. Problem (1): The fault occurrence has been stored. The fault is no longer present, but has not yet been acknowledged. Defect (2): The PROFIBUS communication is faulty. Please contact Service. (As a process value via fieldbus interface not writable!) resetting possible (Reset).				
E.5	r/w	1dP 2dP	8602 16794	33588	Enum	E5 0 No fault,	PROFIBUS fault. Problem (1): The fault occurrence has been stored. The fault is not longer present, but has not yet been acknowledged. Defect (2): The PROFIBUS communication is faulty. Please contact Service. (As a process value via fieldbus interface not writable!) resetting possible (Reset). ror has occurred and has been stored.				
E.5		1dP 2dP	8602 16794 24986	33588		E5 0 No fault, 1 A Profibus er	PROFIBUS fault. Problem (1): The fault occurrence has been stored. The fault is not longer present, but has not yet been acknowledged. Defect (2): The PROFIBUS communication is faulty. Please contact Service. (As a process value via fieldbus interface not writable!) resetting possible (Reset). ror has occurred and has been stored. ct Service. PROFIBUS access fault.				
		1dP 2dP 3dP base 1dP 2dP	8602 16794 24986 411 8603 16795			E5 0 No fault, 1 A Profibus en 2 Please contact Problem_dp 0 No fault,	PROFIBUS fault.         Problem (1): The fault occurrence has been stored. The fault is not longer present, but has not yet been acknowledged.         Defect (2): The PROFIBUS communication is faulty. Please contact Service.         (As a process value via fieldbus interface not writable!)         resetting possible (Reset).         ror has occurred and has been stored.         ct Service.         PROFIBUS access fault.         Possible causes: bus fault, connector problem or no connection t bus.         Possible remedies: Check bus cable, check connector & leads.				
	r/w	1dP 2dP 3dP base 1dP 2dP	8602 16794 24986 411 8603 16795 24987		Enum	E5 0 No fault, 1 A Profibus en 2 Please contact Problem_dp 0 No fault,	PROFIBUS fault.         Problem (1): The fault occurrence has been stored. The fault is not longer present, but has not yet been acknowledged.         Defect (2): The PROFIBUS communication is faulty. Please contact Service.         (As a process value via fieldbus interface not writable!)         resetting possible (Reset).         ror has occurred and has been stored.         ct Service.         PROFIBUS access fault.         Possible causes: bus fault, connector problem or no connection t bus.         Possible remedies: Check bus cable, check connector & leads.         (As a process value via fieldbus interface not writable!)				

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

# 15 Out.1

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

#### 15 Out.1 Conf Description Name r/w Adr. Integer real Тур Value/off Enum Lim2 Output function: Signal limit 2 Lim.2 r/w base 4154 41076 Enum 1dP 12346 2dP 20538 3dP 28730 0 not active 1 The output is activated by an alarm from limit value 2. Enum Lim3 l im.3 r/w base 4155 41078 Enum Output function: Signal limit 3 1dP 12347 2dP 20539 3dP 28731 0 not active The output is activated by an alarm from limit value 3. 1 LP.AL r/w base 4157 41082 Enum Enum\_OUT\_LPAL Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value has to 1dP 12349 change with an output signal of maximum value, else loop alarm is 2dP 20541 generated. 3dP 28733 0 not active The loop alarm (= open loop alarm) is assigned to this output. 1 HC.AL r/w 4158 41084 Enum Enum\_OUT\_HCAL Output function: Signal Heat current alarm. Either break (= current I base < heating current limit) can be monitored or overload (= current I > 1dP 12350 heating current limit), dependent on configuration. 2dP 20542 28734 3dP 0 not active 1 The heating current alarm is assigned to this output. Enum\_HCSC Output function: Signal Solid-state relay (SSR) short circuit. HC.SC r/w base 4159 41086 Enum The short circuit alarm of the SSR is triggered, if a current is 1dP 12351 detected in the heating circuit, although the controller output is 20543 2dP switched off. 28735 3dP 0 not active 1 Output activated by an SSR fault. P.End 41090 Enum Enum PEnd r/w 4161 Output function: Signal Program end. base This message is available when the program has been completed 1dP 12353 (only when configured as a program controller). 2dP 20545 28737 3dP 0 not active 1 This output is activated by the message 'Program end'. FAi.1 4162 41092 Enum Enum\_FAi1 Output function: Signal INP1 fault. r/w base The fail signal is generated, if a fault occurs at the analog Input 1dP 12354 INP1. 20546 2dP 3dP 28738 0 not active

1 The output sends the error message 'INP1 fault'.

Code Table

**Operating Version4** 

Out.1							
ConF							
Name	r/w	Adr. Inte	eger	real	Тур	Value/off	Description
FAi.2	r/w	2dP	4163 12355 20547 28739	41094	Enum	Enum_FAi2	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Inpu INP2.
							nds the error message 'INP2 fault'.
FAi.3	r/w	2dP	4164 12356 20548 28740	41096	Enum	Enum_FAi3	Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Inpu INP3.
	ł	-				0 not active 1 The output se	nds the error message 'INP3 fault'.
							T
PrG.1	r/w	2dP	4165 12357 20549 28741	41098	Enum	Enum_PrG1	Output function: Signal programmer's control output no. 1. A control output is one of the four digital signals that can be operated segment-wise by a program.
		•				0 not active	
						1 Control outpu	t 1 is assigned to this output.
PrG.2	r/w	2dP	4166 12358 20550 28742	41100	Enum	Enum_PrG2	Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.
	-				I	0 not active 1 Control outpu	t 2 is assigned to this output.
PrG.3	r/w	2dP	4167 12359 20551 28743	41102	Enum	Enum_PrG3	Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.
					,	0 not active	
						1 Control outpu	t 3 is assigned to this output.
PrG.4	r/w	2dP	4168 12360 20552 28744	41104	Enum	Enum_PrG4	Output function: Signal programmer's control output no. 4. A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	
						1 Control outpu	t 4 is assigned to this output.
CALL	r/w	2dP	4169 12361 20553 28745	41106	Enum	Enum_CALL	Output: Operator call. At the end of a program segment, a contact is set, e.g. for an acoustic signal. This indicates to the operator that a certain program status has been reached, and operator action is requir
		3dP	20745				Operator calling is used, if the program may only be continued a check or some kind of operator action.

# 15 Out.1

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

1 This output sends the Profibus fault.

### • Signal

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

## 16 Out.2

٠	ConF							
	Name	r/w	Adr. In	teger	real	Тур	Value/off	Description
	0.Act		base 1dP 2dP 3dP	4250 12442 20634 28826	41268	Enum	Enum_OAct	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.
							0 direct / norma 1 inverse / norm	5 1

Y.1	r/w	base	4251	41270	Enum	Enum_	Y1	Output function: Controller output Y1
		1dP	12443					
		2dP	20635					
		3dP	28827					
	-!					0	not active	

1 This output provides the controller output Y1.

r. Integer real Ty se 4252 41272 E1 P 12444 P 20636 P 28828 41274 E1 P 12445 41274 E1 P 12445 2 41274 E1 P 20637 2 128829 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Image         Enum_Y2           0         not           1         This           num         Enum_Lim1           0         not           1         The           num         Enum_Lim2           0         not           1         The           num         Enum_Lim2           0         not           1         The           num         Enum_Lim3           0         not           1         The           num         Enum_Lim3	Description         Output function: Controller output Y2. Caution: Do not confuse controller output Y2 with the parameter 'Fixed output Y2' !         active         s output provides the controller output Y2.         Output function: Signal limit 1         active         e output is activated by an alarm from limit value 1.         Output function: Signal limit 2         output is activated by an alarm from limit value 2.         Output function: Signal limit 3
se       4252       41272       E1         P       12444       12444       1272       E1         P       20636       12445       12445       12445       12445         P       12445       20637       12       12       12         P       28829       28829       12       12       12         Se       4254       41276       E1       12	Image         Enum_Y2           0         not           1         This           num         Enum_Lim1           0         not           1         The           num         Enum_Lim2           0         not           1         The           num         Enum_Lim2           0         not           1         The           num         Enum_Lim3           0         not           1         The           num         Enum_Lim3	Output function: Controller output Y2. Caution: Do not confuse controller output Y2 with the parameter 'Fixed output Y2' !         active         s output provides the controller output Y2.         Output function: Signal limit 1         active         e output is activated by an alarm from limit value 1.         Output function: Signal limit 2         active         e output is activated by an alarm from limit value 2.         Output function: Signal limit 3
P 12445 P 20637 P 28829 Se 4254 41276 P 12446 P 20638 P 28830 P 28830 Se 4255 41278 P 12447 P 12447 P 20639 P 28831 Se 4255 41278 P 12447 P 20639 P 28831	1         This           num         Enum_Lim1           0         not           1         The           num         Enum_Lim2           0         not           1         The           num         Enum_Lim2           0         not           1         The           num         Enum_Lim3           0         not	s output provides the controller output Y2.  Output function: Signal limit 1  active e output is activated by an alarm from limit value 1.  Output function: Signal limit 2  active e output is activated by an alarm from limit value 2.  Output function: Signal limit 3
P 12445 P 20637 P 28829 Se 4254 41276 P 12446 P 20638 P 28830 P 28830 Se 4255 41278 P 12447 P 12447 P 20639 P 28831 Se 4255 41278 P 12447 P 20639 P 28831	num         Enum_Lim1           0         not           1         The           num         Enum_Lim2           0         not           1         The           num         Enum_Lim2           0         not           1         The           num         Enum_Lim3           0         not	Output function: Signal limit 1         active         e output is activated by an alarm from limit value 1.         Output function: Signal limit 2         active         e output is activated by an alarm from limit value 2.         Output function: Signal limit 3
P 12445 P 20637 P 28829 Se 4254 41276 P 12446 P 20638 P 28830 P 28830 Se 4255 41278 P 12447 P 12447 P 20639 P 28831 Se 4255 41278 P 12447 P 20639 P 28831	0     not       1     The       num     Enum_Lim2       0     not       1     The       num     Enum_Lim3       num     0       0     not	active e output is activated by an alarm from limit value 1. Output function: Signal limit 2 active e output is activated by an alarm from limit value 2. Output function: Signal limit 3
P 12446 P 20638 P 28830 Se 4255 41278 P 12447 P 20639 P 28831	1     The       num     Enum_Lim2       0     not       1     The       num     Enum_Lim3       0     not	e output is activated by an alarm from limit value 1.  Output function: Signal limit 2  active e output is activated by an alarm from limit value 2.  Output function: Signal limit 3
P 12446 P 20638 P 28830 Se 4255 41278 P 12447 P 20639 P 28831	num Enum_Lim2 0 not 1 The num Enum_Lim3 0 not	Output function: Signal limit 2         active         e output is activated by an alarm from limit value 2.         Output function: Signal limit 3
P 12446 P 20638 P 28830 Se 4255 41278 P 12447 P 20639 P 28831	num Enum_Lim3	active e output is activated by an alarm from limit value 2. Output function: Signal limit 3
P 12447 P 20639 P 28831	1 The num Enum_Lim3	e output is activated by an alarm from limit value 2. Output function: Signal limit 3
P 12447 P 20639 P 28831	num Enum_Lim3	Output function: Signal limit 3
P 12447 P 20639 P 28831	0 not	
		active
	1 The	detive
1057		e output is activated by an alarm from limit value 3.
se 4257 41282 Ei P 12449 P 20641 P 28833	num Enum_OUT_	LPAL Output function: Signal Interruption alarm (LOOP) The overall control loop is monitored and the process value ha change with an output signal of maximum value, else loop alar generated.
		active
	1 The	e loop alarm (= open loop alarm) is assigned to this output.
se 4258 41284 En P 12450 P 20642 P 28834	num Enum_OUT_	HCAL Output function: Signal Heat current alarm. Either break (= current < heating current limit) can be monitored or overload (= current heating current limit), dependent on configuration.
		active
	1 The	e heating current alarm is assigned to this output.
se 4259 41286 En P 12451 P 20643 P 28835	num 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 i switched off.
P P S P	12450 20642 28834 41286 12451 20643	1       The         12450       41284       Enum       Enum_OUT_         12450       20642       12       12         28834       1       1       The         28834       1       1       The         1       1       The       1         1       1       1       1         1       1       1       1         1       1       1       1         1       1       1       1         1       20643       1       1

P. End       r/w       base       4.261       11290       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).         FAI.1       r/w       base       4.262       41292       Enum       Inum_PAI       Output function: Signal Program end. This message 'Program end'.         FAI.1       r/w       base       4.262       41292       Enum       Inum_PAI       Output function: Signal NP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.         FAI.2       r/w       base       4.263       41294       Enum       Enum_PAI       Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP1.         FAI.2       r/w       base       4.263       41294       Enum_PAI       Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.         FAI.3       r/w       base       4.264       41296       Enum_FAI3       Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.         FAI.3       r/w       base       4.265       41296       Enum_FAI3       Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.         PrG.1       r/w       base	Out.2							
Name         r/w         Adr.         Integer         real         Typ         Value/off         Description           P.End         f/w         base         4261         41290         Enum         Enum_PEnd         Output function: Signal Program end. This message is available when the program has been completed (only when configured as a program controller).           FAI.1         r/w         base         4262         41292         Enum         Enum_PEnd         Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog input INP1.           FAI.1         r/w         base         4263         41294         Enum         Enum_FAI         Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog input INP1.           FAI.2         r/w         base         4263         41294         Enum         Enum_FAI2         Output function: Signal INP1 fault.           FAI.3         r/w         base         4263         41294         Enum         Enum_FAI2         Output function: Signal INP2 fault.           FAI.3         r/w         base         4264         41294         Enum         Enum_FAI2         Output function: Signal INP3 fault.           The output sends the error message 'INP2 fault.         The output sends the error message 'INP2 fault.         The output sends the error message	ConF							
Idia         12453 2dF         20045 20045         20045 2004         20045 <td>Name</td> <td>r/w</td> <td>Adr. Inte</td> <td>eger</td> <td>real</td> <td>Тур</td> <td>Value/off</td> <td>Description</td>	Name	r/w	Adr. Inte	eger	real	Тур	Value/off	Description
Image: Program end:           FAI.1         f/w         base 1245         4262 40P         2064 200P         Enum 200P         Enum 200P         Enum 200P         Enum 200P         Comparison of the fail signal is generated. If a fault occurs at the analog input 10P1.           FAI.1         f/w         base 200P         4263 204P         1294 204P         6         not active 1         Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog input 1NP2.           FAI.2         f/w         base 204P         4263 204P         1296 204P         Enum 204P         Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog input 1NP3.           FAI.3         r/w         base 30P         4265         Final         Enum 204P         Enum 204P         Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog input 1NP3.           PrG.1         r/w         base 204P         4265         Final         Enum 204P         Enum 204P         Enum 204P         Enum 204P         Enum 204P         Enum 204P         Enum 204P         Enum 204P	P.End	r/w	1dP 1 2dP	12453 20645	41290	Enum		This message is available when the program has been completed
FAI.1       r/w       base lag       4262 2046 3dP       41292 20846 20838       Enum FAI.1       Enum_FAI1       Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog input INP1.         FAI.2       r/w       base 1dP       4263 20839       41294 20847       Enum FAI.2       0       not active 1       The output sends the error message: INP1 fault. The fail signal is generated, if a fault occurs at the analog input INP2.         FAI.2       r/w       base 2dP       4264 20647       41296 20647       Enum_FAI2       Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog input INP2.         FAI.3       r/w       base 2dP       4265 2049       41296       Enum FAI3       Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog input INP3.         FAI.3       r/w       base 2dP       4265       41296       Enum FAI3       Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog input INP3.         PrG.1       r/w       base 2dP       4265       41298       Enum_FAI3       Output function: Signal programmer's control output no. 1. A control output is one of the four digital signals that can be operated segment-wise by a program.         PrG.2       r/w       base 3dP       4266       41300       Enum_FG2       Output function: Signal programmer's control output no. 2.								activated by the message 'Drearem and'
Indp         12454 20P         20046 20046         Image: Property and p							I Inis output is	activated by the message Program end .
1       The output sends the error message INP1 fault'.         FAI.2       r/w       base       4263       41294       Enum_FAI2       Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.         FAI.3       r/w       base       4264       41296       Enum_FAI2       Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP2.         FAI.3       r/w       base       4264       41296       Enum_FAI3       Output function: Signal INP3 fault. The output sends the error message 'INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.         PrG.1       r/w       base       4265       41296       Enum_FAI3       Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.         PrG.1       r/w       base       4265       41296       Enum_FG1       Output function: Signal programmer's control output no. 1. A control output 1 is assigned to this output.         PrG.2       r/w       base       4266       41300       Enum_FG2       Output function: Signal programmer's control output no. 2. A control output 1 is assigned to this output.         PrG.3       r/w       base       4267       41302       Enum_FG2       Output function: Signal programmer's control output no. 3. T A control output 2 is assigned to this output.	FAi.1	r/w	1dP 1 2dP	12454 20646	41292	Enum	Enum_FAi1	The fail signal is generated, if a fault occurs at the analog Input
FAI.2       r/w       base 1dP 2dP 2dP 2dP 2dP 2dP 2dP 2dP 2dP 2dP 2								
IdP       12455       20647       3dP       28839       Image: Control output Sends the error message 'INP2 fault'.         FAI.3       r/w       base       4264       41296       Enum_FAI3       Output function: Signal INP3 fault.         FAI.3       r/w       base       4264       41296       Enum_FAI3       Output function: Signal INP3 fault.         FAI.3       r/w       base       4264       41296       Enum_FAI3       Output function: Signal INP3 fault.         FAI.3       r/w       base       4264       41296       Enum_FAI3       Output function: Signal INP3 fault.         FAI.3       r/w       base       4265       41298       Enum_FGI       Output function: Signal programmer's control output no. 1.         Accorrol output 3dP       28840       enum_PrGI       Output function: Signal programmer's control output no. 1.         PrG.1       r/w       base       4266       41300       Enum_PrGI       Output function: Signal programmer's control output no. 2.         PrG.2       r/w       base       4266       41300       Enum_PrG2       Output function: Signal programmer's control output no. 2.         PrG.3       r/w       base       4267       41302       Enum_PrG2       Output function: Signal programmer's control output no. 3. T							1 The output ser	nds the error message 'INP1 fault'.
Image: Problem in the intervent of the problem intervent of the p	FAi.2	r/w	1dP 1 2dP	12455 20647	41294	Enum	Enum_FAi2	The fail signal is generated, if a fault occurs at the analog Input
FAI.3       r/w       base 1dP       4264 12456 2dP       41296 20648 3dP       Enum_FAI3       Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Input INP3.         PrG.1       r/w       base 3dP       4265 20649       41298 20649       Enum_FG1       Output function: Signal programmer's control output no. 1. A control output is one of the four digital signals that can be operated segment-wise by a program.         PrG.2       r/w       base 1dP       4266 1dP       41300 12457 2dP       Enum_PrG1       Output function: Signal programmer's control output no. 1. A control output is one of the four digital signals that can be operated segment-wise by a program.         PrG.2       r/w       base 2dP       4266 20650       41300 2dP       Enum_PrG2       Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.         PrG.3       r/w       base 4267 2dP       41302 20650 2dP       Enum_PrG3       Output function: Signal programmer's control output no. 3. T A control output 2 is assigned to this output.         PrG.3       r/w       base 2dP       41302 20650       Enum_PrG3       Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.								
1dP       12456       20648       20648       1       Image: Pression of the set of the s							1 The output ser	nds the error message 'INP2 fault'.
PrG.1       r/w       base       4265       41298       Enum_PrG1       Output function: Signal programmer's control output no. 1. A control output is one of the four digital signals that can be operated segment-wise by a program.         PrG.2       r/w       base       4266       41300       Enum_PrG2       Output function: Signal programmer's control output no. 2. A control output 1 is assigned to this output.         PrG.2       r/w       base       4266       41300       Enum_PrG2       Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.         PrG.2       r/w       base       4266       41300       Enum_PrG2       Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.         PrG.3       r/w       base       4267       41302       Enum_PrG3       Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.         PrG.3       r/w       base       4267       41302       Enum_PrG3       Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.         9       not active       0       not active	FAi.3	r/w	1dP 1 2dP	12456 20648	41296	Enum	Enum_FAi3	The fail signal is generated, if a fault occurs at the analog Input
PrG.1       r/w       base       4265       41298       Enum       Enum_PrG1       Output function: Signal programmer's control output no. 1. A control output is one of the four digital signals that can be operated segment-wise by a program.         PrG.2       r/w       base       4266       41300       Enum       Enum_PrG2       Output function: Signal programmer's control output no. 2. A control output 1 is assigned to this output.         PrG.2       r/w       base       4266       41300       Enum       Enum_PrG2       Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.         PrG.2       r/w       base       4266       41300       Enum_PrG2       Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.         PrG.3       r/w       base       4267       41302       Enum_PrG3       Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.         PrG.3       r/w       base       4267       41302       Enum_PrG3       Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.         0       not active       Output function: Signal programmer's by a progr		•						
1dP 2dP 2dP 2dP 2dP12457 20649 28841A control output is one of the four digital signals that can be operated segment-wise by a program.PrG.2r/w 1dP 12458 2dP 2dP 2dP 2dP41300 28842Enum PrG2Enum_PrG2Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.PrG.2r/w 3dPbase 2884241300 41302Enum 44302Enum_PrG2Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.PrG.3r/w 2dPbase 2dP 2dP41302 2dS12Enum 44302Enum 44302Enum_PrG3Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.PrG.3r/w 2dP 2dP2457 2dF 2dP41302 2dS13Enum 44302Enum_PrG3Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.							1 The output ser	nds the error message 'INP3 fault'.
PrG.2       r/w       base       4266       41300       Enum       PrG2       Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.         PrG.3       r/w       base       4267       41302       Enum       PrG3       Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.         PrG.3       r/w       base       4267       41302       Enum_PrG3       Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.         PrG.3       r/w       base       4267       41302       Enum_PrG3       Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.         gdP       20651       20P       20651       0       not active         0       not active       0       not active       0       perated segment-wise by a programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.	PrG.1	r/w	1dP 1 2dP	12457 20649	41298	Enum	Enum_PrG1	A control output is one of the four digital signals that can be
PrG.2       r/w       base 1dP       12458 2dP       41300 20650 3dP       Enum_PrG2       Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.         PrG.3       r/w       base 1dP       12458 2842       0       not active 1       0       not active 1       0         PrG.3       r/w       base 1dP       4267 12459 2dP       41302 20651 3dP       Enum_PrG3       Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.         PrG.3       r/w       base 1dP       4267 12459 2dP       41302 20651 3dP       Enum_PrG3       Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.         0       not active       0       not active	ļ							-
1dP       12458       A control output is one of the four digital signals that can be operated segment-wise by a program.         2dP       20650       0       not active         3dP       28842       0       not active         1       Control output 2 is assigned to this output.       0         PrG.3       r/w       base       4267       41302       Enum       Enum_PrG3       Output function: Signal programmer's control output no. 3. T         A control output 5       2dP       20651       6       PrG3       Output function: Signal programmer's control output no. 3. T         A control output 5       2dP       20651       6       6       PrG3       Output function: Signal programmer's control output no. 3. T         A control output 5       0       not active       0       Not active							1 Control output	1 is assigned to this output.
PrG.3       r/w       base       4267       41302       Enum       PrG3       Output function: Signal programmer's control output no. 3. T         A control output       2dP       2061       2061       28843       Image: Control output function: Signal programmer's control output no. 3. T         A control output       28843       Image: Control output function: Signal programmer's control output no. 3. T         A control output is one of the four digital signals that can be operated segment-wise by a program.       Image: Control output function: Signal programmer's control output no. 3. T         B control output function:       0       not active	PrG.2	r/w	1dP 1 2dP	12458 20650	41300	Enum	Enum_PrG2	A control output is one of the four digital signals that can be
1dP       12459         2dP       20651         3dP       28843    O not active								2 is assigned to this output.
	PrG.3	r/w	1dP 1 2dP	12459 20651	41302	Enum	Enum_PrG3	A control output is one of the four digital signals that can be
	_	_	_					

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

Signal

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

							Operating Version
Out.3							
ConF							
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
O.tYP	r/w	base 1dP 2dP 3dP	4370 12562 20754 28946		Enum	Enum_OtYP	Signal type selection OUT
						0 Relay / logic	
						1 0 20 mA co 2 4 20 mA co	
						3 010 V conti	
						4 210 V conti	
						5 transmitter s	upply
0.Act	r/w	base 1dP 2dP 3dP	4350 12542 20734 28926		Enum	Enum_OAct	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output C Inverse: Active function (e.g. limit value) switches the output
						0 direct / norm	
						1 inverse / nor	nally closed
Y.1	r/w	base 1dP 2dP 3dP	4351 12543 20735 28927		Enum	Enum_Y1	Output function: Controller output Y1
L						0 not active	
						1 This output p	rovides the controller output Y1.
Y.2	r/w	base 1dP 2dP 3dP	4352 12544 20736 28928		Enum	Enum_Y2	Output function: Controller output Y2. Caution: Do not confus controller output Y2 with the parameter 'Fixed output Y2' !
,						0 not active	
						1 This output p	rovides the controller output Y2.
Lim.1	r/w	base 1dP 2dP 3dP	4353 12545 20737 28929		Enum	Enum_Lim1	Output function: Signal limit 1
						0 not active	•
						1 The output is	activated by an alarm from limit value 1.
Lim.2	r/w	base 1dP 2dP	4354 12546 20738 28930		Enum	Enum_Lim2	Output function: Signal limit 2

1 The output is activated by an alarm from limit value 2.

Im.3       r/w       base       4355       1478       Enum_Lin3       Output function: Signal limit 3         Lim.3       r/w       base       4355       1478       Enum_Lin3       Output function: Signal limit 3         JadP       28931       0       not active       1       The output is activated by an alarm from limit value 3.         LP.AL       r/w       base       4357       14182       Enum_OUT_LPAL       Output function: Signal Interruption alarm (LOOP)         LP.AL       r/w       base       4355       14182       Enum_OUT_LPAL       Output function: Signal Interruption alarm (LOOP)         JdP       26993       26933       11482       Enum_OUT_LPAL       Output function: Signal Heat current alarm is assigned to this output.         HC.AL       r/w       base       4356       14484       Enum_OUT_HCAL       Output function: Signal Heat current alarm is assigned to this output.         HC.AL       r/w       base       4359       14484       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 switched off.         HC.SC       r/w       base       4367       14186       Enum_HCSC       Output function: Signal Solid-state relay (SSR) short circuit. The short	Out.3	3						
Name         r/w         Adr. Integer         real         Typ         Value/off         Description           Lim.3         n/w         base         4355         41478         Enum         Enum_Lim.3         Output function: Signal limit 3           Lim.3         n/w         base         4355         41478         Enum_Lim.3         Output function: Signal limit 3           Job         126         7/39         3dP         29931         O         not active           LP.AL         r/w         base         4357         41482         Enum_OUT_LPAL         Output function: Signal Interruption alarm (LOOP)           HC.AL         r/w         base         4358         41484         Enum_OUT_LPAL         Output function: Signal Heat current alarm. Either break (= current barg original / fast on output signal of maximum value, else loop alarg original / fast on output signal Heat current alarm. Either break (= current barg output.           HC.AL         r/w         base         4359         41484         Enum         Enum_OUT_HCAL         Output function: Signal Heat current alarm. Either break (= current barg output.           HC.AL         r/w         base         4359         41486         Enum         Enum_HCSC         Output function: Signal Meat current alarm. Either break (= current barg occurent limit) cabe barged on overload (= current barg occurent limit),								
Lim 3       r/w       base       4355       41478       Enum       Enum_Lim3       Output function: Signal limit 3         Lim 3       IdP       12547       2dP       20739       0       natative       1       0       natative       1       0       natative       1       0       natative       1       0       natative       1	Name	r/w	Adr. Inte	eger re	eal	Тур	Value/off	Description
1         The output is activated by an alarm from limit value 3.           LP.AL         I/W         base         4357         41482         Enum         Enum_OUT_IPAL         Output function: Signal Interruption alarm (LOOP)           JdP         209         20741         3dP         2093         On ot active         The overall control loop is monitored and the process value he change with an output signal of maximum value, else loop alarm (LOOP)           HC.AL         r/W         base         4358         41484         Enum         On not active         On ot active         Corport function: Signal Heat current alarm. Either break (- curren heating current limit), dependent on configuration.           JdP         12551         2dP         2074         The heating current limit), dependent on configuration.           HC.SC         r/w         base         4359         41486         Enum         Enum_HCSC         Output function: Signal Solid-state relay (SSR) short circuit.           HC.SC         r/w         base         4359         41486         Enum         Enum_HCSC         Output function: Signal Solid-state relay (SSR) short circuit.           HC.SC         r/w         base         4354         41490         Enum_HCSC         Output function: Signal Program end.           HC.SC         r/w         base         4361         Enum_HCH<	Lim.3	-	base 1dP 2dP	4355 4 12547 20739			Enum_Lim3	•
Index         12549 20P         20741 2074         Intervention of the process value he change with an output signal of maximum value, else loop ala generated.           HC.AL         r/w         base         4358         41484         Enum         Imm_OUT_HCAL         Output function: Signal Heat current alarm. Either break (= current heating current limit) can be monitored or overload (= current heating current limit).           HC.AL         r/w         base         4358         41484         Enum         Enum_OUT_HCAL         Output function: Signal Heat current alarm. Either break (= current heating current limit) can be monitored or overload (= current heating current limit).           HC.SC         r/w         base         4359         41486         Enum         Enum_HCSC         Output function: Signal Heat current alarm. Either break (= current heating current limit).           HC.SC         r/w         base         4359         41486         Enum         Enum_HCSC         Output function: Signal Solid-state relay (SSR) short circuit. The short circuit larm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output switched off.           P.End         r/w         base         4361         41490         Enum_Fend         Output function: Signal Program end. This message is available when the program has been comple (only when configured as a program controller).           FAI.1         r/w         base         4362								s activated by an alarm from limit value 3.
1       The loop alarm (- open loop alarm) is assigned to this output.         HC.AL       r/w       base       4358       41484       Enum       Enum_OUT_HCAL       Output function: Signal Heat current alarm. Either break (= current limit), dependent on configuration.         3dP       28934       0       0       not active       - heating current limit), dependent on configuration.         HC.SC       r/w       base       4359       41486       Enum       Enum_HCSC       Output function: Signal Kate relay (SSR) short circuit.         HC.SC       r/w       base       4359       41486       Enum       Enum_HCSC       Output function: Signal Signal Yold-state relay (SSR) short circuit.         HC.SC       r/w       base       4351       41490       Enum_HCSC       Output function: Signal Yold-state relay (SSR) short circuit.         HC.SC       r/w       base       4361       41490       Enum_HCSC       Output function: Signal Program end.         P.End       r/w       base       4361       41490       Enum_PEnd       Output function: Signal Program end.         This output is activated by an SSR fault.       0       not active       1       This output is activated by the message 'Program end'.         FAI.1       r/w       base       4362       14490       Enum_FAI1	LP.AL	r/w	1dP 2dP	12549 20741	41482	Enum	Enum_OUT_LPAL	The overall control loop is monitored and the process value had change with an output signal of maximum value, else loop ala
HC.AL       r/w       base       4358       41484       Enum       Enum_OUT_HCAL       Output function: Signal Heat current limit) can be monitored or overload (= curren heating current limit), dependent on configuration.         HC.AL       1dP       12550       0       not active       1       The heating current limit), dependent on configuration.         HC.SC       r/w       base       4359       41486       Enum       Enum_HCSC       Output function: Signal Solid-state relay (SSR) short circuit. The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output switched off.         HC.SC       r/w       base       4361       41490       Enum_HCSC       Output function: Signal Program end. This message is available when the program has been complet (only when configured as a program controller).         P.End       r/w       base       4361       41490       Enum_PEnd       Output function: Signal Program end. This message is available when the program has been complet (only when configured as a program controller).         P.End       r/w       base       4362       41492       Enum_FAI1       Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Inp INP1.         FAi.1       r/w       base       4362       41492       Enum_FAI1       Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the anal			I					
$ \begin{array}{ c c c c c } \hline 1dP & 1255 \\ 2dP & 2074 \\ 3dP & 2893 \\ \hline \end{array} & \hline \end{array} & \hline \cr \cr$							1 The loop ala	rm (= open loop alarm) is assigned to this output.
Image: Problem in the state in the second of the second	HC.AL	r/w	1dP 2dP	12550 20742	41484	Enum	Enum_OUT_HCAL	Output function: Signal Heat current alarm. Either break (= cur < heating current limit) can be monitored or overload (= curren heating current limit), dependent on configuration.
HC.SC       r/w       base 10P       12551 12551 2dP       1486 20743 20743       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 switched off.         P.End       r/w       base 1dP       4361 12553 20745       41490 Enum_PEnd       Enum_PEnd       Output function: Signal Program end. This message is available when the program has been comple (only when configured as a program controller).         P.End       r/w       base 3dP       4362 20745       Enum_PEnd       Output function: Signal Program end. This message is available when the program has been comple (only when configured as a program controller).         FAi.1       r/w       base 1dP       12554 20745       Enum_FAi1       Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Inpu INP1.         FAi.2       r/w       base 4363       41494 41494       Enum_FAi2       Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Inpu INP1.         FAi.2       r/w       base 4363       41494 41494       Enum_FAi2       Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Inpu INP2.							0 not active	
IdP       12551       Image: Second s							1 The heating	current alarm is assigned to this output.
P.End       r/w       base       4361       41490       Enum_PEnd       Output activated by an SSR fault.         P.End       r/w       base       4361       1490       Enum_PEnd       Output function: Signal Program end. This message is available when the program has been complet (only when configured as a program controller).         FAi.1       r/w       base       4362       41492       Enum       Enum_FAi1       Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Inp INP1.         FAi.2       r/w       base       4363       41494       Enum       Enum_FAi2       Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Inp INP1.	HC.SC	r/w	1dP 2dP	12551 20743	41486	Enum	Enum_HCSC	The short circuit alarm of the SSR is triggered, if a current is detected in the heating circuit, although the controller output
P.End       r/w       base       4361       41490       Enum_PEnd       Output function: Signal Program end. This message is available when the program has been complet (only when configured as a program controller).         FAi.1       r/w       base       4362       41492       Enum       0       not active       1       This output is activated by the message 'Program end'.         FAi.1       r/w       base       4362       41492       Enum_FAi1       Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Inpu INP1.         FAi.1       r/w       base       4363       41494       Enum_FAi1       Output function: Signal INP1 fault. The output sends the error message 'INP1 fault'.         FAi.2       r/w       base       4363       41494       Enum_FAi2       Output function: Signal INP2 fault. The output sends the error message 'INP1 fault'.							0 not active	
IdP       12553       IdP       20745       This message is available when the program has been complet (only when configured as a program controller).         IdP       28937       IdP       28937       IdP							1 Output activa	ated by an SSR fault.
FAi.1       r/w       base       4362       41492       Enum_FAi1       Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Inplication in the fail signal is generated.         FAi.2       r/w       base       4363       41494       Enum_FAi2       Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Inplication in the fail signal is generated.         FAi.2       r/w       base       4363       41494       Enum_FAi2       Output function: Signal INP2 fault. The output sends the error message 'INP1 fault'.         FAi.2       r/w       base       4363       41494       Enum_FAi2       Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Inplication is generated, if a fault occurs at the analog Inplication is generated, if a fault occurs at the analog Inplication is generated, if a fault occurs at the analog Inplication is generated, if a fault occurs at the analog Inplication is generated, if a fault occurs at the analog Inplication is generated, if a fault occurs at the analog Inplication is generated, if a fault occurs at the analog Inplication is generated, if a fault occurs at the analog Inplication is generated, if a fault occurs at the analog Inplication is generated, if a fault occurs at the analog Inplication is generated, if a fault occurs at the analog Inplication is generated, if a fault occurs at the analog Inplication is generated, if a fault occurs at the analog Inplication is generated, if a fault occurs at the analog Inplication is generated, if a fault occurs at the analog Inplication is generated, if a fault occurs at the analog Inplication	P.End	r/w	1dP 2dP	12553 20745	41490	Enum	Enum_PEnd	This message is available when the program has been comple
FAi.1r/wbase4362 1dP 12554 2dP 20746 3dP41492 28938Enum_FAi1Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Inp INP1.Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Inp INP1.FAi.2r/wbase4363 4149441494 Enum_FAi2Enum_FAi2Output function: Signal INP1 fault. The output sends the error message 'INP1 fault'.FAi.2r/wbase4363 1dP 12555 2dP 2dP 2dP41494 28939Enum_FAi2Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Inp INP2.								
IdP       12554       Image: Constraint of the second seco							1 This output i	s activated by the message 'Program end'.
FAi.2       r/w       base       4363       41494       Enum_FAi2       Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Inpu INP2.         adP       28939       28939       V<	FAi.1	r/w	1dP 2dP	12554 20746	41492	Enum	Enum_FAi1	The fail signal is generated, if a fault occurs at the analog Input
FAi.2 r/w base 4363 41494 Enum Enum_FAi2 Output function: Signal INP2 fault. 1dP 12555 2dP 20747 3dP 28939		•	•					
1dP12555The fail signal is generated, if a fault occurs at the analog Input INP2.2dP20747INP2.3dP28939							1 The output s	ends the error message 'INP1 fault'.
0 not active	FAi.2	r/w	1dP 2dP	12555 20747	41494	Enum	Enum_FAi2	The fail signal is generated, if a fault occurs at the analog Input
1 The output sends the error message 'INP2 fault'.								

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

0.Src

r/w

base

Signal source of the analog output (visible not with all output signal

17	Out.3								
	ConF Name	r/w	Adr. In	nteger	real	Тур	Valu	ue/off	Description
	Out.0	r/w	base 1dP 2dP 3dP	4371 12563 20755 28947	41510	Float	-1		Lower scaling limit of the analog output (corresponds to 0%). If current and voltage signals are used as output values, the display can be scaled to the output value in the Parameter Level. The output value of the lower scaling point is indicated in the respective electrical unit (mA / V).
	Out.1	r/w	base 1dP 2dP 3dP	4372 12564 20756 28948	41512	Float	-1		Upper scaling limit of the analog output (corresponds to 100%). If current and voltage signals are used as output values, the display can be scaled to the output value in the Parameter Level. The output value of the upper scaling point is indicated in the respective electrical unit (mA / V).

4373 41514 Enum Enum\_OSrc

Dase	4373	+131+	Linam_ooro	Signal source of the analog output (visible not with an output signal
1dP	12565			types O.TYP).
2dP	20757			
3dP	28949			
			0 not	used
			1 Con	troller output y1 (continuous)
			2 Con	troller output y2 (continuous)
			3 proc	cess value
			Exa setp	effective setpoint Weff, which is used for control. mple: The gradient changes the effective setpoint until it reaches the internal (target) point.
			Not	trol deviation xw (process value - set-point)= relative alarm e: Monitoring with the effective set-point Weff. For example using a ramp it is the nging set-point, not the target set-point of the ramp.
			6 Pos	tion feedback signal Yp.
			7 mea	isured value INP1
			8 mea	isured value INP2
			9 mea	isured value INP3

O.FAI	r/w	base	4374	41516	Enum	Enum_0	Fail	fail behaviour
		1dP	12566					
		2dP	20758					
		3dP	28950					
						0	upscale	
						1	downscale	

#### 

JIGHO	ll						
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
Out1	r	base	4380	41528	Enum	Enum_Ausgang	Status of the digital output
		1dP	12572				
		2dP	20764				
		3dP	28956				
<u> </u>	ŀ					0 off	
						1 on	

18 Out.4

7	Out.3								
-	Out.s								
•	Signal								
	Name	r/w	Adr. Ir	nteger	real	Тур	Value/	off	Description
	F.Do1	r/w	base	4381	41530	Enum	Enum_A	Ausgang	Forcing of this digital output. Forcing involves the external operation
			1dP	12573					of an output. The instrument has no influence on this output (use of
			2dP	20765					free outputs by superordinate system).
			3dP	28957					
							0	off	
							1	on	
[	F.Out1	r/w	base	4382	41532	Float	0120		Forcing value of the analog output. Forcing involves the external
			1dP	12574					operation of an output, i.e. the instrument has no influence on this
			2dP	20766					output. (Used for the operation of free outputs e.g. by a supervisory
			3dP	28958					PLC.)

ConF							
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
O.tYP	r/w	base 1dP 2dP 3dP	4470 12662 20854 29046	41708	Enum	Enum_OtYP	Signal type selection OUT
						0         Relay / logic           1         0 20 mA cor           2         4 20 mA cor           3         010 V contin           4         210 V contin           5         transmitter su	ttinuous uous uous
0.Act	r/w	base 1dP 2dP 3dP	4450 12642 20834 29026	41668	Enum	Enum_OAct	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.
						0 direct / norma	Ily open

1

inverse / normally closed

Y.1	r/w	base 1dP	4451 12643	Enum	Enum_Y1	Output function: Controller output Y1
		2dP	20835			
		3dP	29027			
					0 not active	

This output provides the controller output Y1. 1

Y.2	r/w	base 1dP 2dP 3dP	4452 12644 20836 29028	41672	Enum	Enum_\		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 pro	vides the controller output Y2.

Out.4						
ConF						
Name	r/w	Adr. Integ	er real	Тур	Value/off	Description
Lim.1	1	-	4453 41674		Enum_Lim1	Output function: Signal limit 1
LIIII. I	r/w		4453 41674 2645			
			2043 20837			
			9029			
		SUP 2	9029		0 pat activa	
					0 not active 1 The output is	s activated by an alarm from limit value 1.
		<b>b</b>		E	Enume Line D	Outrust function, Circulation 4.0
Lim.2	r/w		4454 41676	Enum	Enum_Lim2	Output function: Signal limit 2
			2646			
			0838			
		3dP 2	9030		0 pot octivo	
					0 not active 1 The output is	s activated by an alarm from limit value 2.
				-		
Lim.3	r/w	base 4	4455 41678	Enum	Enum_Lim3	Output function: Signal limit 3
		1dP 12	2647			
		2dP 2	0839			
			9031			
<u> </u>	-!			1	0 not active	1
					1 The output is	s activated by an alarm from limit value 3.
LP.AL	r/w	base 4	4457 41682	Enum	Enum_OUT_LPAL	Output function: Signal Interruption alarm (LOOP)
			2649			The overall control loop is monitored and the process value ha
			0841			change with an output signal of maximum value, else loop ala
			9033			generated.
	_				0 not active	
					1 The loop ala	rm (= open loop alarm) is assigned to this output.
HC.AL	r/w	base 4	4458 41684	Enum	Enum_OUT_HCAL	Output function: Signal Heat current alarm. Either break (= curr
			2650			< heating current limit) can be monitored or overload (= curren
			2030			heating current limit), dependent on configuration.
			9034			
<u> </u>	_	2			0 not active	
						current alarm is assigned to this output.
HC.SC	r/w	base 4	4459 41686	Enum	Enum_HCSC	Output function: Signal Solid-state relay (SSR) short circuit.
			2651			The short circuit alarm of the SSR is triggered, if a current is
			2031			detected in the heating circuit, although the controller output i
			9035			switched off.
					0 not active	
						ated by an SSR fault.
P.End	r/w	base 4	4461 41690	Enum	Enum_PEnd	Output function: Signal Program end.
F.EHU	1/ VV					This message is available when the program has been comple
			2653			(only when configured as a program controller).
			0845			
		3dP 2	9037			
					0 not active	
					1 This output i	s activated by the message 'Program end'.

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

	Out.4									
	ConF									
	lame	r/w	Adr. In	iteger	real	Тур	Value	e/off		Description
	CALL	1	base 1dP 2dP 3dP		41706		Enum_	_CALL		Output: Operator call. At the end of a program segment, a contact is set, e.g. for an acoustic signal. This indicates to the operator that a certain program status has been reached, and operator action is required. Operator calling is used, if the program may only be continued afte a check or some kind of operator action.
-							0	not active		
							1	The outpu	t is s	witched by an operator call.
C	lP.Er	r/w	base 1dP 2dP 3dP	4475 12667 20859 29051	41718	Enum	Enum_	_DP_ERR		Output function: Signal Fault in the Profibus communication. This output is set when a fault in the Profibus communication occurs. There is no more communication with this device.
-	•						0	Not active		
							1	This outpu	ut se	nds the Profibus fault.
(	Dut.0	r/w	base 1dP 2dP 3dP	4471 12663 20855 29047	41710	Float	-1			Lower scaling limit of the analog output (corresponds to 0%). If current and voltage signals are used as output values, the display can be scaled to the output value in the Parameter Level. The output value of the lower scaling point is indicated in the respective electrical unit (mA / V).
0	Dut.1	r/w	base 1dP 2dP 3dP	4472 12664 20856 29048	41712	Float	-1			Upper scaling limit of the analog output (corresponds to 100%). If current and voltage signals are used as output values, the display can be scaled to the output value in the Parameter Level. The output value of the upper scaling point is indicated in the respective electrical unit (mA / V).
0	D.Src	r/w	base 1dP 2dP 3dP	4473 12665 20857 29049	41714	Enum	Enum_	_OSrc		Signal source of the analog output (visible not with all output sign types O.TYP).
_	·						0	not used		
							1 2			put y1 (continuous) put y2 (continuous)
							2	process va	•	
							4	The effect Example: setpoint.	tive s The g	setpoint Weff, which is used for control. gradient changes the effective setpoint until it reaches the internal (target)
							5	Note: Mor changing	nitor set-p	on xw (process value - set-point)= relative alarm ing with the effective set-point Weff. For example using a ramp it is the point, not the target set-point of the ramp.
							6 7	Position fe measured		ack signal Yp.
							8	measured		
							9	measured		
(	D.FAI	r/w	base 1dP 2dP 3dP	4474 12666 20858 29050	41716	Enum	Enum_	_OFail		fail behaviour
							0	upscale		
							1	downscale	0	

1 downscale

Signal							
Name	r/w	Adr. In	teger	real	Тур	Value/off	Description
Out2	r	base 1dP 2dP 3dP	4480 12672 20864 29056	41728	Enum	Enum_Ausgang	Status of the digital output
						0 off 1 on	
F.Do2	r/w	base 1dP 2dP 3dP	4481 12673 20865 29057	41730	Enum	Enum_Ausgang	Forcing of this digital output. Forcing involves the external operation of an output. The instrument has no influence on this output (use of free outputs by superordinate system).
						0 off	
						1 on	
F.Out2	r/w	base 1dP 2dP 3dP	4482 12674 20866 29058	41732	Float	0120	Forcing value of the analog output. Forcing involves the external operation of an output, i.e. the instrument has no influence on this output. (Used for the operation of free outputs e.g. by a supervisory PLC.)

#### 19 Out.5

•	ConF							
	Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
	0.Act	r/w	base 1dP 2dP 3dP	4550 12742 20934 29126		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 / nor	mally open
							1 inverse / no	prmally closed

Y.1	r/w	base	4551	41870	Enum	Enum_Y1	Output function: Controller output Y1
		1dP	12743				
		2dP	20935				
		3dP	29127				

not active

0 1 This output provides the controller output Y1.

Y.2	r/w	base 1dP 2dP 3dP	4552 12744 20936 29128	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.

Out.5							
ConF							
Name	r/w	Adr. Int	eaer r	eal	Тур	Value/off	Description
Lim.1	r/w	base		41874	Enum	Enum_Lim1	Output function: Signal limit 1
			12745				
		2dP	20937				
		3dP	29129				
						0 not active	
						1 The output is	activated by an alarm from limit value 1.
Lim.2	r/w	base	4554	41876	Enum	Enum_Lim2	Output function: Signal limit 2
		1dP	12746				
		2dP	20938				
		3dP	29130				
		501	27100			0 not active	
						1 The output is	activated by an alarm from limit value 2.
Lim.3	r/w	base	4555	41878	Fnum	Enum_Lim3	Output function: Signal limit 3
			12747				
	1	2dP	20939				
		3dP	29131				
		JUF	27131			0 pot optivo	
						0 not active 1 The output is	activated by an alarm from limit value 3.
		I	4557	41000	<b>F</b>		Output function Circulater mation class (LOOD)
LP.AL	r/w	base		41882	Enum	Enum_OUT_LPAL	Output function: Signal Interruption alarm (LOOP)
		1dP	12749				The overall control loop is monitored and the process value has change with an output signal of maximum value, else loop alar
		2dP	20941				generated.
		3dP	29133				
						0 not active	( anon loop alarm) is assigned to this autout
						1 The loop alar	m (= open loop alarm) is assigned to this output.
HC.AL	r/w	base	4558	41884	Enum	Enum_OUT_HCAL	Output function: Signal Heat current alarm. Either break (= curr
			12750				<pre>&lt; heating current limit) can be monitored or overload (= current</pre>
		2dP	20942				heating current limit), dependent on configuration.
		3dP	29134				
	1		2,101		<u> </u>	0 not active	
						1 The heating c	urrent alarm is assigned to this output.
HC.SC	r/w	base	4559	41886	Enum	Enum_HCSC	Output function: Signal Solid-state relay (SSR) short circuit.
			12751				The short circuit alarm of the SSR is triggered, if a current is
		2dP	20943				detected in the heating circuit, although the controller output is
		3dP	20943				switched off.
	1	JUP	27133			0 not active	
						0 not active 1 Output activa	ted by an SSR fault.
	1.			14.85	-		1
P.End	r/w	base		41890	Enum	Enum_PEnd	Output function: Signal Program end.
	1		12753				This message is available when the program has been comple
		2dP	20945				(only when configured as a program controller).
		3dP	29137				
						0 not active	
						1 This output is	activated by the message 'Program end'.

Out.5							
ConF							
Name	r/w	Adr. In	teger i	real	Тур	Value/off	Description
FAi.1	r/w	base 1dP 2dP 3dP	4562 12754 20946 29138	41892	Enum	Enum_FAi1 0 not active	Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the analog Inpu INP1.
						1 The output s	ends the error message 'INP1 fault'.
FAi.2	r/w	base 1dP 2dP 3dP	4563 12755 20947 29139	41894	Enum	Enum_FAi2	Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the analog Inpu INP2.
						0 not active	and the error message (IND) fault
						1 The output s	ends the error message 'INP2 fault'.
FAi.3	r/w	base 1dP 2dP 3dP	4564 12756 20948 29140	41896	Enum	Enum_FAi3	Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the analog Inpu INP3.
	-!					0 not active	
						1 The output s	ends the error message 'INP3 fault'.
PrG.1	r/w	base 1dP 2dP 3dP	4565 12757 20949 29141	41898	Enum	Enum_PrG1	Output function: Signal programmer's control output no. 1. A control output is one of the four digital signals that can be operated segment-wise by a program.
	•					0 not active	ut 1 is assigned to this output
							ut 1 is assigned to this output.
PrG.2	r/w	base 1dP 2dP 3dP	4566 12758 20950 29142	41900	Enum	Enum_PrG2	Output function: Signal programmer's control output no. 2. A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	
						1 Control outp	ut 2 is assigned to this output.
PrG.3	r/w	base 1dP 2dP 3dP	4567 12759 20951 29143	41902	Enum	Enum_PrG3	Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	ut 2 is assigned to this output
						1 Control outp	ut 3 is assigned to this output.
PrG.4	r/w	base 1dP 2dP 3dP	4568 12760 20952 29144	41904	Enum	Enum_PrG4	Output function: Signal programmer's control output no. 4. A control output is one of the four digital signals that can be operated segment-wise by a program.

# 19 Out.5

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

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

## 20 Out.6

•	ConF							
	Name	r/w	Adr. Int	eger	real	Тур	Value/off	Description
	0.Act	r/w	base 1dP 2dP 3dP	4650 12842 21034 29226	42068	Enum	Enum_OAct	Operating sense of the switching output. Direct: Active function (e.g. limit value) switches the output ON; Inverse: Active function (e.g. limit value) switches the output OFF.
							0 direct / norma 1 inverse / norm	

#### Code Table **Operating Version4** 20 Out.6 ConF Description Name r/w Adr. Integer real Тур Value/off Y.1 Enum Y1 Output function: Controller output Y1 r/w base 4651 42070 Enum 1dP 12843 2dP 21035 3dP 29227 0 not active 1 This output provides the controller output Y1. Y.2 42072 Enum Enum\_Y2 r/w base 4652 Output function: Controller output Y2. Caution: Do not confuse the controller output Y2 with the parameter 'Fixed output Y2' ! 1dP 12844 2dP 21036 3dP 29228 not active 0 This output provides the controller output Y2. 1 Lim.1 r/w base 4653 42074 Enum Enum\_Lim1 Output function: Signal limit 1 1dP 12845 21037 2dP 3dP 29229 0 not active The output is activated by an alarm from limit value 1. 1 Lim.2 r/w 4654 42076 Enum Enum\_Lim2 Output function: Signal limit 2 base 1dP 12846 2dP 21038 29230 3dP not active 0 1 The output is activated by an alarm from limit value 2. 4655 42078 Enum Enum\_Lim3 Lim.3 r/w base Output function: Signal limit 3 1dP 12847 21039 2dP 29231 3dP 0 not active 1 The output is activated by an alarm from limit value 3. LP.AL Enum\_OUT\_LPAL Output function: Signal Interruption alarm (LOOP) r/w 4657 42082 Enum base The overall control loop is monitored and the process value has to 1dP 12849 change with an output signal of maximum value, else loop alarm is 2dP 21041 generated. 29233 3dP 0 not active 1 The loop alarm (= open loop alarm) is assigned to this output. HC.AL Enum\_OUT\_HCAL Output function: Signal Heat current alarm. Either break (= current I r/w base 4658 42084 Enum < heating current limit) can be monitored or overload (= current I > 1dP 12850 heating current limit), dependent on configuration. 21042 2dP 3dP 29234

0

1 The heating current alarm is assigned to this output.

Out.6	
ConF	
ConF	
Name r/w Adr. Integer real Typ Value/off Description	
HC.SCr/wbase465942086Enum_HCSCOutput function: Signal Solid-state relay (SSR) short The short circuit alarm of the SSR is triggered, if a cu detected in the heating circuit, although the controlled switched off.HC.SC1dP12851128511285112851128512dP2104312851128511285112851128513dP29235111128511	urrent is
0     not active       1     Output activated by an SSR fault.	
P.End       r/w       base       4661       42090       Enum_PEnd       Output function: Signal Program end. This message is available when the program has been (only when configured as a program controller).         P.End       1dP       12853       Enum_PEnd       Output function: Signal Program end. This message is available when the program has been (only when configured as a program controller).	en complet
0 not active	
1 This output is activated by the message 'Program end'.	
FAi.1r/wbase466242092Enum_FAi1Output function: Signal INP1 fault. The fail signal is generated, if a fault occurs at the a INP1.FAi.1128544444442dP210464444443dP2923844444	nalog Inpu
0 not active	
1 The output sends the error message 'INP1 fault'.	
FAi.2r/wbase466342094Enum_FAi2Output function: Signal INP2 fault. The fail signal is generated, if a fault occurs at the a INP2.FAi.2210474444443dP29239444444	nalog Inpu
0 not active	
1 The output sends the error message 'INP2 fault'.	
FAi.3r/wbase466442096EnumEnum_FAi3Output function: Signal INP3 fault. The fail signal is generated, if a fault occurs at the a INP3.FAi.32dP210484444444443dP2924044444444444	nalog Inpu
0 not active	
1 The output sends the error message 'INP3 fault'.	
PrG.1       r/w       base       4665       42098       Enum_PrG1       Output function: Signal programmer's control output         1dP       12857       12857       A control output is one of the four digital signals that operated segment-wise by a program.         3dP       29241       Image: Signal programmer is control output is one of the four digital signals that operated segment-wise by a program.	
0 not active	
1 Control output 1 is assigned to this output.	
PrG.2       r/w       base       4666       42100       Enum_PrG2       Output function: Signal programmer's control output         1dP       12858       2dP       21050       Enum_PrG2       Output function: Signal programmer's control output         3dP       29242       Enum_PrG2       Enum_PrG2       Output function: Signal programmer's control output	
PrG.2       r/w       base       4666       42100       Enum_PrG2       Output function: Signal programmer's control output         1dP       12858       2dP       21050       Enum       Enum_PrG2       Output function: Signal programmer's control output is one of the four digital signals that operated segment-wise by a program.	

ConF Name		Adr. Inte	aor	roal	Тур	Value/off	Description
	1/ VV	Aur. mie	•		51		
PrG.3	r/w	2dP	4667 12859 21051 29243	42102	Enum	Enum_PrG3	Output function: Signal programmer's control output no. 3. T A control output is one of the four digital signals that can be operated segment-wise by a program.
	•	,		•		0 not active	
						1 Control outpu	t 3 is assigned to this output.
PrG.4	r/w	2dP	4668 12860 21052 29244	42104	Enum	Enum_PrG4	Output function: Signal programmer's control output no. 4. A control output is one of the four digital signals that can be operated segment-wise by a program.
						0 not active	
						1 Control outpu	t 4 is assigned to this output.
CALL	r/w	2dP	4669 12861 21053 29245	42106	Enum	Enum_CALL	Output: Operator call. At the end of a program segment, a contact is set, e.g. for an acoustic signal. This indicates to the operator that a certain program status has been reached, and operator action is required. Operator calling is used, if the program may only be continued after a check or some kind of operator action.
						0 not active	
							switched by an operator call.

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

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

## 22 ProG

ConF							
Name	r/w	Adr. In	iteger	real	Тур	Value/off	Description
t.bAS	r/w	base 1dP 2dP 3dP	6030 14222 22414 30606		Enum	Enum_tbAS	Definition of the programmer's time base in hours using minutes, or in minutes using seconds.
						0 Hours [hh] : M	
						1 Minutes [mm]	: Seconds [ss]

#### **Operating Version4**

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

	ode Ta	able	·							Operating Version
?	ProG									
	PArA									
٩	Vame	r/w	Adr. In	teger	real	Тур	Value	/off		Description
t	YPE	r/w	base 1dP 2dP 3dP	6135 14327 22519 30711	45038	Enum	Enum_	SegTyp		Type of segment 1. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).Note: The segment cannot be configured as the end segment.
							0	time to s		
							1	rate to s	•	
							2			bint of the previous segment is kept constant for the duration 'Pt'.
							3 4	step to s		int and wait
							4 5			nt and wait
							6	The fina of a segu by press	l setpo ment, ing th	bint of the previous segment is kept constant for the duration 'Pt'. At the programmer enters the Stop mode (Run LED is off), and can be re e Start/Stop key (more than 3 s), via the interface, or a digital input.
							7	•		int and wait
							8			ent in a program is the end segment. When the end segment has been ast setpoint is maintained.
	SP	r/w	base 1dP 2dP 3dP	6102 14294 22486 30678	44972	Float	-1			End setpoint of segment 1. This is the target setpoint that is reached at the end of the first segment. The target setpoint i approached from the previous valid setpoint (when starting the segment, matching to process value!). When the program is completed, the controller continues with the last target setpon reached.
F	Pt	r/w	base 1dP 2dP 3dP	6103 14295 22487 30679	44974	Float	0			Segment time/gradient 1. The duration of a segment can be of directly, or by using the segment time and the setpoint different (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the seg type parameter (tYPE).
C	d.Out	r/w	base 1dP 2dP 3dP	6136 14328 22520 30712	45040	Enum	ENUM <u>.</u>	_Spuren		Control outputs 14 - 1. A program can control up to four dig signals: the control outputs 14. A combination of these sign can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly
-							0	0-0-0-0		
							1	1-0-0-0		
							2	0-1-0-0		
							3 4	1-1-0-0 0-0-1-0		
							4 5	1-0-1-0		
							6	0-1-1-0		
							7	1-1-1-0		
							8	0-0-0-1		
							9	1-0-0-1		
							10	0-1-0-1		
							11 12	1-1-0-1 0-0-1-1		
							13	1-0-1-1		

### PMA GmbH - Interfacedescription KS90-1P

ProG									
PArA									
Name	r/w	Adr. In	iteger	real	Тур	Value/o	ff		Description
type	r/w	base 1dP 2dP 3dP	6137 14329 22521 30713	45042	Enum	Enum_Se	gТур		Segment type of segment 2. The segment type defines the setper behaviour for this segment. The setpoint can be held constant or changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).
	-!					0 t	ime to set	-poi	int
							ate to set-	•	
									bint of the previous segment is kept constant for the duration 'Pt'.
							step to set	•	nt int and wait
									nt and wait
						6 T c b	The final so of a segme by pressing	etpo ent, g the	bint of the previous segment is kept constant for the duration 'Pt'. At the the programmer enters the Stop mode (Run LED is off), and can be resta e Start/Stop key (more than 3 s), via the interface, or a digital input.
							•	•	Int and wait
									ent in a program is the end segment. When the end segment has been ast setpoint is maintained.
SP	r/w	base 1dP 2dP 3dP	6104 14296 22488 30680	44976	Float	-1			End setpoint of segment 2. This is the target setpoint that is reached at the end of the second segment. The target setpoint i approached from the previous valid setpoint. When the program completed, the controller continues with the last target setpoint reached.
Pt	r/w	base 1dP 2dP 3dP	6105 14297 22489 30681	44978	Float	0			Segment time/gradient 2. The duration of a segment can be def directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segme type parameter (tYPE).
d.Out	r/w	base 1dP 2dP 3dP	6138 14330 22522 30714	45044	Enum	ENUM_S	puren		Control outputs 14 - 2. A program can control up to four digital signals: the control outputs 14. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
							)-0-0-0		
							-0-0-0		
							)-1-0-0  -1-0-0		
							)-0-1-0		
							-0-1-0		
							)-1-1-0		
							-1-1-0 )-0-0-1		
							-0-0-1  -0-0-1		
						10 C	)-1-0-1		
							-1-0-1		
							)-0-1-1		
							-0-1-1 )-1-1-1		

	ode Ta	able	Ş						Operating Version4
2	ProG								
	PArA								
	Name	r/w	Adr. Int	eger	real	Тур	Value	e/off	Description
	type	r/w	base 1dP 2dP 3dP	6139 14331 22523 30715	45046	Enum	Enum_	_SegTyp	Segment type of segment 3. The segment type defines the setp behaviour for this segment. The setpoint can be held constant of changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).
	<u> </u>						0	time to set-po	int
							1	rate to set-po	
							2	•	oint of the previous segment is kept constant for the duration 'Pt'.
							3	step to set-po	
							4	time to set-po	
							5 6	rate to set-po	int and wait ioint of the previous segment is kept constant for the duration 'Pt'. At the
							0	of a segment by pressing tl	the programmer enters the Stop mode (Run LED is off), and can be restance Start/Stop key (more than 3 s), via the interface, or a digital input.
							7	step to set-po	
							8		nent in a program is the end segment. When the end segment has been last setpoint is maintained.
	SP	r/w	base 1dP 2dP 3dP	6106 14298 22490 30682	44980	Float	-1	🗆	End setpoint of segment 3. This is the target setpoint that is reached at the end of the third segment. The target setpoint is approached from the previous valid setpoint. When the program completed, the controller continues with the last target setpoint reached.
	Pt	r/w	base 1dP 2dP 3dP	6107 14299 22491 30683	44982	Float	0		Segment time/gradient 3. The duration of a segment can be de directly, or by using the segment time and the setpoint differen (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
	d.Out	r/w	base 1dP 2dP 3dP	6140 14332 22524 30716	45048	Enum	ENUM	_Spuren	Control outputs 14 - 3. A program can control up to four digital signals: the control outputs 14. A combination of these signal can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
							0	0-0-0-0	
							1	1-0-0-0	
							2 3	0-1-0-0 1-1-0-0	
							4	0-0-1-0	
							5	1-0-1-0	
							6	0-1-1-0	
							7	1-1-1-0	
							8	0-0-0-1	
							9	1-0-0-1	
							10 11	0-1-0-1 1-1-0-1	
							11 12	0-0-1-1	
							12	1-0-1-1	
							14	0-1-1-1	
							15	1-1-1-1	

	ProG							
	PArA							
ĺ	Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
	type	r/w	base 1dP 2dP 3dP	6141 14333 22525 30717		Enum	Enum_SegTyp	Segment type of segment 4. The segment type defines the setper behaviour for this segment. The setpoint can be held constant or changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).
L						ļ	0 time to set-po	int
							1 rate to set-poi	
								oint of the previous segment is kept constant for the duration 'Pt'.
							<ul><li>3 step to set-po</li><li>4 time to set-po</li></ul>	
							5 rate to set-poi	
							of a segment, by pressing th	oint of the previous segment is kept constant for the duration 'Pt'. At the the programmer enters the Stop mode (Run LED is off), and can be restan e Start/Stop key (more than 3 s), via the interface, or a digital input.
								ent in a program is the end segment. When the end segment has been
							reached, the la	ast setpoint is maintained.
	SP	r/w	base 1dP 2dP 3dP	6108 14300 22492 30684		Float	-1 🗆	End setpoint of segment 4. This is the target setpoint that is reached at the end of the fourth segment. The target setpoint is approached from the previous valid setpoint. When the program completed, the controller continues with the last target setpoint reached.
	Pt	r/w	base 1dP 2dP 3dP	6109 14301 22493 30685		Float	0	Segment time/gradient 4. The duration of a segment can be def directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segme type parameter (tYPE).
	d.Out	r/w	base 1dP 2dP 3dP	6142 14334 22526 30718		Enum	ENUM_Spuren	Control outputs 14 - 4. A program can control up to four digital signals: the control outputs 14. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
							0 0-0-0-0	•
							1 1-0-0-0	
							2 0-1-0-0 3 1-1-0-0	
							4 0-0-1-0	
							5 1-0-1-0	
							6 0-1-1-0 7 1-1-1-0	
							8 0-0-0-1	
							9 1-0-0-1	
							10 0-1-0-1	
							11 1-1-0-1 12 0-0-1-1	
							13 1-0-1-1	
							14 0-1-1-1	
							15 1-1-1-1	

	ode Ta	able	) )						Operating Version4
2	ProG								
	PArA								
	Name	r/w	Adr. In	teger	real	Тур	Value	e/off	Description
	type	r/w	base 1dP 2dP 3dP	6143 14335 22527 30719	45054	Enum	Enum_	_SegTyp	Segment type of segment 5. The segment type defines the setp behaviour for this segment. The setpoint can be held constant of changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).
		_					0	time to set-po	int
							1	rate to set-po	
							2	•	oint of the previous segment is kept constant for the duration 'Pt'.
							3	step to set-po	
							4 5	time to set-po rate to set-po	
							6	The final setp of a segment,	oint and wait oint of the previous segment is kept constant for the duration 'Pt'. At the the programmer enters the Stop mode (Run LED is off), and can be resta the Start/Stop key (more than 3 s), via the interface, or a digital input.
							7	step to set-po	
							8		ent in a program is the end segment. When the end segment has been ast setpoint is maintained.
	SP	r/w	base 1dP 2dP 3dP	6110 14302 22494 30686	44988	Float	-1	🛛	End setpoint of segment 5. This is the target setpoint that is reached at the end of the fifth segment. The target setpoint is approached from the previous valid setpoint. When the program completed, the controller continues with the last target setpoint reached.
	Pt	r/w	base 1dP 2dP 3dP	6111 14303 22495 30687	44990	Float	0		Segment time/gradient 5. The duration of a segment can be dedirectly, or by using the segment time and the setpoint differen (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
	d.Out	r/w	base 1dP 2dP 3dP	6144 14336 22528 30720	45056	Enum	ENUM	_Spuren	Control outputs 14 - 5. A program can control up to four digital signals: the control outputs 14. A combination of these signal can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
							0	0-0-0-0	
							1	1-0-0-0	
							2 3	0-1-0-0 1-1-0-0	
							4	0-0-1-0	
							5	1-0-1-0	
							6	0-1-1-0	
							7	1-1-1-0	
							8	0-0-0-1	
							9 10	1-0-0-1 0-1-0-1	
							10 11	0-1-0-1 1-1-0-1	
							12	0-0-1-1	
							13	1-0-1-1	
							14	0-1-1-1	
							15	1-1-1-1	

	ProG							
	PArA							
ĺ	Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
	type	r/w	base 1dP 2dP 3dP	6145 14337 22529 30721		Enum	Enum_SegTyp	Segment type of segment 6. The segment type defines the setpo behaviour for this segment. The setpoint can be held constant or changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).
L						<u> </u>	0 time to set-po	int
							1 rate to set-poi	
								oint of the previous segment is kept constant for the duration 'Pt'.
							<ul><li>3 step to set-po</li><li>4 time to set-po</li></ul>	
							5 rate to set-poi	
							6 The final setpo of a segment, by pressing th	oint of the previous segment is kept constant for the duration 'Pt'. At the the programmer enters the Stop mode (Run LED is off), and can be restar e Start/Stop key (more than 3 s), via the interface, or a digital input.
							<ul><li>7 step to set-po</li><li>8 The last segm</li></ul>	int and wait ent in a program is the end segment. When the end segment has been
								ast setpoint is maintained.
	SP	r/w	base 1dP 2dP 3dP	6112 14304 22496 30688	44992	Float	-1 🗆	End setpoint of segment 6. This is the target setpoint that is reached at the end of the sixth segment. The target setpoint is approached from the previous valid setpoint. When the program completed, the controller continues with the last target setpoint reached.
	Pt	r/w	base 1dP 2dP 3dP	6113 14305 22497 30689	44994	Float	0	Segment time/gradient 6. The duration of a segment can be defidirectly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segme type parameter (tYPE).
	d.Out	r/w	base 1dP 2dP 3dP	6146 14338 22530 30722		Enum	ENUM_Spuren	Control outputs 14 - 6. A program can control up to four digital signals: the control outputs 14. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
-						ļ	0 0-0-0-0	
							1 1-0-0-0	
							2 0-1-0-0 3 1-1-0-0	
							4 0-0-1-0	
							5 1-0-1-0	
							6 0-1-1-0	
							7 1-1-1-0 8 0-0-0-1	
							9 1-0-0-1	
							10 0-1-0-1	
							11 1-1-0-1	
							12 0-0-1-1 13 1-0-1-1	
							14 0-1-1-1	

		·							Operating version
ProG									
PArA									
Name		Adr. Ir	nteger	real	Тур	Value	e/off		Description
type	r/w	base 1dP 2dP 3dP	-	45062	• ·	Enum_	_SegTyp		Segment type of segment 7. The segment type defines the se behaviour for this segment. The setpoint can be held constan changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).
						0	time to se	t-po	int
						1	rate to set		
						2		•	pint of the previous segment is kept constant for the duration 'Pt'.
						3	step to set	t-poi	int
						4			int and wait
						5		•	nt and wait
						6 7	of a segme by pressin	ent, g th	bint of the previous segment is kept constant for the duration 'Pt'. At the programmer enters the Stop mode (Run LED is off), and can be re e Start/Stop key (more than 3 s), via the interface, or a digital input. int and wait
						8	The last se	egm	ent in a program is the end segment. When the end segment has bee ast setpoint is maintained.
SP	r/w	base	<b>411</b>	44996	Elect	-1			End setpoint of segment 7. This is the target setpoint that is
JF	17.00			44990	FIUAL	'		-	reached at the end of the seventh segment. The target setpoint that is
		1dP	14306						approached from the previous valid setpoint. When the progr
		2dP	22498						completed, the controller continues with the last target setpo
		3dP	30690						reached.
Pt	r/w	base 1dP	14307	44998	Float	0			Segment time/gradient 7. The duration of a segment can be directly, or by using the segment time and the setpoint different (SP – segment starting setpoint). Whether the setting is for
		2dP 3dP	22499 30691						segment time or the gradient, is defined by means of the seg type parameter (tYPE).
d.Out	r/w	base	6148	45064	Enum	ENUM	I_Spuren		Control outputs 14 - 7. A program can control up to four dig
		1dP	14340						signals: the control outputs 14. A combination of these sigr
		2dP	22532						can be assigned to every segment, whereby the signals are
		3dP	30724						operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly
						0	0-0-0-0		
						1	1-0-0-0		
						2	0-1-0-0		
						3 4	1-1-0-0 0-0-1-0		
						4 5	0-0-1-0 1-0-1-0		
						6	0-1-1-0		
						7	1-1-1-0		
						8	0-0-0-1		
						9	1-0-0-1		
						10	0-1-0-1		
						11	1-1-0-1		
						12	0-0-1-1		
						13	1-0-1-1		
						14	0-1-1-1		
						15	1-1-1-1		

Operating Version4

ProG							
PAr	4						
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
type	r/w	base 1dP 2dP 3dP	6149 14341 22533 30725		Enum	Enum_SegTyp	Segment type of segment 8. The segment type defines the setper behaviour for this segment. The setpoint can be held constant of changed with a ramp or a step function. Continuation to next segment is automatic or manual (define a hold time).
L	I				I	0 time to set-po	int
						1 rate to set-poi	
							oint of the previous segment is kept constant for the duration 'Pt'.
						<ul><li>3 step to set-point</li><li>4 time to set-point</li></ul>	
						5 rate to set-poi	
						6 The final setpo of a segment, by pressing th	oint of the previous segment is kept constant for the duration 'Pt'. At the the programmer enters the Stop mode (Run LED is off), and can be resta e Start/Stop key (more than 3 s), via the interface, or a digital input.
							int and wait ent in a program is the end segment. When the end segment has been ast setpoint is maintained.
SP	r/w	base 1dP 2dP 3dP	6116 14308 22500 30692		Float	-1 🗆	End setpoint of segment 8. This is the target setpoint that is reached at the end of the eighth segment. The target setpoint is approached from the previous valid setpoint. When the program completed, the controller continues with the last target setpoint reached.
Pt	r/w	base 1dP 2dP 3dP	6117 14309 22501 30693		Float	0	Segment time/gradient 8. The duration of a segment can be def directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting is for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
d.Out	r/w	base 1dP 2dP 3dP	6150 14342 22534 30726		Enum	ENUM_Spuren	Control outputs 14 - 8. A program can control up to four digital signals: the control outputs 14. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
						0 0-0-0-0	
						1 1-0-0-0 2 0-1-0-0	
						2 0-1-0-0 3 1-1-0-0	
						4 0-0-1-0	
						5 1-0-1-0	
						6 0-1-1-0 7 1.1.1.0	
						7 1-1-1-0 8 0-0-0-1	
						9 1-0-0-1	
						10 0-1-0-1	
						11 1-1-0-1	
						12 0-0-1-1 13 1-0-1-1	
						10 1-0-1-1	
						14 0-1-1-1	

tYPE       r/w       base base base 3dP       6151 43070 30727       45070 14343 22535 30727       Enum_SegTyp       Segment type of segment 9. The segment type define behaviour for this segment. The setpoint can be held changed with a ramp or a step function. Continuation segment is automatic or manual (define a hold time).         0       time to set-point       1       rate to set-point         1       rate to set-point       1       rate to set-point         2       The final setpoint of the previous segment is kept constant for the duration 3       step to set-point         3       time to set-point       1       rate to set-point         4       time to set-point and wait       5       rate to set-point and wait         6       The final setpoint of the previous segment is kept constant for the duration of a segment, the programmer enters the Stop mode (Run LED is off), and by pressing the Start/Stop key (more than 3), via the interface, or a digita 7         SP       r/w       base 10P       6118       45004       Float       -1       Image: Control of the end of the end of the nint segment. When the end segment reached, the last segment is maintained.         SP       r/w       base 3dP       6119       45006       Float       -1       Image: Control of the gradient 9. The sit the last target segment is maintained.         SP       r/w       base 3dP       6119       45006       Float	version
Name         r/w         Adr. Integer         real         Typ         Value/off         Description           1YPE         r/w         base         6151         45070         Enum         Enum_SegTyp         Segment type of segment 9. The segment type define behaviour for this segment. The setpoint can be held changed with a ramp or a step function. Continuation segment is automatic or manual (define a hold time).           3dP         30727         0         time to set-point         1         rate to set-point           1         rate to set-point         1         The final setpoint of the previous segment is kept constant for the duration 3         step to set-point           2         The final setpoint of the previous segment is kept constant for the duration 3         step to set-point           4         time to set-point         1         rate to set-point and wait           5         rate to set-point and wait         6         The final setpoint of the previous segment is kept constant for the duration of a segment, the programmer enters the Stop mode (Run LED is off), and by pressing the Start/Stop key (more than 3), via the interface, or a digit 7           7         step to set-point in a program is the end segment. When the end segment reached, the last segment is automatice.           SP         r/w         base         6118         45004         Float         1          End setpoint of segment 9. This is the tar	
Name         r/w         Adr. Integer         real         Typ         Value/off         Description           1YPE         r/w         base         6151         45070         Enum         Enum_SegTyp         Segment type of segment 9. The segment type define behaviour for this segment. The setpoint can be held changed with a ramp or a step function. Continuation segment is automatic or manual (define a hold time).           0         time to set-point         1         rate to set-point           1         rate to set-point         1         The final setpoint of the previous segment is kept constant for the duration 3           3         step to set-point         1         The final setpoint of the previous segment is kept constant for the duration 3           4         time to set-point and wait         6         The final setpoint of the previous segment is kept constant for the duration of a segment, the programmer enters the Stop mode (Run LED is off), and by pressing the Start/Stop key (more than 3), via the interface, or a digite 7           7         step to set-point in a wait         8         The last segment in a program is the end segment. When the end segment reached, the last setpoint of the previous valid setpoint. When the end segment reached, at the end of the ninth segment. The target setpoint 1           8         The last segment is approached from the previous valid setpoint. When the end segment reached.           9         0.0694         1          End setp	
type       r/w       base base base adP       6151 14343 30727       45070 Lass adP       Enum_SegTyp       Segment type of segment 9. The segment type define behaviour for this segment. The setpoint can be held changed with a ramp or a step function. Continuation segment is automatic or manual (define a hold time).         0       time to set-point       0       time to set-point         1       rate to set-point       1       rate to set-point         2       The final setpoint of the previous segment is kept constant for the duration 3       step to set-point         4       time to set-point       1       rate to set-point         5       rate to set-point and wait       6       The final setpoint of the previous segment is kept constant for the duration 3         6       The final setpoint and wait       6       The final setpoint and wait         6       The final setpoint of the previous segment is kept constant for the duration of a segment, the programmer enters the Stop mode (Run LED is off), and by pressing the Start/Stop key (more than 3), via the interface, or a digita 7         7       step to set-point and wait       8         8       The last segment in a program is the end segment. When the end segment reached, the last setpoint is maintained.         SP       r/w       base       6118       45004       Float       -1       Image: completed, the controller continues with the last target reached. <th></th>	
SP       r/w       base       6118       45004       Float       -1        End setpoint of segment is kept constant for the duration of a segment, the programmer enters the Stop mode (Run LED is off), and by pressing the Start/Stop key (more than 3 s), via the interface, or a digita 7         SP       r/w       base       6118       45004       Float       -1        End setpoint of segment is kept constant for the duration of a segment, the programmer enters the Stop mode (Run LED is off), and by pressing the Start/Stop key (more than 3 s), via the interface, or a digita 7         SP       r/w       base       6118       45004       Float       -1        End setpoint of segment 9. This is the target setpoint reached at the end of the ninth segment. The target setpoint reached at the end of the ninth segment. The target setpoint 2dP         22b2       3dP       30694       Float       0       Segment time/gradient 9. The duration of a segment time and the setpoin (SP – segment starting setpoint). Whether the setting segment time or the gradient, is defined by means of type parameter (tYPE).         d.Out       r/w       base       6152       45072       Enum       Control outputs 14 - 9. A program can control up to signals: the control outputs 14 . A combination of the setting or the origination of the setting seting and the setting set the orint outputs 14 . A com	constan
1       rate to set-point         2       The final setpoint of the previous segment is kept constant for the duration of step to set-point         3       step to set-point and wait         5       rate to set-point and wait         6       The final setpoint of the previous segment is kept constant for the duration of a segment, the programmer enters the Stop mode (Run LED is off), and by pressing the Start/Stop key (more than 3 s), via the interface, or a digita of a segment, the programmer enters the Stop mode (Run LED is off), and by pressing the Start/Stop key (more than 3 s), via the interface, or a digita of a segment, the programmer enters the Stop mode (Run LED is off), and by pressing the Start/Stop key (more than 3 s), via the interface, or a digita of a segment, the programmer enters the Stop mode (Run LED is off), and by pressing the Start/Stop key (more than 3 s), via the interface, or a digita of a segment, the programmer enters the Stop mode (Run LED is off), and by pressing the Start/Stop key (more than 3 s), via the interface, or a digita of a segment, the last segment in a program is the end segment. When the end segment reached, the last segment is maintained.         SP       r/w       base       6118       45004       Float       1        End setpoint of segment 9. This is the target setpoint reached at the end of the ninth segment. The target setpoint and wait setpoint and wait setpoint. When the completed, the controller continues with the last target of approached from the previous valid setpoint. When the completed, the controller continues with the last target setpoint and wait setpoint. When the	
3       step to set-point         4       time to set-point and wait         5       rate to set-point and wait         6       The final setpoint of the previous segment is kept constant for the duration of a segment, the programmer enters the Stop mode (Run LED is off), and by pressing the Start/Stop key (more than 3 s), via the interface, or a digital of a segment in a program is the end segment. When the end segment reached, the last segment in a program is the end segment. When the end segment reached, the last setpoint is maintained.         SP       r/w       base       6118       45004       Float       -1       Image: Float segment in a program is the end segment. When the end segment reached, the last setpoint is maintained.         SP       r/w       base       6118       45004       Float       -1       Image: Float segment in a program is the end segment. When the end segment reached at the end of the ninth segment. The target setpoint reached at the end of the ninth segment. The target setpoint and wait segment in a program is approached from the previous valid setpoint. When the completed, the controller continues with the last targe reached.         Pt       r/w       base       6119       45006       Float       0       Segment time/gradient 9. The duration of a segment directly, or by using the segment time and the setpoint (SP - segment starting setpoint). Whether the setting segment time or the gradient, is defined by means of type parameter (tYPE).         d.Out       r/w       base       6152       45072       Enum<	
4       time to set-point and wait         5       rate to set-point and wait         6       The final setpoint of the previous segment is kept constant for the duration of a segment, the programmer enters the Stop mode (Run LED is off), and by pressing the Start/Stop key (more than 3 s), via the interface, or a digite 7         7       step to set-point and wait         8       The last segment in a program is the end segment. When the end segmen reached, the last sequent in a program is the end of the ninth segment. The target setpoint is maintained.         SP       r/w       base       6118       45004       Float       -1        End setpoint of segment 9. This is the target setpoint reached at the end of the ninth segment. The target setpoint approached from the previous valid setpoint. When the completed, the controller continues with the last target reached.         Pt       r/w       base       6119       45006       Float       0       Segment time/gradient 9. The duration of a segment directly, or by using the segment time and the setpoint (SP – segment starting setpoint). Whether the setting segment time or the gradient, is defined by means of type parameter (tYPE).         d.Out       r/w       base       6152       45072       Enum       ENUM_Spuren       Control outputs 14. A combination of the previous to the previous to the previous the order outputs 14. A combination of the sequence to the output s 14. A combination of the previous the sequence to the previous the previous the sequenchad the output s 14. A combination of t	1 'Pt'.
5       rate to set-point and wait         6       The final setpoint of the previous segment is kept constant for the duration of a segment, the programmer enters the Stop mode (Run LED is off), and by pressing the Start/Stop key (more than 3 s), via the interface, or a digita reached, the last segment in a program is the end segment. When the end segmen reached, the last setpoint of segment 9. This is the target setpoint is maintained.         SP       r/w       base       6118       45004       Float       -1        End setpoint of segment 9. This is the target setpoint is maintained.         SP       r/w       base       6119       45004       Float       -1        End setpoint of segment 9. This is the target setpoint. When the carget setpoint of me previous valid setpoint. When the carget setpoint of me previous valid setpoint. When the last target setpoint from the previous valid setpoint. When the carget setpoint of me previous valid setpoint. When the last target setpoint is maintained.         Pt       r/w       base       6119       45006       Float       0       Segment time/gradient 9. The duration of a segment directly, or by using the segment time and the setpoin (SP – segment starting setpoint). Whether the setting segment time or the gradient, is defined by means of type parameter (tYPE).         d.Out       r/w       base       6152       45072       Enum       ENUM_Spuren       Control outputs 14 - 9. A program can control up to signals: the control outputs 14. A combination of the segment on outputs 54 he open segment t	
6       The final setpoint of the previous segment is kept constant for the duration of a segment, the programmer enters the Stop mode (Run LED is off), and by pressing the Start/Stop key (more than 3 s), via the interface, or a digita step to set-point and wait         8       The last segment in a program is the end segment. When the end segment reached, the last setpoint of segment 9. This is the target setpoint of 2dP 22502         SP       r/w       base       6118       45004       Float       -1       Image: Completed, the last setpoint of segment 9. This is the target setpoint of segment 9. This is the target setpoint. When the end segment is approached from the previous valid setpoint. When the completed, the controller continues with the last target reached.         Pt       r/w       base       6119       45006       Float       0       Segment time/gradient 9. The duration of a segment time and the setpoint (SP - segment time or the gradient, is defined by means of type parameter (tYPE).         d.Out       r/w       base       6152       45072       Enum       ENUM_Spuren       Control outputs 14 - 9. A program can control up to complication of the open comparison of the signals: the control outputs 14 - combination of the signals: the control outputs 14 - 9. A program can control up to complete the set on the signals: the control outputs 14 - Southart to sign	
SP       r/w       base       6118       45004       Float       -1        End setpoint of segment 9. This is the target setpoint is maintained.         SP       r/w       base       6118       45004       Float       -1        End setpoint of segment 9. This is the target setpoint reached, the last setpoint is maintained.         SP       r/w       base       6118       45004       Float       -1        End setpoint of segment 9. This is the target setpoint reached at the end of the ninth segment. The target setpoint reached at the end of the ninth segment. The target setpoint of segment 9. This is the target setpoint. When the completed, the controller continues with the last target reached.         Pt       r/w       base       6119       45006       Float       0       Segment time/gradient 9. The duration of a segment directly, or by using the segment time and the setpoin (SP – segment starting setpoint). Whether the setting segment time or the gradient, is defined by means of type parameter (tYPE).         d.Out       r/w       base       6152       45072       Enum       ENUM_Spuren       Control outputs 14 - 9. A program can control up to signals: the control outputs 14 . A combination of t	
8       The last segment in a program is the end segment. When the end segment reached, the last setpoint is maintained.         SP       r/w       base       6118       45004       Float       -1        End setpoint of segment 9. This is the target setpoint reached at the end of the ninth segment. The target sapproached from the previous valid setpoint. When the last target setpoint is approached from the previous valid setpoint. When the last target setpoint is defined by means of the segment time and the setpoint of segment 9. The duration of a segment directly, or by using the segment time and the setpoint of segment 1 and the setpoint. Whether the setting segment time or the gradient, is defined by means of type parameter (tYPE).         d.Out       r/w       base       6152       45072       Enum       ENUM_Spuren       Control outputs 14 - 9. A program can control up to signals: the control outputs 14. A combination of the completed to every segment time and the setpoint of the segment time completed to every segment time completed to every segment time or the gradient, is defined by means of type parameter (tYPE).	can be re
Initial and the second of t	: has bee
IdP       14310       14310       reached at the end of the ninth segment. The target sapproached from the previous valid setpoint. When the completed, the controller continues with the last target sapproached.         Pt       r/w       base       6119       45006       Float       0       Segment time/gradient 9. The duration of a segment directly, or by using the segment time and the setpoin (SP – segment starting setpoint). Whether the setting segment time or the gradient, is defined by means of type parameter (tYPE).         d.Out       r/w       base       6152       45072       Enum       ENUM_Spuren       Control outputs 14 - 9. A program can control up to signals: the control outputs 14. A combination of the segment time or the gradient, is defined by means of type parameter (tYPE).         d.Out       r/w       base       6152       45072       Enum       ENUM_Spuren       Control outputs 14 - 9. A program can control up to signals: the control outputs 14. A combination of the segment time or the segment tim or the segment time or the segment time or the segme	that is
IndiaIndiaIndia2dP22502approached from the previous valid setpoint. When the completed, the controller continues with the last targePtr/wbase611945006Float0Segment time/gradient 9. The duration of a segment directly, or by using the segment time and the setpoin (SP – segment starting setpoint). Whether the setting segment time or the gradient, is defined by means of type parameter (tYPE).d.Outr/wbase615245072EnumENUM_SpurenControl outputs 14 - 9. A program can control up to signals: the control outputs 14. A combination of the or segment the outputs 14. A combination of the segment time outputs 1.	
Ptr/wbase611945006Float0Segment time/gradient 9. The duration of a segment directly, or by using the segment time and the setpoi (SP – segment starting setpoint). Whether the setting segment time or the gradient, is defined by means of type parameter (tYPE).d.Outr/wbase615245072EnumENUM_SpurenControl outputs 14 - 9. A program can control up to signals: the control outputs 14. A combination of the can be assigned to every segment the output starting setpoint the setting signals: the control outputs 14. A combination of the can be assigned to every segment the output starting setpoint to signals:	
Pt       r/w       base       6119       45006       Float       0       Segment time/gradient 9. The duration of a segment directly, or by using the segment time and the setpoin (SP – segment starting setpoint). Whether the setting segment time or the gradient, is defined by means of type parameter (tYPE).         d.Out       r/w       base       6152       45072       Enum       ENUM_Spuren       Control outputs 14 - 9. A program can control up to signals: the control outputs 14. A combination of the sets of the parameter type parameter type parameter type be assigned to every segment ty	
1dP       14311       1dP       14311       1dP       14311       1dP	
adP       22503       3dP       30695       (SP – segment starting setpoint). Whether the setting segment time or the gradient, is defined by means of type parameter (tYPE).         d.Out       r/w       base       6152       45072       Enum       ENUM_Spuren       Control outputs 14 - 9. A program can control up to signals: the control outputs 14. A combination of the can be assigned to every segment the signal.	
adP       22303       segment time or the gradient, is defined by means of type parameter (tYPE).         d.Out       r/w       base       6152       45072       Enum       ENUM_Spuren       Control outputs 14 - 9. A program can control up to signals: the control outputs 14. A combination of the can be assigned to every segment whereby the signal	
1dP 14344 signals: the control outputs 14. A combination of th	
1dP 14344 signals: the control outputs 14. A combination of th	four dig
can be assigned to every segment, whereby the sign	
3dP     30728   operated while the segment is running. For access to controller's outputs, the signals must be assigned accessed acces	
0 0-0-0-0	
1 1-0-0-0	
2 0-1-0-0	
3 1-1-0-0	
4 0-0-1-0 5 1-0-1-0	
6 0-1-1-0	
7 1-1-1-0	
8 0-0-0-1	
9 1-0-0-1	
10 0-1-0-1	
11 1-1-0-1	
12 0-0-1-1	
13 1-0-1-1	
14 0-1-1-1	
15 1-1-1-1	

Operating Version4

type r/	/w b 1 2	Adr. Integer base 615 1dP 1434 2dP 2253 3dP 3072	3 45074 5 7	51	Value/ Enum_S 0 1 2 3 4 5 6	time to set- rate to set- The final se step to set- time to set- rate to set- The final se of a segmen	-poin poir poir poir etpo nt, t	nt bint of the previous segment is kept constant for the duration 'Pt'. nt int and wait nt and wait bint of the previous segment is kept constant for the duration 'Pt'. At the e the programmer enters the Stop mode (Run LED is off), and can be restart
Name r/ tYPE r/v	/w b 1 2	base 615 1dP 1434 2dP 2253	3 45074 5 7	51	Enum_S 0 1 2 3 4 5	time to set- rate to set- The final se step to set- time to set- rate to set- The final se of a segmen	-poin poir poir poir etpo nt, t	Segment type of segment 10. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuat to next segment is automatic or manual (define a hold time).
tYPE r/	/w b 1 2	base 615 1dP 1434 2dP 2253	3 45074 5 7	51	Enum_S 0 1 2 3 4 5	time to set- rate to set- The final se step to set- time to set- rate to set- The final se of a segmen	-poin poir poir poir etpo nt, t	Segment type of segment 10. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuat to next segment is automatic or manual (define a hold time).
	1 2	1dP 1434 2dP 2253	5 7	Enum	0 1 2 3 4 5	time to set- rate to set- The final se step to set- time to set- rate to set- The final se of a segment	-poin poir etpo poin poir etpo nt, t	setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continual to next segment is automatic or manual (define a hold time). Int nt point of the previous segment is kept constant for the duration 'Pt'. Int int and wait nt and wait point of the previous segment is kept constant for the duration 'Pt'. At the the programmer enters the Stop mode (Run LED is off), and can be restar
SP r/					1 2 3 4 5	rate to set- The final set step to set- time to set- rate to set- The final set of a segment	poir poir poir poir poir etpo nt, t	nt pint of the previous segment is kept constant for the duration 'Pt'. nt int and wait nt and wait pint of the previous segment is kept constant for the duration 'Pt'. At the the programmer enters the Stop mode (Run LED is off), and can be restar
SP r/					2 3 4 5	rate to set- The final set step to set- time to set- rate to set- The final set of a segment	poir poir poir poir poir etpo nt, t	nt pint of the previous segment is kept constant for the duration 'Pt'. nt int and wait nt and wait pint of the previous segment is kept constant for the duration 'Pt'. At the the programmer enters the Stop mode (Run LED is off), and can be restar
SP r/					3 4 5	step to set- time to set- rate to set- The final se of a segment	poir poir poir etpo nt, t	nt int and wait nt and wait bint of the previous segment is kept constant for the duration 'Pt'. At the the programmer enters the Stop mode (Run LED is off), and can be restar
SP r/					4 5	time to set- rate to set- The final se of a segmen	poir poir tpo nt, t	Int and wait nt and wait pint of the previous segment is kept constant for the duration 'Pt'. At the the programmer enters the Stop mode (Run LED is off), and can be restar
SP r/					5	rate to set- The final se of a segme	poir etpo nt, t	nt and wait pint of the previous segment is kept constant for the duration 'Pt'. At the the programmer enters the Stop mode (Run LED is off), and can be restar
SP r/						The final se of a segmen	etpo nt, t	int of the previous segment is kept constant for the duration 'Pt'. At the the programmer enters the Stop mode (Run LED is off), and can be restar
SP r/								e Start/Stop key (more than 3 s), via the interface, or a digital input.
SP r/1					7	step to set-	•	
SP r/					8			ent in a program is the end segment. When the end segment has been ast setpoint is maintained.
	1 2	base 612 1dP 1431 2dP 2250 3dP 3069	14	Float	-1	. (		End setpoint of segment 10. This is the target setpoint that is reached at the end of the tenth segment. The target setpoint is approached from the previous valid setpoint. When the program completed, the controller continues with the last target setpoint reached.
Pt r/	1 2	base 612 1dP 1431 2dP 2250 3dP 3069	3 15	Float	0	(		Segment time/gradient 10. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
d.Out r/	1 2	base 615 1dP 1434 2dP 2253 3dP 3073	8	Enum	ENUM_	Spuren		Control outputs 14 - 10. A program can control up to four digita signals: the control outputs 14. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
FF					0	0-0-0-0		
					1	1-0-0-0		
					2 3	0-1-0-0 1-1-0-0		
						0-0-1-0		
					5	1-0-1-0		
						0-1-1-0		
					7 o	1-1-1-0		
					8 9	0-0-0-1 1-0-0-1		
						0-1-0-1		
					11	1-1-0-1		
						0-0-1-1		
						1-0-1-1 0-1-1-1		
						0-1-1-1 1-1-1-1		

		·							Operating version
ProG									
PArA									
Name		Adr In	nteger	real	Тур	Value	e/off		Description
[					1	T			
tYPE	r/w	base		45078	Enum	Enum_	_SegTyp		Segment type of segment 11. The segment type defines the setpoint behaviour for this segment. The setpoint can be held
		1dP	14347						constant or be changed with a ramp or a step function. Contin
		2dP	22539						to next segment is automatic or manual (define a hold time).
		3dP	30731						
						0	time to se		
						ן כ	rate to se	•	
						2 3	step to se		pint of the previous segment is kept constant for the duration 'Pt'.
						4	•	•	int and wait
						5			nt and wait
						6	The final	setpo	pint of the previous segment is kept constant for the duration 'Pt'. At the
									the programmer enters the Stop mode (Run LED is off), and can be res
						7			e Start/Stop key (more than 3 s), via the interface, or a digital input. int and wait
						8			ent in a program is the end segment. When the end segment has been
						Ū	reached, t	the la	ast setpoint is maintained.
[					1			_	
SP	r/w	base		45012	Float	-1			End setpoint of segment 11. This is the target setpoint that is
		1dP	14314						reached at the end of the eleventh segment. The target setpo approached from the previous valid setpoint. When the progra
		2dP	22506						completed, the controller continues with the last target setpoint
		3dP	30698						reached.
Pt	r/w	base	6123	45014	Float	0			Segment time/gradient 11. The duration of a segment can be
		1dP	14315						defined directly, or by using the segment time and the setpoir
		2dP	22507						difference (SP – segment starting setpoint). Whether the setti
		3dP	30699						for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
				45000	-	EN LLIN			
d.Out	r/w	base		45080	Enum	ENUIV	I_Spuren		Control outputs 14 - 11. A program can control up to four dig signals: the control outputs 14. A combination of these signals
		1dP	14348						can be assigned to every segment, whereby the signals are
		2dP	22540						operated while the segment is running. For access to the
		3dP	30732						controller's outputs, the signals must be assigned accordingly
						0	0-0-0-0		
						1	1-0-0-0		
						2 3	0-1-0-0 1-1-0-0		
						3	0-0-1-0		
						5	1-0-1-0		
						6	0-1-1-0		
						7	1-1-1-0		
						8	0-0-0-1		
						9	1-0-0-1		
						10 11	0-1-0-1 1-1-0-1		
						12	0-0-1-1		
						13	1-0-1-1		
						13 14	1-0-1-1 0-1-1-1		

#### PMA GmbH - Interfacedescription KS90-1P

Code Table

Operating Version4

ProG							
PArA							
Name	r/w	Adr. Ir	iteger	real	Тур	Value/off	Description
type	r/w	base 1dP 2dP 3dP	6157 14349 22541 30733	45082	Enum	Enum_SegTyp	Segment type of segment 12. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continua to next segment is automatic or manual (define a hold time).
						0 time to set-p	point
						1 rate to set-p	
							point of the previous segment is kept constant for the duration 'Pt'.
						<ul><li>3 step to set-p</li><li>4 time to set-p</li></ul>	oint point and wait
							oint and wait
						6 The final set of a segmen	point of the previous segment is kept constant for the duration 'Pt'. At the t, the programmer enters the Stop mode (Run LED is off), and can be restar the Start/Stop key (more than 3 s), via the interface, or a digital input.
						7 step to set-p	oint and wait
							ment in a program is the end segment. When the end segment has been last setpoint is maintained.
SP	r/w	base 1dP 2dP 3dP	6124 14316 22508 30700	45016	Float	-1 [	End setpoint of segment 12. This is the target setpoint that is reached at the end of the twelfth segment. The target setpoint i approached from the previous valid setpoint. When the program completed, the controller continues with the last target setpoint reached.
Pt	r/w	base 1dP 2dP 3dP	6125 14317 22509 30701	45018	Float	o C	Segment time/gradient 12. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
d.Out	r/w	base 1dP 2dP 3dP	6158 14350 22542 30734	45084	Enum	ENUM_Spuren	Control outputs 14 - 12. A program can control up to four digita signals: the control outputs 14. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
<u> </u>	•					0 0-0-0-0	
						1 1-0-0-0	
						2 0-1-0-0 3 1-1-0-0	
						4 0-0-1-0	
						5 1-0-1-0	
						6 0-1-1-0	
						7 1-1-1-0	
						8 0-0-0-1	
						9 1_0_0_1	
						9 1-0-0-1 10 0-1-0-1	
						100-1-0-1111-1-0-1	
						100-1-0-1111-1-0-1120-0-1-1	
						100-1-0-1111-1-0-1	

oue i		·						Operating Version4
ProG								
PArA								
Name		Adr. In	iteger	real	Тур	Value/off		Description
type	r/w	base 1dP 2dP 3dP	6159 14351 22543 30735	45086	Enum	Enum_Seg	Тур	Segment type of segment 13. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continu to next segment is automatic or manual (define a hold time).
						0 tir	ne to set-po	int
							te to set-po	
							•	oint of the previous segment is kept constant for the duration 'Pt'.
							ep to set-po	
							•	int and wait int and wait
						oint of the previous segment is kept constant for the duration 'Pt'. At the the programmer enters the Stop mode (Run LED is off), and can be resta the Start/Stop key (more than 3 s), via the interface, or a digital input. oint and wait		
						8 Th	e last segn	ent in a program is the end segment. When the end segment has been ast setpoint is maintained.
SP	r/w	base 1dP 2dP 3dP	6126 14318 22510 30702	45020	Float	-1		End setpoint of segment 13. This is the target setpoint that is reached at the end of the 13th segment. The target setpoint is approached from the previous valid setpoint. When the program completed, the controller continues with the last target setpoint
<b>.</b>						0		reached.
Pt	r/w	base 1dP 2dP 3dP	6127 14319 22511 30703	45022	Float	0		Segment time/gradient 13. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the settin for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
d.Out	r/w	base 1dP 2dP 3dP	6160 14352 22544 30736	45088	Enum	ENUM_Spi	uren	Control outputs 14 - 13. A program can control up to four digit signals: the control outputs 14. A combination of these signal can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
						0 0-	0-0-0	•
							0-0-0	
							1-0-0	
							1-0-0 0-1-0	
							0-1-0 0-1-0	
							1-1-0	
							1-1-0	
							0-0-1	
							0-0-1	
							1-0-1 1-0-1	
							D-1-1	
							0-1-1	
							1-1-1	
						15 1-		

#### PMA GmbH - Interfacedescription KS90-1P

Code Table

Operating Version4

										operating versions
	ProG									
Ī	PArA									
	Name	r/w	Adr. In	iteger	real	Тур	Value	/off		Description
	type	r/w	base 1dP 2dP 3dP	6161 14353 22545 30737	45090	Enum	Enum_	SegTyp		Segment type of segment 14. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continuat to next segment is automatic or manual (define a hold time).
-							0	time to se	t-poi	int
							1	rate to set	•	
							2			bint of the previous segment is kept constant for the duration 'Pt'.
							3 4	step to se	•	int and wait
							5			nt and wait
							6	The final so of a segme by pressin	etpo ent, g the	pint of the previous segment is kept constant for the duration 'Pt'. At the e the programmer enters the Stop mode (Run LED is off), and can be restart e Start/Stop key (more than 3 s), via the interface, or a digital input.
							7 8			int and wait ent in a program is the end segment. When the end segment has been
							0			ast setpoint is maintained.
	SP	r/w	base 1dP 2dP 3dP	6128 14320 22512 30704	45024	Float	-1 .			End setpoint of segment 14. This is the target setpoint that is reached at the end of the 14th segment. The target setpoint is approached from the previous valid setpoint. When the program completed, the controller continues with the last target setpoint reached.
	Pt	r/w	base 1dP 2dP 3dP	6129 14321 22513 30705	45026	Float	0			Segment time/gradient 14. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
	d.Out	r/w	base 1dP 2dP 3dP	6162 14354 22546 30738	45092	Enum	ENUM_	_Spuren		Control outputs 14 - 14. A program can control up to four digita signals: the control outputs 14. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
-							0	0-0-0-0		
							1	1-0-0-0		
							2 3	0-1-0-0 1-1-0-0		
							4	0-0-1-0		
							5	1-0-1-0		
							6	0-1-1-0		
							7 8	1-1-1-0 0-0-0-1		
							9	1-0-0-1		
							10	0-1-0-1		
							11	1-1-0-1		
							12 13	0-0-1-1 1-0-1-1		
							13	0-1-1-1		

oue i	abie	-							Operating Version4
ProG									
PArA									
Name		Adr. Ir	nteger	real	Тур	Value/	off		Description
type	r/w	base 1dP 2dP 3dP	6163 14355 22547 30739	45094	Enum	Enum_S	бедТур		Segment type of segment 15. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continu to next segment is automatic or manual (define a hold time).
	I					0	time to set	t-poi	int
						1	rate to set	•	
						2			bint of the previous segment is kept constant for the duration 'Pt'.
						3	step to set	•	
						4 5			int and wait nt and wait
						6	The final so of a segme by pressin	setpo ent, g the	bint of the previous segment is kept constant for the duration 'Pt'. At the the programmer enters the Stop mode (Run LED is off), and can be rest e Start/Stop key (more than 3 s), via the interface, or a digital input. int and wait
						8	The last se	egmo	ent in a program is the end segment. When the end segment has been ast setpoint is maintained.
SP	r/w	base	6130	45028	Float	-1.			End setpoint of segment 15. This is the target setpoint that is
0.		1dP	14322						reached at the end of the 15th segment. The target setpoint is
		2dP	22514						approached from the previous valid setpoint. When the program
		3dP	30706						completed, the controller continues with the last target setpoir reached.
Pt	r/w	base 1dP 2dP 3dP	6131 14323 22515 30707	45030	Float	0			Segment time/gradient 15. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the settin for segment time or the gradient, is defined by means of the
									segment type parameter (tYPE).
d.Out	r/w	base		45096	Enum	ENUM_	Spuren		Control outputs 14 - 15. A program can control up to four digi signals: the control outputs 14. A combination of these signa
		1dP	14356						can be assigned to every segment, whereby the signals are
		2dP 3dP	22548 30740						operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
						0	0-0-0-0		
						1	1-0-0-0		
						2 3	0-1-0-0 1-1-0-0		
						4	0-0-1-0		
						5	1-0-1-0		
						6	0-1-1-0		
						7	1-1-1-0		
						8	0-0-0-1		
						9 10	1-0-0-1 0-1-0-1		
						10	1-1-0-1		
						12	0-0-1-1		
						13	1-0-1-1		
						14	0-1-1-1		
						15	1-1-1-1		

Operating Version4

								operating versions
Pro	ЭG							
PA	rA							
Name	;	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
type		r/w	base 1dP 2dP 3dP	6165 14357 22549 30741		Enum	Enum_SegTyp	Segment type of segment 16. The segment type defines the setpoint behaviour for this segment. The setpoint can be held constant or be changed with a ramp or a step function. Continua to next segment is automatic or manual (define a hold time).
L						I	0 time to set-p	oint
							1 rate to set-po	
								point of the previous segment is kept constant for the duration 'Pt'.
							<ul><li>3 step to set-p</li><li>4 time to set-p</li></ul>	oint oint and wait
								bint and wait
							6 The final set of a segment by pressing t	point of the previous segment is kept constant for the duration 'Pt'. At the t, the programmer enters the Stop mode (Run LED is off), and can be restan he Start/Stop key (more than 3 s), via the interface, or a digital input.
								oint and wait nent in a program is the end segment. When the end segment has been
								last setpoint is maintained.
SP		r/w	base 1dP 2dP 3dP	6132 14324 22516 30708		Float	-1 🗆	End setpoint of segment 16. This is the target setpoint that is reached at the end of the 16th segment. The target setpoint is approached from the previous valid setpoint. When the program completed, the controller continues with the last target setpoint reached.
Pt		r/w	base 1dP 2dP 3dP	6133 14325 22517 30709		Float	0	Segment time/gradient 16. The duration of a segment can be defined directly, or by using the segment time and the setpoint difference (SP – segment starting setpoint). Whether the setting for segment time or the gradient, is defined by means of the segment type parameter (tYPE).
d.Out		r/w	base 1dP 2dP 3dP	6166 14358 22550 30742		Enum	ENUM_Spuren	Control outputs 14 - 16. A program can control up to four digital signals: the control outputs 14. A combination of these signals can be assigned to every segment, whereby the signals are operated while the segment is running. For access to the controller's outputs, the signals must be assigned accordingly.
							0 0-0-0-0	
							1 1-0-0-0	
							2 0-1-0-0 3 1-1-0-0	
							4 0-0-1-0	
							5 1-0-1-0	
							6 0-1-1-0	
							7 1-1-1-0 8 0-0-0-1	
							9 1-0-0-1	
							10 0-1-0-1	
							11 1-1-0-1	
							12 0-0-1-1 13 1-0-1-1	
							14 0-1-1-1	

ode T	able	e						Operating Version4
ProG								
Signa	al							
Name		Adr. Ir	nteger	real	Тур	Value/off		Description
St.Prog	r	base 1dP 2dP 3dP	6050 14242 22434 30626	44868	Int	0255		The programmer's status contains bit-wise coded data, e.g. whic point of the program sequence the program has reached.
							) 'Run 'End 'Res 'Star 'Ban	' et' 'tFlankMissing' dHold + FailHold'
SP.Pr	r	base 1dP 2dP 3dP	6051 14243 22435 30627		Float	-1 0		
T1.Pr	r	base 1dP 2dP 3dP	6052 14244 22436 30628		Float	0		Only with a running program. The net (elapsed) time of the programmer is shown in a simplified form as time elapsed since program start.Caution: Stop times are not counted! If the first segment is defined as a gradient, the program starts at the proce value, whereby the offset is defined as the time that the control would have needed with the gradient beginning at the setpoint valid at program start.
T3.Pr	r	base 1dP 2dP 3dP	6053 14245 22437 30629		Float	0		Only with running program. The remaining programmer time is given by the sum of the currently running segment plus the times the remaining program segments (without hold times).
T2.Pr	r	base 1dP 2dP 3dP	6054 14246 22438 30630		Float	0		Only while program is running. The net segment time correspond to the elapsed segment time.Caution: Stop times are not counter the first segment has been defined as a gradient, the start commences at process value, and the offset specified for the first segment corresponds to the time that the controller would have required with a gradient beginning at the actual process value when the program was started.
T4.Pr	r	base 1dP 2dP	6055 14247 22439		Float	0		Only with running program. The remaining time of the running program segment (without hold times).

		2dP 3dP	22439 30631				
SG.Pr	r	base 1dP 2dP 3dP	6056 14248 22440 30632	44880	Int	016	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.
Pr.SG	r/w	base 1dP 2dP 3dP	6060 14252 22444 30636	44888	Int	116	Segment number for Preset. Preset involves starting the selected program with a different segment than the normal (1st) start segment. The starting setpoint of the preset segment becomes effective immediately, i.e. the program is not started. To use the Preset function, the programmer must be in the Stop or Reset state.

# 22 ProG

Signal							
Name	r/w	Adr. Ir	nteger	real	Тур	Value/off	Description
Pr.EF	r	base		44882	Int	016	Number of the active program. The program remains active until a reset or a new start is triggered.
		1dP	14249				reset of a new start is inggered.
		2dP	22441				
		3dP	30633				
SP.En	r	base	6058	44884	Float	-1 [	
		1dP	14250				
		2dP	22442				
		3dP	30634				

#### 23 SEtP

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

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

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

## 24 Tool

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



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