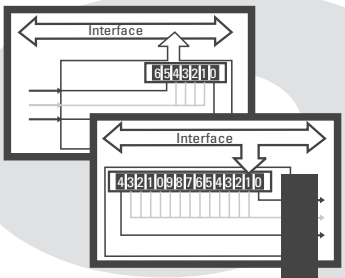
PMA Prozeß- und Maschinen-Automation GmbH

Multi-function unit KS 98-1



ISO1745

KS98-1

Interface description

ISO 1745 protocol

9499 040 82911

vailid from: 8439

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Content

1. Hints on operation

If multi-function unit KS 98-1 is equipped with module B (option), a serial, bussable interface for transmission of process values, parameters and configuration data is available. Connection is via the instrument rear. The serial communication interface permits connection to supervisory systems, visualization tools, etc.
Various serial interface versions are available.
A TTL and an RS485/422 hardware interface are realized.

Communication is according to the master/slave principle. KS 98-1 is always slave. The serial interface software is implemented as standard in the firmware.

The front-panel PC interface is also provided as standard. This interface is used for connection of the engineering tool running on an external PC.

1.1. Interface connection

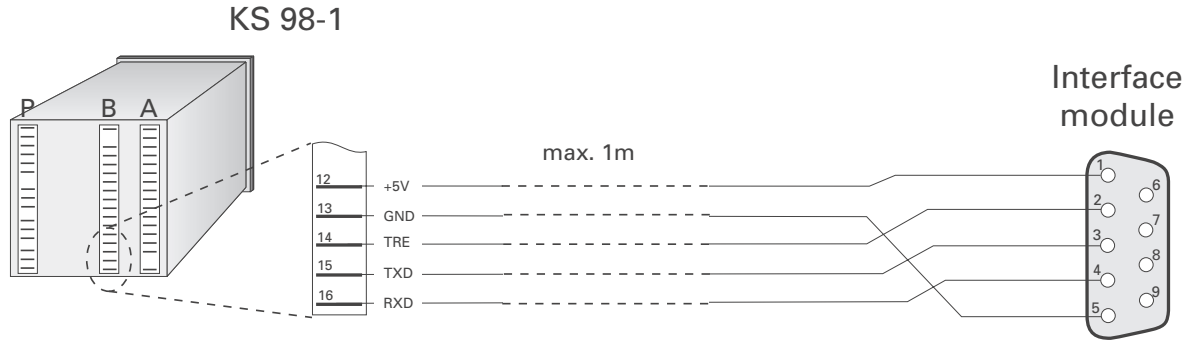
The interface hardware is implemented on module B. The serial interface is connectable via connector B.
The following option is available:

- Option : rear serial interface,
  TTL-based physical signals;
  Protocols: ISO1745
  12 NC: 9407 xxx 1xxxx

- Option 2: rear serial interface,
  selectable RS485/RS422-based physical signals;
  Protocols: ISO1745
  12 NC: 9407 xxx 2xxxx

1.1.1 TTL interface version

The 'serial TTL interface' option is a low-priced version for connecting up to 4 units to an interface module 9404 429 980x1.

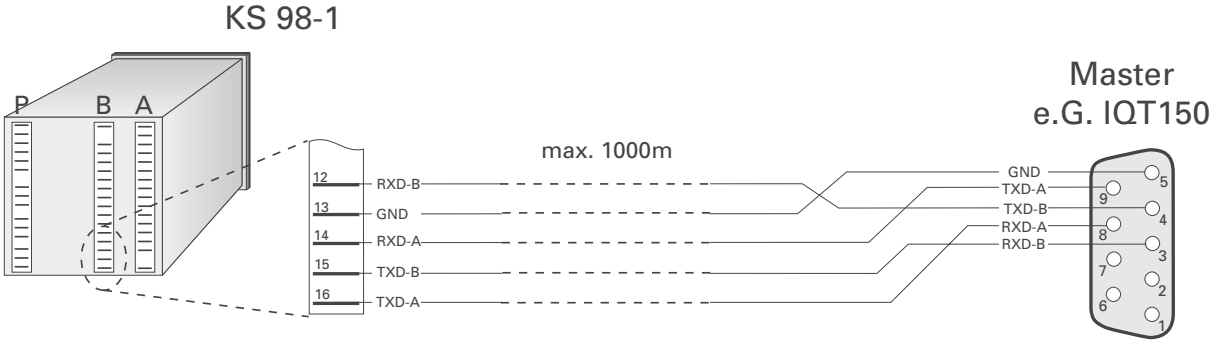


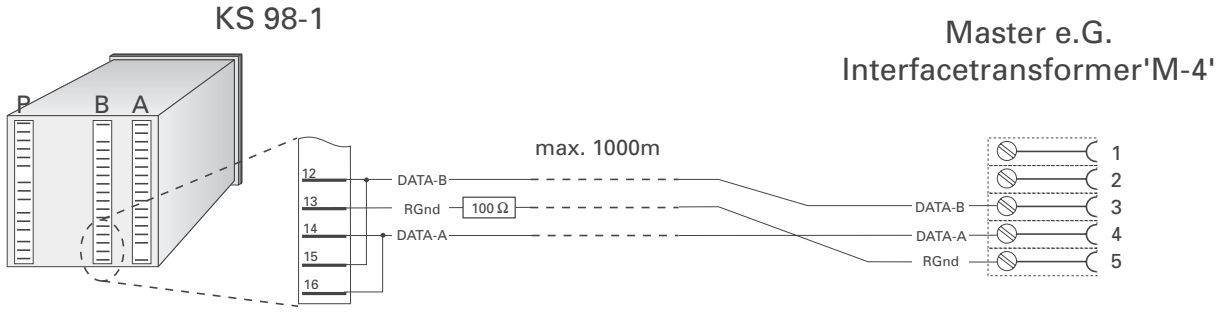
The connector is designed for using interface cable 9404 407 50011 for connection to the interface module. In the interface module, the connections of the instrument interfaces are galvanically connected with the bus interface and galvanically isolated from the supply voltage.

1.1.2 RS485/422 interface version

Another module B version offers an RS485 or an RS422 interface. 'RS422' in the sense of this product means a 4-wire RS485 interface. A driver for receiving and a driver for sending are available.

With 2-wire RS485, the lines for receiving and sending must be galvanically connected.





If an RGND connection is required with a setting for RS485, a 100Ohm resistor must be fitted between terminal 13 (GND) and terminal 5 on the interface transformer.
The outputs are galvanically isolated.

The interface mode is half-duplex.

Appropriate cabling must be provided by the user, whereby the general specifications for cables and the signal specifications acc. to EIA RS485 must be taken into account.

2. Interface protocol

2.1. Protocol layer 1

Physically, bus connection is:

- via module B as TTL interface to the interface module (12NC: 9404 429 980x1), which is fitted with an RS422/485 interface with a 9-pole sub-D-connector socket towards the bus. Max. four controllers can be connected to this module.
- directly via an RS485/422 connection on module B.
- via the front-panel PC interface as TTL signal.

2.1.1 Data format

The following firmly set transmission format must be used:

- 1 start bit
- 7-bit ASCII value or 7-bit binary
- 1 parity bit (EVEN)
- 1 stop bit

LSB is sent first, MSB is parity bit.

2.1.2 Baudrate

The Baudrate for the serial interface is adjustable, e.g. via the local operation. The following Baudrates are possible:

- 2400 Baud
- 4800 Baud
- 9600 Baud
- 19200 Baud

2.1.3 Parity

Parity detection is firmly adjusted to EVEN.

2.1.4 Addressing

KS 98-1 can be operated with instruments KS 92/94, KS 4580, KS 4770, DIGITAL 380 and PRO 96 as well as the ICS 90 and ITS 90 systems at the same bus. Decisive for instrument selection is the address (2 bytes).

The KS 98-1 (0...99) address is adjustable via the main menu
(`General Data` → `Instrument data` → `Addr.`).

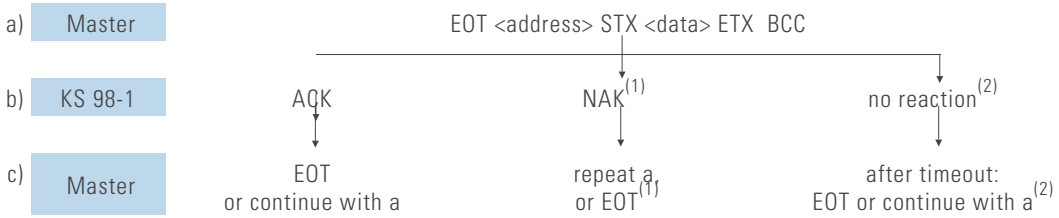
2.2. Protocol layer 2

A rigid master/slave principle is used, whereby KS 98-1 is always slave. Communication control (communication start and cancellation by EOT) is always by the master.

Two data communication services are available:

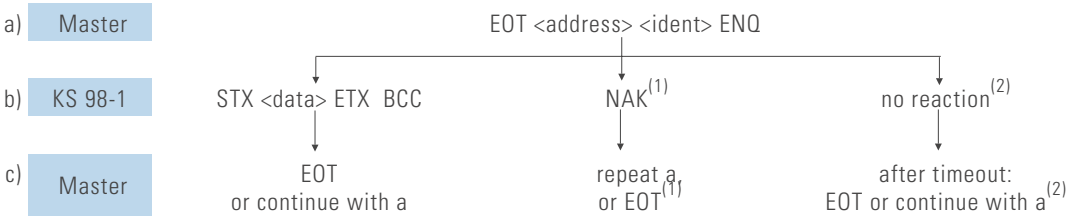
- for data sending: SDA (Send Data with Acknowledge)
  Data sending, acknowledged by KS 98-1

Data flow direction : Master → KS 98-1



- for data request: RDR (Request Data with Reply)
  Data request with reply in one communication cycle.

Data flow direction : KS 98-1 → Master



2.2.1 Transmission control characters

The following transmission control characters are used:

Abbreviation	HEX	Description
STX	02	Start of Text - data start
ETX	03	End of Text - data end
EOT	04	End of Transmission - Reset of units connected to the interface or transmission cancellation
ENQ	05	Enquiry - enquiry for reply
ACK	06	Acknowledge - acknowledgement
NAK	15	Not Acknowledge - no acknowledgement

2.2.2 Character format

Numbers and characters in the address, identification or data field are always transmitted as ASCII characters.
The following 7-bit ASCII characters with parity (EVEN) are valid

CHR	HEX	Description
,	2C	comma as separator
=	3D	separator between identification and value
0...9	30...39	values for numbers and codes
B	42	additional for codes
:...?	3A...3F	values for floating point format (FP)
@...I	40...7F	values for status and control bytes
...I	20...7F	characters for text string (CHAR16)
.	2E	decimal point

1) Possible after disturbance of transmission or after sending inadmissible data.
(2) Possible after KS 98-1 failure, bus failure or faulty address specification.

3. Message structure

3.1. Message elements

The terms used in the following description are explained below:

Element	Description	Rem.
<addr>	Address of a unit connected to the interface, always 2 bytes long, adjustable at the instrument	A
<data>	data field composed of a) fields <ident> a. <value>, separated by character '=' b) a series of <value> with some block accesses	B
<ident>	identification field composed of a) field <code> and b) additional selection criteria <selection> dependent of the individual case	C
<value>	value of a datum, which is addressed with the key.	
<code>	address key of a datum, 2-digit, range decimal numbers, first digit also 'A' to 'F'.	D
<selection>	further address field for selection of <function block no> a. <function no>	E
<BCC>	Block Check Count. All characters between STX (exclusive) and ETX (inclusive) are EXOR-connected bytewisely and output as 1 byte, always after ETX.	F

Bem.A Address field

The address field can be transmitted only after 'EOT' and is therefore generated only by the master. It is two bytes long. The address number range is 00 ... 99. If the address sent corresponds to the one stored in the unit, the message is intended for this unit.

Bem.B Data field

The data field contains the parameters and data to be transmitted.

The equality sign is followed by the value of a datum (<valuex>). Several data are separated by a comma. The data type depends on the access. The last value before 'ETX' ends without ','.

Additional selection criteria with block read accesses are specified only once. The data follow without further identification to increase the compacity of the message structure.

- Special value definition:
  -32000 switch-off function (display '□□')

Bem.C Identification field

The identification field addresses a defined datum or data range in the unit. It comprises a code and an additional selection ident with some accesses.

With a data request, the identification field serves to inform KS 98-1 which data are expected to be sent by KS98. These data always follow on the address field. They are also specified for clear determination of the datum in the reply, followed by the data field with separator "=".

With data sending, STX is followed by the identification field for addressing the values to be sent. The data field with character "=" is appended.

Bem.D Code

The code identification is two bytes long and the value range includes ASCII '00'...'99' and 'B1'... 'B4'.

Bem.E Additional selection criteria

To form a purposeful sub-quantity from the large number of data, additional selection criteria are defined:

- Function block
  A function block is addressed with a function block number. It covers range '0' to '250' and is appended to the code field with a comma.

'<code>,<FB no.>'

Function block number ranges:

- 0 general data for the overall instrument
- 1 - 99 firmly adjusted function blocks
- 100 - 250 variable function blocks

The function block number can be allocated freely for variable function blocks in the engineering tool.

- Function
  A function as partial address of a function block is addressed with a function number. It covers range '0' to '99' and is appended to the function block number with a comma.

'<code>,<FB no.>,<fct. no.>'

Function number ranges:

- 0 first general function, default values, unless a no. is specified
- 1 - 79 function for addressing further data ranges dependent of type no.
- 80-84 special function display text, dependent of type no.
- 85-89 special function special data, dependent of type no.

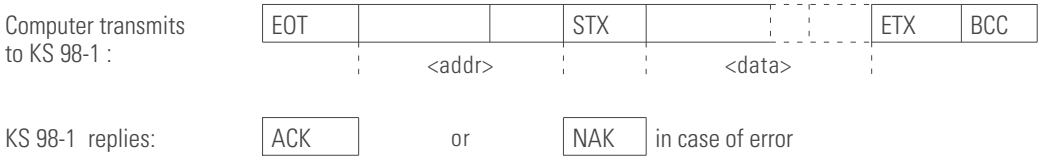
Bem.F Safety procedure

Correct transmission of a message is supported by two safety procedures:

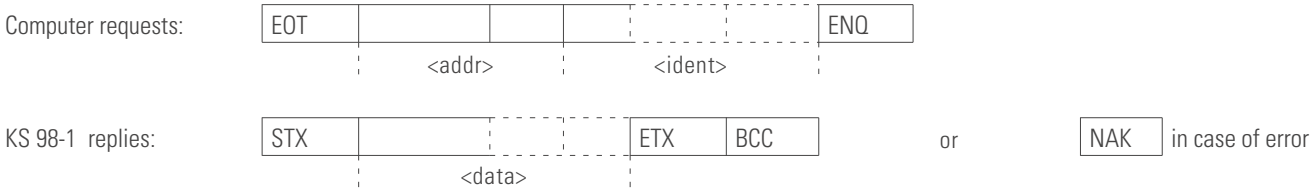
- check of each message byte by formation of parity (1 bit per 7 data bits)
- Check by Block Check Count : safety part, which connects all characters of a message between STX (excl.) and ETX (incl.) by a logic XOR function; length 1 byte, follows always after ETX.

3.2. Basic message structure

Message structure with data sending:



Message structure with data request:



3.3. Data types

Values of data are divided into data types for transmission. Only characters which can be ASCII-coded are permitted. Data sent by the master should be transmitted without leading zeros, to ensure a maximum number of values to be transmitted.

- BCD (floating point number in BCD-ASCII format)
  Range: -29999 ... -0.001, 0, 0.001 ... 200000
  optional: negative sign a. decimal point permitted; exponential representation not permitted.
  With received data, number of digits and position of comma are not fixed and depend on the FP resolution. The values are not rounded off.
  Switch-off value for BCD data is : -32000

- INT (positive integer number in ASCII format)
  Range: 0 ... 32767
  Exception: switch-off value '-32000'

- ST1 (status, bit-oriented, 1 byte length)
  Range: 00H ... 3FH, transmitted as: 40H...7FH
  Only 6 bits can be used for transmission of information, i.e. bit 0...5 (LSB = bit 0). Bit 6 must always be set to '1' to avoid confusion with the control characters. Bit 7 contains the parity bit.

- CHAR[16]
  Text string comprising 16 characters
  permissible characters 20FH ... 7FH

- ICMP (Integer Compact)
  Bit information as integer transmission, max. 15 bits
  Range: 0...32767; integer transmission in the ASCII format.

	fixed to '0'	signification of bits														
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Value	-	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1

- Example:
  Bit 13 = 1 and bit 1 = 1, all remaining bits are '0'
  internal hex value: 0x2002, as integer value: 8194, transmitted ASCII value: '8194'

- SYS16
  System identification number, 16 Bytes
  Format: xx,yyyyyyyy,zzzz (⟶ Page 12)

4. Standard protocol

Only the system identification number can be read in the standard protocol.

CODE table:

Code	Description	R/W	Type	Range	Description	Rem.
18	System ident	R	SYS16		System detection	A

Bem.A Instrument data

System identification number (code 18)

For instrument identification, instrument type and software code number can be read via code 18. The datum is composed of the following components:

Instrument type: (23 = KS98)
SW code number: (the last eight digits)
Instrument version: 7th to 10th digit of 12NC (4 digits)

Example:
The computer requests the system identification (code 18) from KS 98-1 with address 01.

Computer requests:

EOT	0	1	1	8	ENQ
	<addr>		<code>		

KS 98-1 replies:

STX	1	8	=	23,15725420,5210	ETX	BCC
	<code>			<val>		

5. Function block protocol

5.1. Principles of the function block protocol

A function block has input and output data (process data), parameters and configuration data. It is addressable via a block number. An allocated type number defines the relevant function.

The access mechanisms are:

5.1.1 Individual access

With this access (code xx), an individual process, parameter or configuration value of a function block can be read or written.
Unless a value is specified for "function", function 00 (general) is specified as default.

Example 1: (message structure with data sending)
Transmission of the absolute correcting variable (Y_{man}) to CONTR+ .

Computer transmits data to KS98:	EOT	0	2	STX	3	6	,	1	0	0	,	1	=	5	0	ETX	BCC
		Addr			Code			FB no.				Fct. no.		Value			

KS 98-1 replies: ACK or NAK in case of error

Example 2: (message structure with data request)
Reading the max. limitation of INTE (integrator).

Computer requests:	EOT	0	2	4	4	,	1	2	1	,	2	0	ENQ
		Addr		Code			FB no.				Fct.no.		

KS 98-1 replies:	STX	4	4	=	7	9	ETX	BCC
		Code			Value			

5.1.2 Block access (tens block)

With this access (code x0), max. nine process values of a function can be read.

Example: (message structure with data request)
Reading of values (W_{nvol}, W_{vol}, ΔY and Y_{abs}) from CONTR+ .

Computer requests:	**EOT**	0	2	3	0	,	1	0	0	,	1	**ENQ**
		Addr		Code			FB no.				Fct.no.	

KS 98-1 replies:	**STX**	3	1	=	5	0	,	3	2	=	7	9	,	3	3	=	1	0	,	3	4	=	5	0	**ETX**	**BCC**
		Code			Value1			Code			Value2			Code			Value3			Code			Value4			

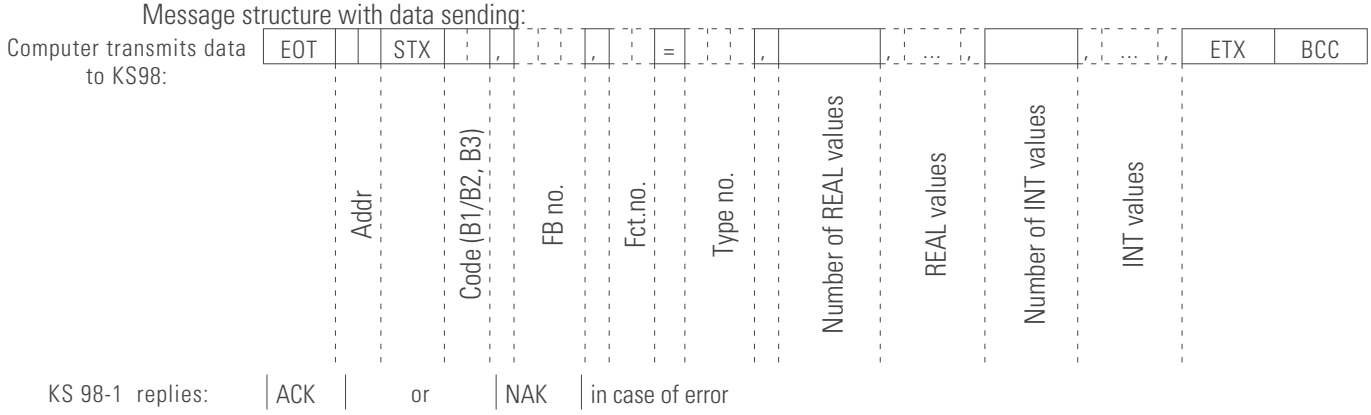
5.1.3 Block access (overall block)

With this access, all I/O (code B1), parameter (code B2), configuration data (code B3) and display texts (code B2) of a function can be read or written. The following conditions are applicable for this access:

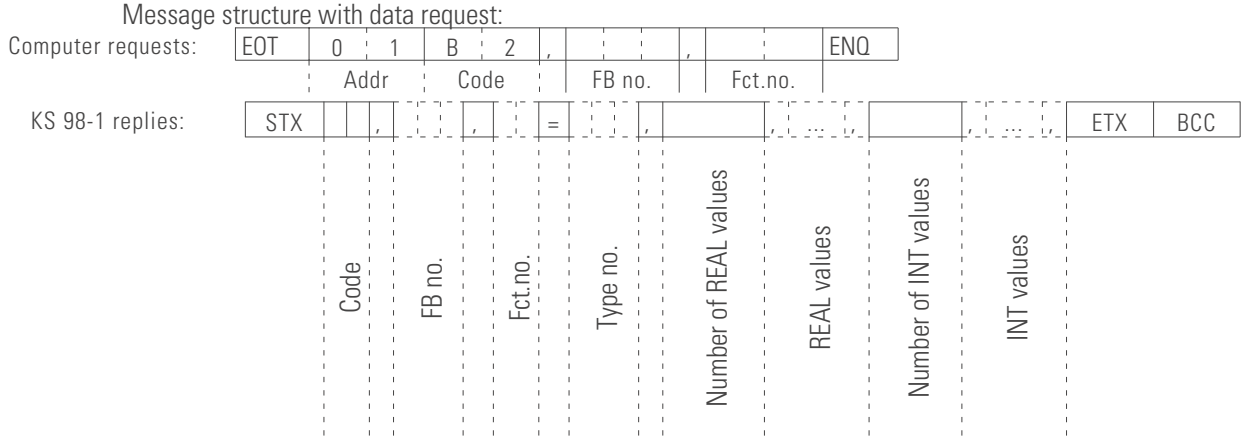
- For writing data with 'code B3' or 'code B2' with fct. no. ≥ 80, the instrument must be switched to the 'offline' mode. All new configuration data and parameters are effective only after the instrument was switched back to online.
- All data of a message must be defined. Omissions are not permissible.
- The complete message must also be specified, if parts of a message in the instrument (HW and SW options) are not used. Checking of the non-existing data is omitted.
- With faulty block write accesses, the following information is applicable: a message is replied with NAK, if at least one datum is faulty. All transmitted valid data of a message are rejected.
- If the function number is omitted, function 0 (general) is addressed.

The general structure of a message with block accesses with code B1/B2/B3 is shown below.

Message structure with data sending:



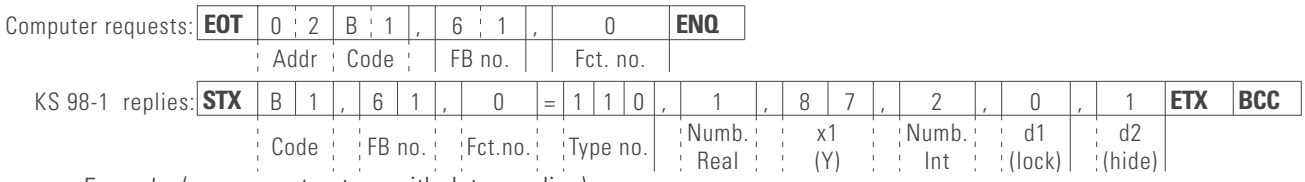
Message structure with data request:



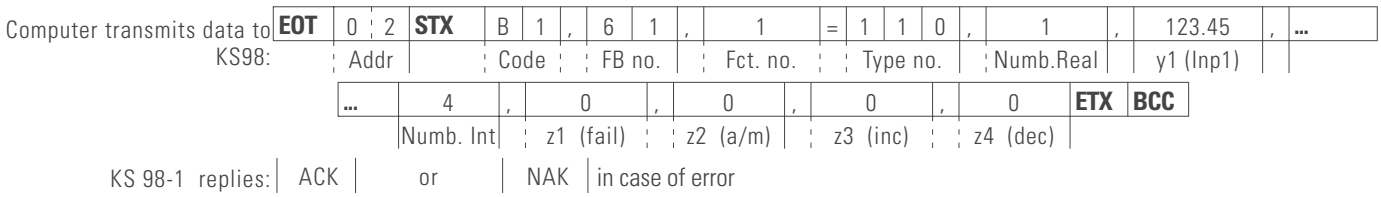
5.1.4 Examples for overall block accesses

I/O data (code B1)

I/O data of a function block can be read or written[1] via the B1 access.
Example: (message structure with data request)
AINP1 input value reading.



Example: (message structure with data sending)
Writing the AINP1 output values. The written values are effective with 1 specified in Debug (→ see page 18).



[1] Only output data of function blocks INP1 ... INP6 and DINP can be written.

Trend data of VTREND (code B1)

The 125 only readable trend data of function VTREND can be read in four B1 accesses with fct. no. 80 ... 84 (⟶ see also page 44).
Example: (message structure with data request)
Reading trend data 75 .. 100.

Computer requests:

EOT	0	2	B	1	,	1	1	0	,	8	3	**ENQ**
	Addr		Code			FB no.				Fct. no.		

KS 98-1 replies:

STX	B	1	,	1	1	0	,	8	3	=	9	9	,	25	,	8.001	,	9.995	,	12.003	,	14.002	,	16.001	,	...
	Code			FB no.				Fct.no.			Type no.			Numb. Real		25 trend data										

...	55.982	,	58.002	,	1	,	32	**ETX**	**BCC**
	trend data				numb. int		index		

Parameter data (code B2)

The access via code B2 permits groupwise parameter data reading and writing.
Example: (message structure with data request)
TIME1 parameter reading.

Computer requests:

EOT	0	2	B	2	,	1	0	1	,	0	**ENQ**
	Addr		Code			FB no				Fct no.	

KS 98-1 replies:

STX	B	2	,	1	0	1	,	0	=	6	9	,	2	,	0	,	0	,	0	**ETX**	**BCC**
	Code			FB no.				Fct.no.		Type no.			Numb. Real		T1		T2		Numb. Int		

Example: (message structure with data sending)
TIME1 parameter writing

Computer transmits data to KS98:

EOT	0	2	**STX**	B	2	,	1	0	1	,	0	=	6	9	,	2	,	0	,	0		,	0	**ETX**	**BCC**
	Addr			Code			FB no.				Fct. no.		Type no.			Numb. Real		T1		T2			Numb. Int		

KS 98-1 replies: | ACK | or | NAK | in case of error

Display texts (code B2)

This access permits groupwise reading and writing of display texts. A text always comprises 16 caracters and is of the CHAR(16) type. Writing is possible only during off-line (configuration mode).
Example: (message structure with data request)
VTREND display text reading.

Computer requests:

EOT	0	2	B	2	,	1	1	0	,	8	0	**ENQ**
	Addr		Code			FB no.				Fct no.		

KS 98-1 replies:

STX	B	2	,	1	1	0	,	8	0	=	9	9	,	0	,	2	,	VTREND	,	_UNIT_	**ETX**	**BCC**
	Code			FB no.				Fct. no.			Type no.			Numb. Real		Numb. Int		<Text 1>		<Text 2>		

Example: (message structure with data sending)
VTREND display text writing

Computer transmits data to KS98:

EOT	0	2	**STX**	B	2	,	1	1	0	,	8	0	=	9	9	,	0	,	2	,	XTrend	,	Bar	**ETX**	**BCC**
	Addr			Code			FB no				Fct.no.			Type no.			Numb. Real		Numb. Int		<Text 1>		<Text 2>		

KS 98-1 replies: | ACK | or | NAK | in case of error

Password (code B2)

Example: (message structure with data sending)
Set / change / delete password. This access is permitted unless a password exists already, or in the 'logged-in' condition.

Computer transmits data to KS98:	**EOT**	0 2	**STX**	B 2	,	0	,	8 0	=	0	,	0	,	1	,	ABC...NOP	**ETX**	**BCC**
		Addr		Code		FB no.		Fct. no.		Type no.		Numb. Real		Numb. Int		Password (16 characters)		

KS 98-1 replies:	ACK	or	NAK	in case of error

Example: (message structure with data sending)
Logging in (password entry). This access is always permitted.

Computer transmits data to KS98:	**EOT**	0 2	**STX**	B 2	,	0	,	8 1	=	0	,	0	,	1	,	ABC...NOP	**ETX**	**BCC**
		Addr		Code		FB no.		Fct. no.		Type no.		Numb. Real		Numb. Int		Password (16 characters)		

KS 98-1 replies:	ACK	or	NAK	in case of error

Example: (message structure with data sending)
Logging out (password activation). This access is permitted, if a password exists (password status = 1 or 2)

Logging out	**EOT**	0 2	**STX**	2 3	,	0	,	4	=	2	**ETX**	**BCC**
		Addr		Code		FB no		Fct.no.		Logging out		

KS 98-1 replies:	ACK	or	NAK	in case of error

Configuration data (code B3)

The access via code B3 permits groupwise reading and writing of configuration data. For writing configuration data, the unit must be switched to the configuration mode: All newly entered configurations are effective only, when switching the unit back to on-line.
Example: (message structure with data request)
TIME1 configuration reading.

Computer requests:	**EOT**	0 2	B 3	,	1 0 1	,	0	**ENQ**
		Addr	Code		FB no		Fct.no.	

KS 98-1 replies:	**STX**	B 3	,	1 0 1	,	0	=	6 9	,	0	,	1	,	0	**ETX**	**BCC**
		Code		FB no.		Fct. no.		Type no.		Numb.Real		Numb.Int		Select		

Example: (message structure with data sending)
TIME1 parameter writing.

Switching KS 98-1 to off-line	**EOT**	0 2	**STX**	2 1	,	0	,	0	=	1	**ETX**	**BCC**
		Addr		Code		FB no.		Fct.no.		OpMode		

KS 98-1 replies:	ACK	or	NAK	in case of error

Computer transmits data to KS98:	**EOT**	0 2	**STX**	B 3	,	1 0 1	,	0	=	6 9	,	0	,	1	,	1	**ETX**	**BCC**
		Addr		Code		FB no.		Fct. no.		Type no.		Numb. Real		Numb. Int		Select		

KS 98-1 replies:	ACK	or	NAK	in case of error

Switch KS 98-1 to on-line	**EOT**	0 2	**STX**	2 1	,	0	,	0	=	0	**ETX**	**BCC**
		Addr		Code		FB no.		Fct. no.		OpMode		

KS 98-1 replies:	ACK	or	NAK	in case of error

6. Code tables

6.1. Scheme of addressing data

The adressing of the data follows the principle described below:

Code datarange	***codenumber-range***
Level 1-data	
-Read-only , ("Block 00")	0x, (1x)
-Read/Write integer values	2x
-Read/Write real values	3x
Parameter	4x, 5x, 6x
Config-data	7x, 8x, 9x

Function-no. datarange	***function number-range***
Level 1-data	0 ... 19
Parameter	
- Real parameter	20 ... 24
- Integer parameter	25 ... 29
Config-data	
- Real configurations	30 ... 34
- Integer configurations	35 ... 39
Special fct. display texts	80 ... 84
Special fct. special data	85 ... 89

For Level 1 - data with code-ranges 0x and 1x effective:

- **Values 01, 02 and. 11, 12 are reserved for statuswords type ST1.**
- **Max. 7 further values type BCD**

Blockreading (10-block) access is possible, if defined, writing only as single access.

6.2. Header structure

The signification of the header inscription is:

Des.	Description	Range	R/W	Def.	Type	Rem.	Code	Fct.no.
Short name	Short description of value	Range	R = read W= write R/W = read and write	default value (with param. and config. data)	data type (→ S.11)	Remark	Access code	Function number

The column R/W is dropped if within a table reading and writing is allowed (see e.g. configuration- or parameterdata).

6.3. Instrument function

INSTRUMENT (instrument function - no. 0) Fixed block number 0

Process data

Des.	Description		Range	R/W	Type	Rem.	Code	Fct.no.
Block	Block access		01, 02	R	block		00	0
Status 1	Instrument status 1			R	ST1	A	01	0
Status 2	Instrument status 2			R	ST1	B	02	0
Block	Block access			R	block		20	0
OpMode	Instrument mode:	Online	0	R/W	INT		21	0
		Offline (configuration)	1					
		Cancel configuration	2	R				
Save	Safety status:	not active	0	R/W	INT		22	0
		active	1					
ResUpd	Reset of local data change	not changed	0	R/W	INT	C	23	0
		changed	1	R				
ClearE	Delete engineering	not deleted	0	R	INT		24	0
		deleted / delete	1	R/W				
Wire	Finish wiring	not finished	0	R	INT		25	0
		finished / finish	1	R/W				
Debug	Debug mode		0..127	R/W	INT	D	26	0
PwFChk	Activate power fail check	not active	0	R	INT		27	0
		active / activate	1	R/W				
WriteOK	Write permission for field interface	read and write permission	0	R/W	INT		28	0
		only read permission	1					
Block	Block access		01	R	block		00	1
Status 3	Instrument status 3			R	ST1	E	01	1
Block	Block access		21 .. 27	R	block		20	1
HWbas	Basic HW option: module A, B		2101..2999	R	INT	F	21	1
HWext	Ext. HW option: module B, C		0000..9999	R	INT	G	22	1
SWopt	SW option		0000..9999	R	INT	H	23	1
SWcode	SW code number (7th to 10th digit)		7254	R	INT	I	24	1
SWvers	SW version (SW code number 11th - 12th digit)		0000..0099	R	INT	J	25	1
OPvers	Operating version		0000..0099	R	INT		26	1
EEPvers	EEPROM version		0000..0099	R	INT		27	1
Block	Block access		21 .. 23	R	block		20	2
WrErr	Error during last write access		0, 100..127	R	INT		21	2
WrErPos	Position of last write access		0..99	R	INT		22	2
ReErr	Error during last read access		0, 100..127	R	INT		23	2
Block	Block access		21, 22	R	block		20	3
Addr	Interface address:	ISO 1745	0 .. 99	R/W	INT	K	21	3
		PROFIBUS	0 .. 126					
AdrFl	Flag for address changing disabled		0 / 1	R/W	INT		22	3
Block	Block access		21 .. 23	R	block		20	4
PasMod	Password mode		0 .. 3	R/W	INT	R	21	4
PasVer	Password attempts		0 .. 99	R/W	INT	M	22	4
PasSt	Password status	No password existing	0	R/(W)	INT		23	4
		Password existing (in logged-in condition)	1					
		Password existing (in logged-out condition)	2					
Refresh	activate/deactivate fast parameterchannel transmission		0...1	S	INT		31	98

Rem. Instrument 'status 1'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	XFail	Sensor failure (common message)	no	yes
D1	CNF	Instrument status	online	configuration
D2		Safety status	not active	active
D3		EEPROM error	no	yes
D4		Power-fail check	not active	active
D5	UPD	Parameter update	no	yes
D6	'1'	Always '1'		
D7		Parity		

Rem.A Instrument 'status 2'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0		Engineering existing	no	yes
D1		Wiring finished	no	yes
D2		Parameter display by operation	possible	blocked
D3		Configuration display by operation	possible	blocked
D4		Main menu display by operation	possible	blocked
D5		Field interface	read/write	read
D6	'1'	always '1'		
D7		Parity		

Rem.B Parameter update bit 'ResUpd'

Changing of a parameter value or of a configuration value via the local front panel or the PC interface is displayed in the status1 UPD flag. After power recovery, this bit is also set. The flag can be reset with code 23 = 0.

Rem.C Debug

Used for storage of the I/O data written with AINPx and DINPUT.

2^6	2^5	2^4	2^3	2^2	2^1	2^0
DINPUT	AINP6	AINP5	AINP4	AINP3	—	AINP1

Example: The outputs of AINP1 and AINP5 shall be specified via the interface. In this case, 9 must be specified in 'Debug'.

Rem.D Instrument 'Status 3'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0		Bus access not successful	no	yes
D1		Parameter setting faulty	no	yes
D2		Configuration faulty	no	yes
D3		No traffic of useful data	no	yes
D4		Data status channel 1 .. 4	ok	faulty
D5		Address changing disabled	no	yes
D6	'1'	Always '1'		
D7		Parity		

Rem.E HWbas (basic HW option: module A, B)

	Instrument type (Modul A)		Output-HW (Modul P)		
	T	**H**	**Z**	**E**	
KS 98-1	2	1	0	1	relay: Out1, 2, 3, 4
			2	1	Current: Out 1, 2 relay: Out 4, 5

Example: Value 'HWbas = 2121' means that the addressed unit is a KS 98-1 with 2 relays and 2 current outputs. (12NC e.g. 9407 956 xx0x1)

Rem.F HWext (ext. HW option: module B, C)

	Module B		Module C		
	T	**H**	**Z**	**E**	
Not existing	0	0	0	0	Not existing
TTL-interface ISO 1745, without real-time clock	0	1	0	1	version a: 1 analog output (OUT3, continuous)
RS485/422-interface ISO 1745, with real-time clock	0	2	0	2	version b: 2 analog inputs (INP3, INP4)
PROFIBUS	1	0	0	4	version c: 5 digital inputs (di8 .. di12) and 2 digital outputs (do5, do6)
			0	5	version a+c
			0	6	version b+c
			0	7	version a+b+c

Example: Value 'HWexts = 0104' means that the addressed unit is equipped with a module B as TTL interface without real-time clock and a version C module c.
(12NC e.g. 9407 96x 11x01)

Rem.G SWopt change 12NC 10th digit

T				H				Z				E			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Presently no definition

Rem.H SWCod (SW code number 7th - 10th digit)

T	H	Z	E
7th digit	8th digit	9th digit	10th digit

Example: Value 'SWCod = 7254' means that the addressed unit contains the software with code number 4012 157 254xx.

Rem.I SWVers (SW code number 11th and 12th digit)

T	H	Z	E
		11th digit	12th digit

Example: Value 'SWCod = 0011' means that the addressed unit contains the software with code number 4012 15x xxx11.

Rem.J Interface address

A single write access to the address (code 21, fct.no. 3) disables further write accesses. A new write access is possible only, if a write access with code 73, fct. no. 35 was made, if the address was changed via the instrument front panel, or if disabling was removed by deleting flag `AdrFl` with code 22, fct.no. 3.

Rem.K Password mode

The password mode determines the access possibilities (→ see following table) to the KS 98-1 data via the interface.

	`PasMod` = 0	`PasMod` = 1	`PasMod` = 2	`PasMod` = 3
Password writing (logging in)	enabled	enabled	enabled	enabled
Process data reading and writing	enabled	enabled	enabled	disabled
I/O data and trend data reading and writing (code B1)	enabled	enabled	enabled	disabled
Parameter and display text reading and writing (code B2)	enabled	enabled	disabled	disabled
Configuration reading and writing (code B3)	enabled	disabled	disabled	disabled

PROFIBUS data can always be read / written!

Rem.L Password attempts

Determines the number of permitted unsuccessful attempts during password transmission (log-in). When exceeding the number of permitted attempts, KS 98-1 is switched to the OFFLINE mode and the password as well as the existing engineering are deleted.

Parameter data

Des.	Description	Range	Default	Type	Rem.	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
`Block`	Block access	41 .. 48		block		40	25	B2	0
`Year`	Time year [1, 2]	0 .. 99	0	INT		41	25		
`Month`	Time month [1]	1 .. 12	1	INT		42	25		
`Day`	Time day [1]	1 .. 31	1	INT		43	25		
`Hour`	Time hours [1]	0 .. 23	0	INT		44	25		
`Minute`	Time minutes [1]	0 .. 59	0	INT		45	25		
`P-hide`	Parameter display by operation	0 (possible) 1 (blocked)	0	INT	A	46	25		
`C-hide`	Configuration display by operation	0 (possible) 1 (blocked)	0	INT		47	25		
`M-hide`	Main menu display by operation	0 (possible) 1 (blocked)	0	INT		48	25		

[1] These parameters are effective only if the real-time clock (HW option B with RS485) is fitted.
[2] Calculation of the current year: range 70 ... 99 corresponding to 1970 ... 1999; range 00 ... 69 corresponding to 2000 ... 2069; examples: value 98 corresponds to year1998, value 02 corresponds to year 2002.

Rem.M Blocking by operation

Parameters ParOP, ConOp and MenOp affect the possibility to change existing settings via the operation. Their status is connected via an OR function with the relevant digital inputs of function STATUS (→ see page 83), if it is used. The parameters are stored in EEPROM, i.e. they are available also after power-on. The priority of the OR function results is different.

MenOp	ParOp	ConOp	Main menu	Parameter	Configuration
1	d.c.	d.c.	blocked	blocked	blocked
0	1	d.c.	operable	blocked	blocked
0	0	1	operable	operable	blocked

Configuration display blocking means that the instrument cannot leave the online mode by operator entry, but only by interface message and that the configuration display via operation is not possible.
Parameter display blocking means that the parameters cannot be displayed. This does not affect the change of level-1 data on the operating pages.

Password

	Description	Type	Fct. no.	Code
SetPas	Set / change / delete password	CHAR(16)	80	B2
LogPas	Logging in (password)	CHAR(16)	81	

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Block	Block access	41 .. 48		Block	70	35	B3	0
Prot	Protocol mode	0	0	INT	71	35		
Baud	Baudrate	0 (not adjustable) 1 (2400 Baud) 2 (4800 Baud) 3 (9600 Baud) 4 (19200 Baud)	1	INT	72	35		
Adr	Instrument adress	0 .. 99 (ISO1745) 0 .. 126 (PROFIBUS)	0 126	INT	73	35		
Freq	Mains frequency	0 (50 Hz) 1 (60 Hz)	0	INT	74	35		
Langu	language	0 (german) 1 (english)	0	INT	75	35		

6.4. Scaling and calculation functions

ABSV (Absolute value - no. 01)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
a	Multiplication factor	-29999 .. 999999	1,000	FP	41	20	B2	0
a0	Offset	-29999 .. 999999	0,000	FP	42	20		

I/O data

	Description	Fct.no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	ABSV	80	B2

ADSU (Addition / subtraction - no. 03)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
a	Multiplication factor for x1	-29999 .. 999999	1,000	FP	41	20	B2	0
b	Multiplication factor for x2	-29999 .. 999999	1,000	FP	42	20		
c	Multiplication factor for x3	-29999 .. 999999	1,000	FP	43	20		
d	Multiplication factor for x4	-29999 .. 999999	1,000	FP	44	20		
a0	Offset	-29999 .. 999999	0,000	FP	45	20		

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1	x2	x3	x4	0	B1
Analog outputs:	y1				1	

Display texts

Default display		Fct. no.	Code
Text 1:	ADSU	80	B2

MUDI (Multiplication / division - no. 05)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
a	Multiplication factor for x1	-29999 .. 999999	1,000	FP	41	20	B2	0
b	Multiplication factor for x2	-29999 .. 999999	1,000	FP	42	20		
c	Multiplication factor for x3	-29999 .. 999999	1,000	FP	43	20		
a0	Offset for x1	-29999 .. 999999	0,000	FP	44	20		
b0	Offset for x2	-29999 .. 999999	0,000	FP	45	20		
c0	Offset for x3	-29999 .. 999999	0,000	FP	46	20		

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1	x2	x3		0	B1
Analog outputs:	y1				1	

Display texts

Default display		Fct. no.	Code
Text 1:	MUDI	80	B2

SQRT (Square root function - no. 08)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
a	Multiplication factor	-29999 .. 999999	1,000	FP	41	20	B2	0
a0	Input offset	-29999 .. 999999	0,000	FP	42	20		
y0	Output offset	-29999 .. 999999	0,000	FP	43	20		

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	SQRT	80	B2

SCAL (Scaling - no. 09)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
a	Multiplication factor	-29999 .. 999999	1,000	FP	41	20	B2	0
a0	Offset	-29999 .. 999999	0,000	FP	42	20		
Exp	Exponent	-7 .. 7	1,000	FP	43	20		

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	SCAL	80	B2

10EXP (Power of 10 - no. 10)

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	10EXP	80	B2

EEXP (e function - no. 11)

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	EEXP	80	B2

LN (Natural logarithm - no.12)

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	LN	80	B2

LG10 (Decimal logarithm - no. 13

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	LG10	80	B2

6.5. Non-linear functions

LINEAR (Linearization function no.. 07)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x(1)	Input value for point 1	-29999 .. 999999	0,000	FP	41	20	B2	0
y(1)	Output value for point 1	-29999 .. 999999	0,000	FP	42	20		
x(2)	Input value for point 2	-29999 .. 999999	1,000	FP	43	20		
y(2)	Output value for point 2	-29999 .. 999999	1,000	FP	44	20		
x(3)	Input value for point 3	-29999 .. 999999	2,000	FP	45	20		
y(3)	Output value for point 3	-29999 .. 999999	2,000	FP	46	20		
x(4)	Input value for point 4	-29999 .. 999999	3,000	FP	47	20		
y(4)	Output value for point 4	-29999 .. 999999	3,000	FP	48	20		
x(5)	Input value for point 5	-29999 .. 999999	4,000	FP	49	20		
y(5)	Output value for point 5	-29999 .. 999999	4,000	FP	50	20		
x(6)	Input value for point 6	-29999 .. 999999	5,000	FP	51	20		
y(6)	Output value for point 6	-29999 .. 999999	5,000	FP	52	20		
x(7)	Input value for point 7	-29999 .. 999999	6,000	FP	53	20		
y(7)	Output value for point 7	-29999 .. 999999	6,000	FP	54	20		
x(8)	Input value for point 8	-29999 .. 999999	7,000	FP	55	20		
y(8)	Output value for point 8	-29999 .. 999999	7,000	FP	56	20		
x(9)	Input value for point 9	-29999 .. 999999	8,000	FP	57	20		
y(9)	Output value for point 9	-29999 .. 999999	8,000	FP	58	20		
x(10)	Input value for point 10	-29999 .. 999999	9,000	FP	59	20		
y(10)	Output value for point 10	-29999 .. 999999	9,000	FP	60	20		
x(11)	Input value for point 11	-29999 .. 999999	10,000	FP	61	20		
y(11)	Output value for point 11	-29999 .. 999999	10,000	FP	62	20		

I/O data	Description	Fct. no.	Code
Analog input:	x1	0	B1
	Casc		
Analog output:	y1	1	

Display texts

	Default display	Fkt. Nr.	Code
Text 1:	LINEAR	80	B2

GAP (Dead band - no. 20)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Low	Lower limit values	-29999 .. 0,000	0,000	FP	41	20	B2	0
High	Upper limit value	0,000 .. 999999	0,000	FP	42	20		

I/O data		Fct. no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

	Default display	Fct. no.	Code
Text 1:	GAP	80	B2

CHAR (Function generator - no. 21)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x(1)	Input value for point 1	-29999 .. 999999	0,000	FP	71	30		
y(1)	Output value for point 1	-29999 .. 999999	0,000	FP	72	30		
x(2)	Input value for point 2	-29999 .. 999999	1,000	FP	73	30		
y(2)	Output value for point 2	-29999 .. 999999	1,000	FP	74	30		
x(3)	Input value for point 3	-29999 .. 999999	2,000	FP	75	30		
y(3)	Output value for point 3	-29999 .. 999999	2,000	FP	76	30		
x(4)	Input value for point 4	-29999 .. 999999	3,000	FP	77	30		
y(4)	Output value for point 4	-29999 .. 999999	3,000	FP	78	30		
x(5)	Input value for point 5	-29999 .. 999999	4,000	FP	79	30		
y(5)	Output value for point 5	-29999 .. 999999	4,000	FP	81	30		
x(6)	Input value for point 6	-29999 .. 999999	5,000	FP	82	30		
y(6)	Output value for point 6	-29999 .. 999999	5,000	FP	83	30	B2	0
x(7)	Input value for point 7	-29999 .. 999999	6,000	FP	84	30		
y(7)	Output value for point 7	-29999 .. 999999	6,000	FP	85	30		
x(8)	Input value for point 8	-29999 .. 999999	7,000	FP	86	30		
y(8)	Output value for point 8	-29999 .. 999999	7,000	FP	87	30		
x(9)	Input value for point 9	-29999 .. 999999	8,000	FP	88	30		
y(9)	Output value for point 9	-29999 .. 999999	8,000	FP	89	30		
x(10)	Input value for point 10	-29999 .. 999999	9,000	FP	91	30		
y(10)	Output value for point 10	-29999 .. 999999	9,000	FP	92	30		
x(11)	Input value for point 11	-29999 .. 999999	10,000	FP	93	30		
y(11)	Output value for point 11	-29999 .. 999999	10,000	FP	94	30		
Seg	Number of segments	0 .. 10	2	INT	71	35		

I/O data	Description	Fct. no.	Code
Analog input:	x1	0	B1
Analog output:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	CHAR	80	B2

6.6. Trigonometric functions

SIN (Sine function - no. 80)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Select	Unit: Angular degree	0	0	INT	41	25	B2	0
	Unit: radian measure	1						

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	SIN	80	B2

COS (Cosine function - no. 81)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Select	unit: angular degree	0	0	INT	41	25	B2	0
	Unit: radian	1						

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	COS	80	B2

TAN (Tangent function - no. 82)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Select	unit: angular degree	0	0	INT	41	25	B2	0
	Unit: radian measure	1						

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	TAN	80	B2

COT (Cotangent function - no. 83)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Select	Unit: angular degree	0	0	INT	41	25	B2	0
	Unit: radian measure	1						

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	COT	80	B2

ARCSIN (Arc- sine function - no. 84)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Select	Unit: Angular degree Unit: Radian measure	0 1	0	INT	41	25	B2	0

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	ARCSIN	80	B2

ARCCOS (Arc-cosine function - no. 85)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Select	Unit: Degree of angle Unit: Arc measure	0 1	0	INT	41	25	B2	0

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	ARCCOS	80	B2

ARCTAN (Arc-tangent function - no. 86)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Select	Unit: Angular degree Unit: Radian measure	0 1	0	INT	41	25	B2	0

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	ARCTAN	80	B2

ARCCOT (Arc-cotangent function - no. 87)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Select	Unit: Angular degree Unit: Radian measure	0 1	0	INT	41	25	B2	0

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	ARCCOT	80	B2

6.7. Logic functions

AND (AND gate - no. 60)

I/O data

	Description				Fct. no.	Code
Digital inputs:	d1	d2	d3	d4	0	B1
Digital outputs:	z1	z2			1	

Display texts

Default display		Fct. no.	Code
Text 1:	AND	80	B2

NOT (Inverter - no. 61)

I/O data

	Description	Fct. no.	Code
Digital inputs:	d1	0	B1
Digital outputs:	z1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	NOT	80	B2

OR (OR gate - no. 62)

I/O data

I/O data					Fct. no.	Code
Digital inputs:	d1	d2	d3	d4	0	B1
Digital outputs:	z1	z2			1	

Display texts

Default display		Fct. no.	Code
Text 1:	OR	80	B2

BOUNCE (De-bouncer - no. 63)

I/O data

	Description	Fct. no.	Code
Digital inputs:	d1	0	B1
Digital outputs:	z1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	BOUNCE	80	B2

EXOR (Exclusive OR gate - no. 64)

I/O data

	Description				Fct. no.	Code
Digital inputs:	d1	d2			0	B1
Digital outputs:	z1	z2			1	

Display texts

Default display		Fct. no.	Code
Text 1:	EXOR	80	B2

FLIP (D-type flip-flop - no. 65)

I/O data

	Description				Fct. no.	Code
Digital inputs:	d1 (signal)	d2 (clock)	d3 (reset)		0	B1
Digital outputs:	z1	z2			1	

Display texts

Default display		Fct. no.	Code
Text 1:	FLIP	80	B2

MONO (Monoflop - no. 66)

Parameter setting data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Ti1	Pulse duration in s (d1, Mode1 = 0)	0,0 .. 999999	1,0	FP	41	20	B2	0
Ti2	Pulse duration in s (d2, Mode2 = 0)	0,0 .. 999999	1,0	FP	42	20		
Mode1	Source of pulse duration T1 = Ti1	0	0	INT	41	25		
	Source of pulse duration T1 = x1	1						
Mode2	Source of pulse duration T1 = Ti2	0	0	INT	42	25		
	Source of pulse duration T1 = x2	1						

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1 (Ti1)	x2 (Ti2)			0	B1
Digital inputs:	d1	d2				
Digital outputs:	z1	z2	z3	z4	1	

Display texts

Default display		Fct. no.	Code
Text 1:	MONO	80	B2

STEP (Step function for sequencing - no. 68)

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1 (Casc)				0	B1
Digital inputs:	d1	d2	d3	d4		
	d5	d6	d7	d8		
	d9	d10	d11 (reset)	d12 (stop)		
	d13 (skip)					
Analog outputs:	y1 (step)				1	
Digital outputs:	z1 (activ)					

Display texts

Default display		Fct. no.	Code
Text 1:	STEP	80	B2

TIME1 (Timer - no. 69)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
T1	Delay time in s (d1 = 0→1)	0,0 .. 999999	0,0	FP	41	20	B2	0
T2	Delay time in s (d1 = 1→0)	0,0 .. 999999	0,0	FP	42	20		

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Select	Delay times = T1 / T2	0	0	INT	71	35	B3	0
	Delay times = x1 / x2	1						

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1 (t1)	x2 (t2)			0	B1
Digital inputs:	d1					
Digital outputs:	z1	z2			1	

Display texts

Default display		Fct. no.	Code
Text 1:	TIME1	80	B2

6.8. Signal converters

ABIN (Analog ↔ binary conversion - no. 71)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Select	analog → binary and vice versa	0	0	INT	71	35	B2	0
	analog → FP and vice versa	1						
	analog → 1 out of 8 and vice versa	2						

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1				0	B1
Digital inputs:	d1	d2	d3	d4		
	d5	d6	d7	d8		
Analog outputs:	y1				1	
Digital outputs:	z1	z2	z3	z4		
	z5	z6	z7	z8		

Display texts

Default display		Fct. no.	Code
Text 1:	ABIN	80	B2

TRUNC (Integer portion - no. 72)

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	TRUNC	80	B2

PULS (Analog-pulse conversion - no. 73)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x0	Span start	-29999 .. 999999	0,000	FP	41	20	B2	0
x100	End of span	-29999 .. 999999	1,000	FP	42	20		
Pulses/h	Pulses/h for x1 = x100	0 .. 18000	0	FP	43	20		

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Digital outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	PULS	80	B2

COUN (Up / down counter - no. 74)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
y0	Preset value	0,000 .. 9999,0	0,000	FP	41	20	B2	0
Max	Max. limit	-29999 .. 999999	9999,0	FP	42	20		
Min	Min. limit	-29999 .. 999999	0,000	FP	43	20		
Mode	Source of preset value = y0	0	0	INT	41	25		
	Source of preset = x1	1						

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1 (Preset)				0	B1
Digital inputs:	d1 (up)	d2 (down)	d3 (preset)	d4 (reset)		
Analog outputs:	y1 (Count)				1	
Digital outputs:	z1 (carry)	z2 (borrow)				

Display texts

Default display		Fct. no.	Code
Text 1:	COUN	80	B2

MEAN (Mean value generation - no. 75)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
sample	Sample time	0,100 .. 999999	100	FP	71	30	B3	0
ValNo	Number of values to be sampled	1 .. 100	100	INT	71	35		
Unit	Time unit for Sample: s	0	0	INT	72	35		
	Time unit for Sample: min	1						
	Time unit for Sample: h	2						

I/O data

	Description			Fct. no.	Code
Analog inputs:	x1			0	B1
Digital inputs:	d1 (disabl)	d2 (reset)	d3 (sample)		
Analog outputs:	y1 (Mean)			1	
Digital outputs:	z1 (ready)				

Display texts

Default display		Fct.no.	Code
Text 1:	MEAN	80	B2

AOCTET (Data type convertor - no. 02)

Configuration data

	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Ioct	Data type of Inputs Uint8	0	0	INT	41	25	B3	0
	Data type of Inputs Int8	1						
	Data type of Inputs Uint16	2						
	Data type of Inputs Int16	3						
	Data type of Inputs Uint32	4						
	Data type of Inputs Int32	5						
	Data type of Inputs Float	6						
Ooct	Data type of Outputs Uint8	0	0	INT	42	25		
	Data type of Outputs Int8	1						
	Data type of Outputs Uint16	2						
	Data type of Outputs Int16	3						
	Data type of Outputs Uint32	4						
	Data type of Outputs Int32	5						
	Data type of Outputs Float	6						

I/O-data

	Description				Fct..no.	Code
Analog inputs:	x1 (Ioct1)	x2 (Ioct2)	x3 (Ioct3)	x4 (Ioct4)	0	B1
	x5 (X 1)					
Analog Outputs:	y1 (Y 1)	y2 (Ooct1)	y3 (Ooct2)	y4 (Ooct3)	1	
	y5 (Ooct4)					

Display texts

Default display		Fct..no.	Code
Text 1:	AOCTET	80	B2

6.9. Time functions

LEAD (Differentiator - no. 50)

Parameter data

	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
a	Gain factor	-29999 .. 999999	1,000	FP	41	20	B2	0
y0	Output offset	-29999 .. 999999	0,000	FP	42	20		
T	Time constant in s	0,0 .. 199999	1,0	FP	43	20		

Configuration data

	Description	Range	Def.	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Mode	Differentiate all changes	0	0	INT	71	35	B3	0
	Differentiate only positive changes	1						
	Differentiate only negative changes	2						

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Analog outputs:	y1	1	

Display texts

Default display		Fct. no.	Code
Text 1:	LEAD	80	B2

INTE (Integrator - no. 51)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
T	Time constant in s	0,1 .. 999999	60,0	FP	41	20	B2	0
x0	Constant	-29999 .. 999999	0,000	FP	42	20		
y0	Preset value	-29999 .. 999999	0,000	FP	43	20		
Max	Max. limit	0,000 .. 999999	1,000	FP	44	20		
Min	Min. limit	-29999 .. 1,000	0,000	FP	45	20		
Mode	Source of preset value = y0	0	0	INT	41	25		
	Source of Preset = x2	1						

I/O data

	Description			Fct. no.	Code
Analog inputs:	x1	X2 (preset)		0	B1
Digital inputs:	d1 (stop)	d2 (reset)	d3 (preset)		
Analog outputs:	y1			1	
Digital outputs:	z1 (max)	z2 (min)			

Display texts

Default display		Fct. no.	Code
Text 1:	INTE	80	B2

LAG (Filter - no. 52)

Parameter data

Des.	Description	Range	Default	Type	Single access Fct. no.	Single access Code	Block access Code	Block access Fct. no.
T	Time constant in s	0,0 .. 199999	1,0	FP	20	41	B2	0

I/O data

	Description			Fct. no.	Code
Analog inputs:	x1			0	B1
Digital inputs:	d1 (reset)				
Analog outputs:	y1			1	

Display texts

Default display		Fct. no.	Code
Text 1:	LAG	80	B2

DELA1 (Delay time 1 - no. 53)

Parameter data

Des.	Description	Range	Default	Type	Single access Fct. no.	Single access Code	Block access Code	Block access Fct. no.
n	DelayVerzögerungszahl	0 .. 255	0	INT	25	41	B2	0

I/O data

I/O data	Description			Fct. no.	Code
Analog inputs:	x1	X2 (preset)		0	B1
Digital inputs:	d1 (reset)	d2 (pereset)	d3 (clock)		
Analog outputs:	y1			1	

Display texts

Default display		Fct. no.	Code
Text 1:	DELA1	80	B2

DELA2 (Delay time 2 - no. 54)

Parameter data

Des.	Description	Range	Default	Type	Single access Fct. no.	Single access Code	Block access Code	Block access Fct. no.
Td	Delay in s	0,0 .. 999999	0,0	FP	20	41	B2	0

I/O data

	Description			Fct. no.	Code
Analog inputs:	x1	X2 (preset)		0	B1
Digital inputs:	d1 (reset)	d2 (pereset)			
Analog outputs:	y1			1	

Display texts

Default display		Fct. no.	Code
Text 1:	DELA2	80	B2

FILT (Filter with tolerance band - no. 55)

Parameter data

Des.	Description	Range	Default	Type	Single access Fct. no.	Single access Code	Block access Code	Block access Fct. no.
T	Time constant in s	0,0 .. 199999	1,0	FP	20	41	B2	0
Diff	Tolerance band	0,000 .. 999999	1,000	FP	20	41		

I/O data

	Description			Fct. no.	Code
Analog inputs:	x1			0	B1
Digital inputs:	d1 (reset)				
Analog outputs:	y1			1	

Display texts

Default display		Fct. no.	Code
Text 1:	FILT	80	B2

TIMER (Timer 1 - no. 67)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
TS.Mo	Switch-on delay, months	0 .. 12	0	INT	41	25	B2	0
TS.D	Switch-on delay, days	0 .. 31	0	INT	42	25		
TS.H	Switch-on delay, hours	0 .. 23	0	INT	43	25		
TS.Mi	Switch-on time, minutes	0 .. 59	0	INT	44	25		
TE.D	Switch-on duration, days	0 .. 255	0	INT	45	25		
TE.H	Switch-on duration, hours	0 .. 23	0	INT	46	25		
TE.Mi	Switch-on duration, minutes	0 .. 59	0	INT	47	25		

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Func1	Function runs cyclically	0	0	INT	71	35	B3	0
	Function runs once	1						
Func2	Function runs daily	0	0	INT	72	35		
	Function runs from Mon .. Fri	1						
	Function runs from Mon .. Sat	2						
	Function runs weekly	3						

I/O data

	Description	Fct. no.	Code
Digital inputs:	d1 (disabl)	0	B1
Analog outputs:	y1 (Week-D)	1	
Digital outputs:	z1		

Display texts

Default display	Fct. no.	Code
Text 1: TIMER	80	B2

TIME2 (Timer 2 - no. 70)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
TS.D	Switch-on delay, days	0 .. 31	0	INT	41	25	B2	0
TS.H	Switch-on delay, hours	0 .. 23	0	INT	42	25		
TS.Mi	Switch-on delay, minutes	0 .. 59	0	INT	43	25		
TE.D	Switch-on duration, days	0 .. 255	0	INT	44	25		
TE.H	Switch-on duration, hours	0 .. 23	0	INT	45	25		
TE.Mi	Switch-on duration, minutes	0 .. 59	0	INT	46	25		

I/O data

	Description			Fct. no.	Code
Digital inputs:	d1 (disabl)	d2 (reset)	d3 (start)	0	B1
Analog outputs:	y1 (Week-D)			1	
Digital outputs:	z1	z2 (end)			

Display texts

Default display	Fct. no.	Code
Text 1: TIME2	80	B2

6.10. Selection and storage

EXTR (Extreme value selection - no. 30)

I/O data

	Description				Fct.no.	Code
Analog inputs:	x1	x2	x3		0	B1
Analog outputs:	y1 (Max)	y2 (Mid)	y3 (Min)	y4 (MaxNo)	1	
	y5 (MidNo)	y6 (MinNo)				

Display texts

Default display		Fct. no.	Code
Text 1:	EXTR	80	B2

PEAK (Peak value memory - no. 31)

I/O data

	Description				Fct. no.,	Code
Analog inputs:	x1				0	B1
Digital inputs:	d1 (stop)	d2 (reset)				
Analog outputs:	y1 (Max)	y2 (Min)			1	

Display texts

Default display		Fct. no.	Code
Text 1:	PEAK	80	B2

TRST (Hold amplifier - no. 32)

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1				0	B1
Digital inputs:	d1 (hold)					
Analog outputs:	y1	y2			1	

Display texts

Default display		Fct. no.	Code
Text 1:	TRST	80	B2

SELC (Constants selection - no. 33)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
C1.1	Constant 1, group 1	-29999 .. 999999	0.000	FP	41	20	B2	0
C1.2	Constant 2, group 1	-29999 .. 999999	0.000	FP	42	20		
C1.3	Constant 3, group 1	-29999 .. 999999	0.000	FP	43	20		
C1.4	Constant 4, group 1	-29999 .. 999999	0.000	FP	44	20		
C2.1	Constant 1, group 2	-29999 .. 999999	0.000	FP	45	20		
C2.2	Constant 2, group 2	-29999 .. 999999	0.000	FP	46	20		
C2.3	Constant 3, group 2	-29999 .. 999999	0.000	FP	47	20		
C2.4	Constant 4, group 2	-29999 .. 999999	0.000	FP	48	20		

I/O data

	Description				Fct. no.	Code
Digital inputs:	d1				0	B1
Analog outputs:	y1	Y2	Y3	Y4	1	

Display texts

Default display		Fct. no.	Code
Text 1:	SELC	80	B2

SELD (Konstantenauswahl - Typ-Nr. 33)

I/O-Daten

	Beschreibung				Fkt Nr.	Code
Analoge Eingänge:	x1 (select)				0	B1
Digitale Eingänge:	d1	d2	d3	d4		
	d5 (seld1)	d6 (seld2)				
Analoge Ausgänge:	Casc				1	
Digitale Ausgänge:	z1					

SELP (Parameter selection - no. 34)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
C1	Constant 1	-29999 .. 999999	0.000	FP	41	20	B2	0
C2	Constant 2	-29999 .. 999999	0.000	FP	42	20		
C3	Constant 3	-29999 .. 999999	0.000	FP	43	20		

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1				0	B1
Digital inputs:	d1	d2				
Analog outputs:	y1				1	

Display texts

Default display		Fct. no.	Code
Text 1:	SELP	80	B2

SELV1 (Selection of variables - no. 35)

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1	x2	x3	x4	0	B1
Digital inputs:	d1	d2				
Analog outputs:	y1				1	

Display texts

Default display		Fct. no.	Code
Text 1:	SELV1	80	B2

SOUT (Selection of output - no. 36)

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1				0	B1
Digital inputs:	d1	d2				
Analog outputs:	y1	y2	y3	y4	1	

Display texts

Default display		Fct. no.	Code
Text 1:	SOUT	80	B2

REZEPT (Recipe management - no. 37)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Set1.1	Parameter 1 for recipe 1	-29999 .. 999999	0,000	FP	41	20	B2	0
Set1.2	Parameter 2 for recipe 1	-29999 .. 999999	0,000	FP	42	20		
Set1.3	Parameter 3 for recipe 1	-29999 .. 999999	0,000	FP	43	20		
Set1.4	Parameter 4 for recipe 1	-29999 .. 999999	0,000	FP	44	20		
Set2.1	Parameter 1 for recipe 2	-29999 .. 999999	0,000	FP	45	20		
Set2.2	Parameter 2 for recipe 2	-29999 .. 999999	0,000	FP	46	20		
Set2.3	Parameter 3 for recipe 2	-29999 .. 999999	0,000	FP	47	20		
Set2.4	Parameter 4 for recipe 2	-29999 .. 999999	0,000	FP	48	20		
Set3.1	Parameter 1 for recipe 3	-29999 .. 999999	0,000	FP	49	20		
Set3.2	Parameter 2 for recipe 3	-29999 .. 999999	0,000	FP	51	20		
Set3.3	Parameter 3 for recipe 3	-29999 .. 999999	0,000	FP	52	20		
Set3.4	Parameter 4 for recipe 3	-29999 .. 999999	0,000	FP	53	20		
Set4.1	Parameter 1 for recipe 4	-29999 .. 999999	0,000	FP	54	20		
Set4.2	Parameter 2 for recipe 4	-29999 .. 999999	0,000	FP	55	20		
Set4.3	Parameter 3 for recipe 4	-29999 .. 999999	0,000	FP	56	20		
Set4.4	Parameter 4 for recipe 4	-29999 .. 999999	0,000	FP	57	20		
Set5.1	Parameter 1 for recipe 5	-29999 .. 999999	0,000	FP	58	20		
Set5.2	Parameter 2 for recipe 5	-29999 .. 999999	0,000	FP	59	20		
Set5.3	Parameter 3 for recipe 5	-29999 .. 999999	0,000	FP	61	20		
Set5.4	Parameter 4 for recipe 5	-29999 .. 999999	0,000	FP	62	20		

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1	x2	x3	x4	0	B1
	x5 (SetNo)					
Digital inputs:	d1 (store)	d2 (manual)				
Analog outputs:	y1	y2	y3	y4	1	
	y5 (Casc)					

Display texts

Default display		Fct. no.	Code
Text 1:	REZEPT	80	B2

2OF3 (2-out-of-3 selection with mean value formation - no. 38)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Diff	Difference limit value	0,000 .. 999999	1.000	FP	41	20	B2	0

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1	x2 (X1mult)	x3 (X2)	x4 (X2mult)	0	B1
	x5 (X3)	x6 (X3mult)				
Digital inputs:	d1 (fail1)	d2 (fail2)	d3 (fail3)	d4 (off)		
Analog outputs:	y1	y2 (Casc)			1	
Digital outputs:	z1 (err1)	z2 (err2)				

Display texts

Default display		Fct. no.	Code
Text 1:	2OF3	80	B2

SELV2 (Cascadable selection of variables - no. 39)

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1	x2	x3	x4	0	B1
	x5 (Select)					
Analog outputs:	y1	y2 (				
		Casc)			1	

Display texts

Default display		Fct. no.	Code
Text 1:	SELV2	80	B2

6.11. Alarm and limiting

ALLP (Alarm and limiting with fixed limits - no. 40)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Select	Value x1 for monitoring	0	0	INT	71	35	B2	0
	Value dx1/dt for monitoring	1						
	Value x1 for monitoring - x0	2						

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
H1	High alarm 1 and high limit	-29999 .. 999999	9999,0	FP	41	20	B2	0
H2	High alarm 2	-29999 .. 999999	9999,0	FP	42	20		
L1	Low alarm 1 or low limit	-29999 .. 999999	-9999,0	FP	43	20		
L2	Low alarm 2	-29999 .. 999999	-9999,0	FP	44	20		
x0	Offset	-29999 .. 999999	0,000	FP	45	20		
xsd	Switching hysteresis	0,000 .. 999999	1,000	FP	46	20		

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1				0	B1
Analog outputs:	y1				1	
Digital outputs:	z1 (h1)	z2 (h2)	z3 (l2)	z4 (l2)		

Display texts

Default display		Fct. no.	Code
Text 1:	ALLP	80	B2

ALLV (Alarm and limiting with variable limits - no. 41)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Select	Value x1 for monitoring	0	0	INT	71	35	B2	0
	Value dx1/dt for monitoring	1						
	Value x1 for monitoring - x0	2						

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
H2	High alarm 2	-29999 .. 999999	9999,0	FP	42	20	B2	0
L2	Low alarm 2	-29999 .. 999999	-9999,0	FP	44	20		
x0	Offset	-29999 .. 999999	0,000	FP	45	20		
xsd	Switching hysteresis	0,000 .. 999999	1,000	FP	46	20		

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1	x2 (H1)	x3 (L1)		0	B1
Analog outputs:	y1				1	
Digital outputs:	z1 (h1)	z2 (h2)	z3 (l1)	z4 (l2)		

Display texts

Default display		Fct. no.	Code
Text 1:	ALLV	80	B2

EQUAL (Comparison - no. 42)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Diff	Tolerance limit	0,000 .. 999999	0,000	FP	41	20	B2	0
Mode	Source of tolerance limit: Diff	0	0	INT	41	25		
	Source of tolerance limit: x3	1						

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1	x2	x3 (Diff)		0	B1
Digital outputs:	z1 (X1 > X2)	z2 (X1 = X2)	z3 (X1 < X2)	z4 (X1 ≤ X2)	1	
	z5 (X1 ≠ X2)	x6 (X1 ≥ X2)				

Display texts

Default display		Fct. no.	Code
Text 1:	EQUAL	80	B2

VELO (Rate of change limiting - no. 43)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Grx+	Positive gradient	0,000 .. 999999	0,000	FP	41	20	B2	0
Grx-	Negative gradient	-29999 .. 0,000	0,000	FP	42	20		
Mode+	Source of positive gradient: Grx+	0	0	INT	41	25		
	Source of positive gradient: x2	1						
Mode-	Source of negative gradient: Grx-	0	0	INT	42	25		
	Source of negative gradient: x3	1						

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1	x2 (GrX+)	x3 (GrX-)		0	B1
Digital inputs:	d1	d2				
Analog outputs:	y1				1	

Display texts

Default display		Fct. no.	Code
Text 1:	VELO	80	B2

LIMIT (Multiple alarm - no. 44)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Mode1	Mode: Max. alarm	0	0	INT	71	35	B3	0
	Mode: Min. alarm	1						
Mode2	Operating mode: max. alarm	0	0	INT	72	35		
	Operating mode: min. alarm	1						
Mode3	Operating mode: max. alarm	0	0	INT	73	35		
	Operating mode: min. alarm	1						
Mode4	Operating mode: max. alarm	0	0	INT	74	35		
	Operating mode: min. alarm	1						
Mode5	Operating mode: max. alarm	0	0	INT	75	35		
	Operating mode: min. alarm	1						
Mode6	Operating mode: max. alarm	0	0	INT	76	35		
	Operating mode: min. alarm	1						
Mode7	Operating mode: max. alarm	0	0	INT	77	35		
	Operating mode: min. alarm	1						
Mode8	Operating mode: max. alarm	0	0	INT	78	35		
	Operating mode: min. alarm	1						

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
L1	Alarm value 1	-29999 .. 999999	0,000	FP	41	20	B2	0
L2	Alarm value 2	-29999 .. 999999	0,000	FP	42	20		
L3	Alarm value 3	-29999 .. 999999	0,000	FP	43	20		
L4	Alarm value 4	-29999 .. 999999	0,000	FP	44	20		
L5	Alarm value 5	-29999 .. 999999	0,000	FP	45	20		
L6	Alarm value 6	-29999 .. 999999	0,000	FP	46	20		
L7	Alarm value 7	-29999 .. 999999	0,000	FP	47	20		
L8	Alarm value 8	-29999 .. 999999	0,000	FP	48	20		

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1				0	B1
Digital outputs:	z1 (I1)	z2 (I2)	z3 (I3)	z4 (I4)	1	
	z5 (I5)	x6 (I6)	x7 (I7)	x8 (I8)		

Display texts

Default display		Fct. no.	Code
Text 1:	LIMIT	80	B2

ALARM (Alarm processing - no. 45)

Configuration data

Des.	Description	Range	Default	Type	Code	Fct. no.	Block access Code	Block access Fct. no.
Fnc	Alarm function: meas. value	0	0	INT	71	35	B3	0
	Alarm function: meas. value + d1	1						
	Alarm function: d1	2						

Parameter data

Des.	Description	Range	Default	Type	Code	Fct. no.	Block access Code	Block access Fct. no.
LimL	Lower alarm value	-29999 .. 999999	-10,00	FP	41	20	B2	0
LimH	Upper alarm value	-29999 .. 999999	10,000	FP	42	20		
Lxsd	Switching difference	0,000 .. 999999	0,000	FP	43	20		

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1				0	B1
Digital inputs:	d1 (fail)	d2 (stop)				
Digital outputs:	z1 (alarm)				1	

Display texts

Default display		Fct. no.	Code
Text 1:	ALARM	80	B2

6.12. Visualization

TEXT (Textcontainer with language-dependent selection - no. 79)

I/O-Data

	Description			Fct. no.	Code
Analog inputs:	x1 (Index)	x2 (Case)	x3 (UsrLan)	0	B1
Analoge outputs:	y1 (Index)			1	

Display texts

	Default display	Fct. no.	Code
Text 1:	TEXT	80	B2
Text 2:	TEXT_1		
Text 3:	TEXT_2		
Text 4:	TEXT_3		
Text 5:	TEXT_4		

VWERT (Display / preset of process values - no. 96)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Disp1	Display line, value variable Only display line Line is empty	0 1 2	0	INT	71	35	B3	0
Disp2	Display line, value variable Only display line Line is empty	0 1 2	0	INT	72	35		
Disp3	Display line, value variable Only display line Line is empty	0 1 2	0	INT	73	35		
Disp4	Display line, value variable Only display line Line is empty	0 1 2	0	INT	74	35		
Disp5	Display line, value variable Only display line Line is empty	0 1 2	0	INT	75	35		
Disp6	Display line, value variable Only display line Line is empty	0 1 2	0	INT	76	35		
Mode1	Display line analog Display line digital Display line time Display line radio Display line switch Display line push-button Display line text Display line menu	0 1 2 3 4 5 6 7	0	INT	77	35		
Mode2	Display line analog Display line digital Display line time Display line radio Display line switch Display line push-button Display line text Display line menu	0 1 2 3 4 5 6 7	0	INT	78	35		
Mode3	Display line analog Display line digital Display line time Display line radio Display line switch Display line push-button Display line text Display line menu	0 1 2 3 4 5 6 7	0	INT	79	35		

Mode4	Display line analog	0	0	INT	81	35		
	Display line digital	1						
	Display line time	2						
	Display line radio	3						
	Display line switch	4						
	Display line push-button	5						
	Display line text	6						
	Display line menu	7						
Mode5	Display line analog	0	0	INT	82	35		
	Display line digital	1						
	Display line time	2						
	Display line radio	3						
	Display line switch	4						
	Display line push-button	5						
	Display line text	6						
	Display line menu	7						
Mode6	Display line analog	0	0	INT	83	35		
	Display line digital	1						
	Display line time	2						
	Display line radio	3						
	Display line switch	4						
	Display line push-button	5						
	Display line text	6						
	Display line menu	7						
dP1	Digits behind decimal point in analog line 1	0 .. 3	0	INT	84	35		
dP2	Digits behind decimal point in analog line 2	0 .. 3	0	INT	85	35		
dP3	Digits behind decimal point in analog line 3	0 .. 3	0	INT	86	35		
dP4	Digits behind decimal point in analog line 4	0 .. 3	0	INT	87	35		
dP5	Digits behind decimal point in analog line 5	0 .. 3	0	INT	88	35		
dP6	Digits behind decimal point in analog line 6	0 .. 3	0	INT	89	35		

Parameters

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Y1	Starting value of analog output 1	-29999 .. 999999	0	FP	41	20	B2	0
Y2	Starting value of digital output 2	-29999 .. 999999	0	FP	42	20		
Y3	Starting value of analog output 3	-29999 .. 999999	0	FP	43	20		
Y4	Starting value of analog output 4	-29999 .. 999999	0	FP	44	20		
Y5	Starting value of analog output 5	-29999 .. 999999	0	FP	45	20		
Y6	Starting value of analog output 6	-29999 .. 999999	0	FP	46	20		
z1	Starting value of digital output 1	0 / 1	0	INT	41	25		
z2	Starting value of digital output 1	0 / 1	0	INT	42	25		
z3	Starting value of digital output 1	0 / 1	0	INT	43	25		
z4	Starting value of digital output 1	0 / 1	0	INT	44	25		
z5	Starting value of digital output 1	0 / 1	0	INT	45	25		
z6	Starting value of digital output 1	0 / 1	0		46	25		

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1	x2	x3	x4	0	B1
	x5	x6	x7 (Casc)			
Digital inputs:	d1 (hide)	d2 (lock)	d3	d4		
	d5	d6	d7	d8		
	d9 (store)					
Analog outputs:	y1	y2	y3	y4	1	
	y5	y6	y7 (Bl-no)	y8 (Line)		
Digital outputs:	z1	z2	z3	z4		
	z5	z6				

Display texts

Default display		Fct. no.	Code
Text 1:	VWERT	80	B2
Text 2:	Name_1 Off		
Text 3:	Name_1 On		
...			
Text 12:	Name_6 Off		
Text 13:	Name_6 On		

VBAR (Bargraph display - no. 97)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x3 0	Scaling of bargraph 1 (0%)	-29999 .. 999999	0,000	FP	71	30	B3	0
x3 100	Scaling of bargraph 1 (100%)	-29999 .. 999999	100,00	FP	72	30		
x3 mid	Scaling of bargraph 1 (start value)	-29999 .. 999999	0,000	FP	73	30		
x4 0	Scaling of bargraph 2 (0%)	-29999 .. 999999	0,000	FP	74	30		
x4 100	Scaling of bargraph 2 (100%)	-29999 .. 999999	100,00	FP	75	30		
x4 mid	Scaling of bargraph 2 (start value)	-29999 .. 999999	0,000	FP	76	30		
Disp1	Display x1/x2, value variable Only display x1/x2 No display x1/x2	0 1 2	0	INT	71	35		
Disp2	Display x1/x2, value variable Only display x1/x2 No display x1/x2	0 1 2	0	INT	72	35		
Dp1	Digit behind the decimal point in value display 1	0 .. 3	0	INT	73	35		
Dp2	Digit behind the decimal point in value display 2	0 .. 3	0	INT	74	35		
Type	Both bargraphs horizontal Both bargraphs vertical	0 1	0	INT	75	35		

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Y1	Starting value for analog output 1	-29999 .. 999999	0,000	FP	41	20	B2	0
Y2	Starting value for analog output 2	-29999 .. 999999	0,000	FP	42	20		

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1	x2	x3 (Bar 1)	x4 (Bar 2)	0	B1
	x5 (Mark11)	x6 (Mark 12)	x7 (Mark 21)	x8 (Mark 22)		
Digital inputs:	d1 (hide)	d2 (lock)				
Analog outputs:	y1	y2	y3 (BI-no)		1	

Display texts

Default display		Fct. no.	Code
Text 1:	VBar	80	B2
Text 2:	Name_1		
Text 3:	UNIT_1		
Text 12:	NAME_2		
Text 13:	UNIT_2		

VPARA (Parameter display no. 98)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
P 1-Bl	Block number parameter 1	0 .. 250	0	INT	71	35	B3	0
P 1-No	Number parameter 1	1 .. 99	1	INT	72	35		
P 2-Bl	Block number parameter 2	0 .. 250	0	INT	73	35		
P 2-No	Number parameter 2	1 .. 99	1	INT	74	35		
P 3-Bl	Block number parameter 3	0 .. 250	0	INT	75	35		
P 3-No	Number parameter 3	1 .. 99	1	INT	76	35		
P 4-Bl	Block number parameter 4	0 .. 250	0	INT	77	35		
P 4-No	Number parameter 4	1 .. 99	1	INT	78	35		
P 5-Bl	Block number parameter 5	0 .. 250	0	INT	79	35		
P 5-No	Number parameter 5	1 .. 99	1	INT	81	35		
P 6-Bl	Block number parameter 6	0 .. 250	0	INT	82	35		
P 6-No	Number parameter 6	1 .. 99	1	INT	83	35		

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1 (P 1)	x2 (P 2)	x3 (P 3)	x4 (P 4)	0	B1
	x5 (P 5)	x6 (P 6)				
Digital inputs:	d1 (hide)	d2 (lock)	d3 (store)			
Analog outputs:	y1 (P 1)	y2 (P 2)	y3 (P 3)	y4 (P 4)	1	
	y5 (P 5)	y6 (P 6)				
Digital outputs:	z1 (P 1)	z2 (P 2)	z3 (P 3)	z4 (P 4)		
	z5 (P 5)	z6 (P 6)				

Display texts

Default display		Fct. no.	Code
Text 1:	VPARA	80	B2
Text 2:	Para 1		
Text 3:	Unit 1		
...			
Text 12:	Para 6		
Text 13:	Unit 6		

VTREND (Trend display - no. 99)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Sample	Time unit of sampling interval	0,200 .. 999999	1,000	INT	71	30	B3	0
X 0	Display scaling 0 %	-29999 .. 999999	0,000	INT	72	30		
X 100	Display scaling 100 %	-29999 .. 999999	100,00	INT	73	30		
Unit	Block number parameter 1	0 .. 250	0	INT	71	35		
	Number parameter 1	1 .. 99						
	Block number parameter 2	0 .. 250						
Dp	Number parameter 2	1 .. 99	1	INT	72	35		

I/O-data

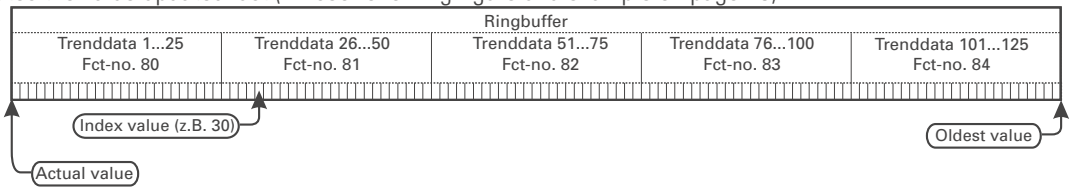
	Description				Fct. no.	Code
Analog inputs:	x1				0	B1
Digital inputs:	d1 (hide)	d2 (disabl)	d3 (reset)	d4 (sample)		
Analog outputs:	y1 (X-100)	y2 (Bl-no)			1	
Digital outputs:	z1 (ready)					

Display texts

Default display		Fct. no.	Code
Text 1:	VTREND	80	B2
Text 2:	_UNIT_		

Trend data

The 100 only readable trend data can be read via four B1 accesses. The index which is transmitted with each read access indicates the value updated last (→ see following figure and example on page 15).



6.13. Communication

L1READ (Read level 1 data - no. 100)

Process data

Des.	Description	R/W	Type	Range	Rem.	Code	Fct. no.
Block	Block access	R	Block	01 .. 09		00	0
Status 1	L1READ status 1	R	ST1		A	01	0
Status 2	L1READ status 2	R	ST1		B	03	0
X1	Analog input X1	R	FP	-29999 .. 999999		04	0
X2	Analog input X2	R	FP	-29999 .. 999999		05	0
X3	Analog input X3	R	FP	-29999 .. 999999		06	0
X4	Analog input X4	R	FP	-29999 .. 999999		07	0
X5	Analog input X5	R	FP	-29999 .. 999999		08	0
X6	Analog input X6	R	FP	-29999 .. 999999		09	0

Rem. ***'Status 1'***

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	d1	Status d1	off	on
D1	d2	Status d2	off	on
D2	d3	Status d3	off	on
D3	d4	Status d4	off	on
D4	d5	Status d5	off	on
D5	d6	Status d6	off	on
D6	'1'	always '1'		
D7		Parity		

Rem.A ***'Status 2'***

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	d7	Status d7	off	on
D1	d8	Status d8	off	on
D2	d9	Status d9	off	on
D3	d10	Status d10	off	on
D4	d11	Status d11	off	on
D5	d12	Status d12	off	on
D6	'1'	always '1'		
D7		Parity		

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1	x2	x3	x4	0	B1
	x5	x6	x7			
Digital inputs:	d1	d2	d3	d4		
	d5	d6	d7	d8		
	d9	d10	d11	d12		

Display texts

Default display		Fct. no.	Code
Text 1:	L1READ	80	B2

L1WRITE (Write Level 1 data - no. 101)

Process data

Des.	Description	R/W	Type	Range	Rem.	Code	Fct. no.
Block	Block access	R	Block	31 .. 39		30	0
	Digital outputs z1 .. z15	R/W	ICMP	0 .. 32767	A	31	0
Y1	Analog output Y1	R/W	FP	-29999 .. 999999		33	0
Y2	Analog output Y2	R/W	FP	-29999 .. 999999		34	0
Y3	Analog output Y3	R/W	FP	-29999 .. 999999		35	0
Y4	Analog output Y4	R/W	FP	-29999 .. 999999		36	0
Y5	Analog output Y5	R/W	FP	-29999 .. 999999		37	0
Y6	Analog output Y6	R/W	FP	-29999 .. 999999		38	0
Y7	Analog output Y7	R/W	FP	-29999 .. 999999		39	0

Rem. Data structure

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Signification	0	z15	z14	z13	z12	z11	z10	z9	z8	z7	z6	z5	z4	z3	z2	z1

I/O data

	Description				Fct. no.	Code
Analog outputs:	y1	y2	y3	y4	1	B1
	y5	y6	y7	y8		
Digital outputs:	z1	z2	z3	z4		
	z5	z6	z7	z8		
	z9	z10	z11	z12		
	z13	z14	z15			

Display texts

Default display		Fct. no.	Code
Text 1:	L1WRITE	80	B2

DPREAD (Read Level 1 data via PROFIBUS - no. 102)

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1	x2	x3	x4	0	B1
	x5	x6				
Digital inputs:	d1	d2	d3	d4		
	d5	d6	d7	d8		
	d9	d10	d11	d12		
	d13	d14	d15	d16		
Digital outputs:	z1 (b-err)	z2 (p-err)	z3 (c-err)	z4 (d-err)	1	

Display texts

Default display		Fct. no.	Code
Text 1:	DPREAD	80	B2

DPWRITE (Write Level 1 data via PROFIBUS - no. 103)

I/O data

	Description				Fct. no.	Code
Analog outputs:	y1	y2	y3	y4	1	B1
	y5	y6				
Digital outputs:	z1	z2	z3	z4		
	z5	z6	z7	z8		
	z9	z10	z11	z12		
	z13	z14	z15	z16		
	z17 (b-err)	z18 (p-err)	z19 (c-err)	z20 (d-err)		
	z21 (valid)					

Display texts

Default display		Fct. no.	Code
Text 1:	DPWRITE	80	B2

6.14. KS98-CAN-extension

C_RM2x (CANopen field bud coupler RM 201 - Type-Nr. 14) block numbers 21-25

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
NodeId	Node addresse of RM2x	-29999 .. 999999	0,000	FP	41	20	B2	0

I/O-data

	Description				Fct. no.	Code
Digital outputs:	z1 (et_err)	z2 (id_err)	z3 (valid)		1	B1

Display texts

Default display		Fct. no.	Code
Text 1:	C_RM2x	80	B2

RM_DI (RM 200 - digital input module - Typ-Nr. 15)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
MTyp	Module type RM 241 = 4 x 24 VDC	0	0	INT	71	35	B3	0
	Module type RM 242 = 8 x 24 VDC	1						
	Module type RM 243 = 4 x 230VAC	2						
Inv 1	direct input of signal1	0	0	INT	72	35		
	invers input of signal1	1						
Inv 2	direct input of signal2	0	0	INT	73	35		
	invers input of signal 2	1						
Inv 3	direct input of signal 3	0	0	INT	74	35		
	invers input of signal 3	1						
Inv 4	direct input of signal 4	0	0	INT	75	35		
	invers input of signal 4	1						
Inv 5	direct input of signal 5	0	0	INT	76	35		
	invers input of signal 5	1						
Inv 6	direct input of signal 6	0	0	INT	77	35		
	invers input of signal 6	1						
Inv 7	direct input of signal 7	0	0	INT	78	35		
	invers input of signal 7	1						
Inv 8	direct input of signal 8	0	0	INT	79	35		
	invers input of signal 8	1						

I/O-data

					Fct. no.	Code
Digital outputs:	z1 (et_err)	z2 (Iotid)	z3 (valid)	z4 (di 1)	1	B1
	z5 (di 1)	z6 (di 1)	z7 (di 1)	z8 (di 1)		
	z9 (di 1)	z10 (di 1)	z11 (di 1)			

Display texts

Default display		Fct. no.	Code
Text 1:	RM_DI	80	B2

RM_DO (RM 200 - digital output module - Typ-Nr. 16)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
MTyP	Module type RM 251 = 8 x 24 VDC,0,5A Module type RM 252 = 4 x Relais (230 VDC) 2A	0 1	0	INT	71	35	B3	0
Inv 1	direct output of signal 1 invers output of signal 1	0 1	0	INT	72	35		
Inv 2	direct output of signal 2 invers output of signal 2	0 1	0	INT	73	35		
Inv 3	direct output of signal 3 invers output of signal 3	0 1	0	INT	74	35		
Inv 4	direct output of signal 4 invers output of signal 4	0 1	0	INT	75	35		
Inv 5	direct output of signal 5 invers output of signal 5	0 1	0	INT	76	35		
Inv 6	direct output of signal 6 invers output of signal 6	0 1	0	INT	77	35		
Inv 7	direct output of signal 7 invers output of signal 7	0 1	0	INT	78	35		
Inv 8	direct output of signal 8 invers output of signal 8	0 1	0	INT	79	35		

I/O-data

					Fct. no.	Code
Digital inputs:	d1 (do 1)	d2 (do 2)	d3 (do 3)	d4 (do 4)	0	B1
	d5 (do 5)	d6 (do 6)	d7 (do 7)	d8 (do 8)		
Digital outputs:	z1 (et_err)	z1 (slotid)	z1 (valid)	z1 (di 1)	1	B1
	z1 (di 2)	z1 (di 3)	z1 (di 4)	z1 (di 5)		
	z1 (di 6)	z1 (di 7)	z1 (di 8)			

Display texts

Default display		Fct. no.	Code
Text 1:	RM_DO	80	B2

RM_AI (RM 200 - analog input module - Typ-Nr. 17)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Tf 1	Filter time constant [s] A1	0 .. 999999	0.5	FP	71	30	B3	0
X0 1	Scaling start value (0%) A1	-29999 .. 999999	0.000	FP	72	30		
X100 1	Scaling end value (100%) A1	-29999 .. 999999	100.00	FP	73	30		
Tf 2	Filter time constant [s] A2	0 .. 999999	0.5	FP	74	30		
X0 2	Scaling start value (0%) A2	-29999 .. 999999	0.000	FP	75	30		
X100 2	Scaling end value (100%) A2	-29999 .. 999999	100.00	FP	76	30		
Tf 3	Filter time constant [s] A3	0 .. 999999	0.5	FP	77	30		
X0 3	Scaling start value (0%) A3	-29999 .. 999999	0.000	FP	78	30		
X100 3	Scaling end value (100%) A3	-29999 .. 999999	100.00	FP	79	30		
Tf 4	Filter time constant [s] A4	0 .. 999999	0.5	FP	80	30		
X0 4	Scaling start value (0%) A4	-29999 .. 999999	0.000	FP	81	30		
X100 4	Scaling end value (100%) A4	-29999 .. 999999	100.00	FP	82	30		
MTyP	Module type RM 221-0 = 4x 0/4...20 mA	0	0	INT	71	35		
	Module type RM 221-1 = 4x -10/0...10 V	1						
	Module type RM 221-2 = 2x 0/4...20 mA + 2x -10/0...10 V	2						
	Modul type RM 222-0 = 4x 0/4...20 mA, TPS	3						
	Module type RM 222-1 = 4x -10/0...10 V, Poti, TPS	4						
	Module type 222-2 = 2x 0/4...20 mA + 2x -10/0...10 V, Poti, TPS	5						
	Module type 224-1 = 4x thermocouple/ Pt 100, 16Bit	6						
	Module type RM 224-1 = 2x thermocouple, 16Bit	7						

STyp 1	Sensor type of A1: Type J = -120...1200°C	1	1	INT	72	35	B3	0
	Type K = -130...1370°C	2						
	Type L = -120... 900°C	3						
	Type E = -130...1000°C	4						
	Type T = -130...400°C	5						
	Type S = 12...1760°C	6						
	Type R = 13...1760°C	7						
	Type B = 50...1820°C	8						
	Type N = -109...1300°C	9						
	Type W = 50...2300°C	10						
	Pt100 = -200 ... 850°C	30						
	Standard signal= 0...10V	40						
	Standard signal= -10...10V	41						
	Standard signal= 4...20mA	50						
	Standard signal= 0...20mA	51						
Unit 1	Unit of A1= °C	0	0	INT	73	35		
	Unit of A1= °F	1						
	Unit of A1= K	2						
STyp 2	Sensor type of A2: Type J = -120...1200°C	1	1	INT	74	35		
	Type K = -130...1370°C	2						
	Type L = -120... 900°C	3						
	Type E = -130...1000°C	4						
	Type T = -130...400°C	5						
	Type S = 12...1760°C	6						
	Type R = 13...1760°C	7						
	Type B = 50...1820°C	8						
	Type N = -109...1300°C	9						
	Type W = 50...2300°C	10						
	Pt100 = -200 ... 850°C	30						
	Standard signal= 0...10V	40						
	Standard signal= -10...10V	41						
	Standard signal= 4...20mA	50						
	Standard signal= 0...20mA	51						
Unit 2	Unit of A2= °C	0	0	INT	75	35		
	Unit of A2= °F	1						
	Unit of A2= K	2						
STyp 3	Sensor type of A3: Type J = -120...1200°C	1	1	INT	76	35		
	Type K = -130...1370°C	2						
	Type L = -120... 900°C	3						
	Type E = -130...1000°C	4						
	Type T = -130...400°C	5						
	Type S = 12...1760°C	6						
	Type R = 13...1760°C	7						
	Type B = 50...1820°C	8						
	Type N = -109...1300°C	9						
	Type W = 50...2300°C	10						
	Pt100 = -200 ... 850°C	30						
	Standard signal= 0...10V	40						
	Standard signal= -10...10V	41						
	Standard signal= 4...20mA	50						
	Standard signal= 0...20mA	51						
Unit 3	Unit of A3= °C	0	0	INT	77	35		
	Unit of A3= °F	1						
	Unit of A3= K	2						
STyp 4	Sensor type of A4: Typ J = -120...1200°C	1	1	INT	78	35		
	Typ K = -130...1370°C	2						
	Typ L = -120... 900°C	3						
	Typ E = -130...1000°C	4						
	Typ T = -130...400°C	5						
	Typ S = 12...1760°C	6						
	Typ R = 13...1760°C	7						
	Typ B = 50...1820°C	8						
	Typ N = -109...1300°C	9						
	Typ W = 50...2300°C	10						
	Pt100 = -200 ... 850°C	30						
	Standard signal= 0...10V	40						

	Standard signal= -10...10V	41	1	INT	78	35	B3	0
	Standard signal= 4...20mA	50						
	Standard signal= 0...20mA	51						
Unit 4	Unit of A4= °C	0	0	INT	79	35		
	Unit of A4= °F	1						
	Unit of A4= K	2						
Fail 1	Upscale: z3 = 1, y1 = x100	0	0	INT	80	35		
	Downscale: z3 = 1, y1 = x0	1						
Fail 2	Upscale: z4 = 1, y1 = x100	0	0	INT	81	35		
	Downscale: z4 = 1, y1 = x0	1						
Fail 3	Upscale: z5 = 1, y1 = x100	0	0	INT	82	35		
	Downscale: z5 = 1, y1 = x0	1						
Fail 4	Upscale: z6 = 1, y1 = x100	0	0	INT	83	35		
	Downscale: z6 = 1, y1 = x0	1						

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x1in 1	Meas.value correction P1, input 1	-29999 .. 999999	0,000	FP	41	20	B2	0
x1out 1	Meas.value correction P1, output 1	-29999 .. 999999	0,000	FP	42	20		
x2in 1	Meas.value correction P21, input 1	-29999 .. 999999	100,00	FP	43	20		
x2out 1	Meas.value correction P2, output 1	-29999 .. 999999	100,00	FP	44	20		
x1in 2	Meas.value correction P1, input 2	-29999 .. 999999	0,000	FP	45	20		
x1out 2	Meas.value correction P1, output 2	-29999 .. 999999	0,000	FP	46	20		
x2in 2	Meas.value correction P2, input 2	-29999 .. 999999	100,00	FP	47	20		
x2out 2	Meas.value correction P2, output 2	-29999 .. 999999	100,00	FP	48	20		
x1in 3	Meas.value correction P1, input 3	-29999 .. 999999	0,000	FP	49	20		
x1out 3	Meas.value correction P1, output 3	-29999 .. 999999	0,000	FP	50	20		
x2in 3	Meas.value correction P2, input 3	-29999 .. 999999	100,00	FP	51	20		
x2out 3	Meas.value correction P2, output 3	-29999 .. 999999	100,00	FP	52	20		
x1in 4	Meas.value correction P1, input 4	-29999 .. 999999	0,000	FP	53	20		
x1out 4	Meas.value correction P1, output 4	-29999 .. 999999	0,000	FP	54	20		
x2in 4	Meas.value correction P2, input 4	-29999 .. 999999	100,00	FP	55	20		
x2out 4	Meas.value correction P2, output 4	-29999 .. 999999	100,00	FP	56	20		

I/O-data

					Fct. no.	Code
Analog inputs:	x1 (Slot x)				0	B1
Digital inputs:	d1 (lock)	d2 (hide)				
Analog outputs:	y1 (AI 1)	y1 (AI 1)	y1 (AI 1)	y1 (AI 1)	1	
Digital outputs:	z1 (et-err)	z1 (slotid)	z1 (valid)	z1 (fail 1)		
	z1 (fail 2)	z1 (fail 3)	z1 (fail 4)	z1 (tcfail)		

Display texts

Default display		Fct. no.	Code
Text 1:	RM_AI	80	B2

Attention!

This functionblock had no parameter data for online calibration until operating version 6. To differentiate between both, the new functionblock has the typenumber 19, the old one, without parameter data is number 17.

RM_AO (RM 200 - analog output module - Typ-Nr. 18)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
X0 1	Value of AO 1 at 0%	-29999 .. 999999	0,000	FP	71	30	B3	0
X100 1	Value of AO 1 at 100%	-29999 .. 999999	100,00	FP	72	30		
X0 2	Value of AO 2 at 0%	-29999 .. 999999	0,000	FP	73	30		
X100 2	Value of AO 2 at 100%	-29999 .. 999999	100,00	FP	74	30		
X0 3	Value of AO 3 at 0%	-29999 .. 999999	0,000	FP	75	30		
X100 3	Value of AO 3 at 100%	-29999 .. 999999	100,00	FP	76	30		
X0 4	Value of AO 4 at 0%	-29999 .. 999999	0,000	FP	77	30		
X100 4	Value of AO 4 at 100%	-29999 .. 999999	100,00	FP	78	30		
MTyp	Module type RM 231-0 = 4x 0/4..20 mA / 4x 0...10 V	0	0	INT	71	35		
	Module type RM 231-1= 4x 0/4..20 mA / 2x 0...10V / 2x-10...10V	1						
	Modultyp RM 231-2 = 4x 0/4...20 mA / 4x -10...10 V	2						
Otyp 1	Output-signal 1 -10 .. 10V	10	0	INT	72	35		
	Output-signal 1 0 .. 10V	11						
	Output-signal 1 0 .. 20mA	20						
	Output-signal 1 4 .. 20mA	21						
Otyp 2	Output-signal 2 -10 .. 10V	10	0	INT	73	35		
	Output-signal 2 0 .. 10V	11						
	Output-signal 2 0 .. 20mA	20						
	Output-signal 2 4 .. 20mA	21						
Otyp 3	Output-signal 3 -10 .. 10V	10	0	INT	74	35		
	Output-signal 3 0 .. 10V	11						
	Output-signal 3 0 .. 20mA	20						
	Output-signal 3 4 .. 20mA	21						
Otyp 4	Output-signal 4 -10 .. 10V	10	0	INT	75	35		
	Output-signal 4 0 .. 10V	11						
	Output-signal 4 0 .. 20mA	20						
	Output-signal 4 4 .. 20mA	21						
Fail 1	Fail function off output 1	0	0	INT	76	35		
	Keep valueon fail on output 1	1						
Fail 2	Fail function off output 2	0	0	INT	77	35		
	Keep valueon fail on output 2	1						
Fail 3	Fail function off output 3	0	0	INT	78	35		
	Keep valueon fail on output 3	1						
Fail 4	Fail function off output 4	0	0	INT	79	35		
	Keep valueon fail on output 4	1						

I/O-data

	Description				Fct. no.	Code
Analog inputs:	x1 (Slot x)	x2 (AO 1)	x3 (AO 2)	x4 (AO 3)	0	B1
	x5 (AO 4)					
Digital outputs:	z1 (et-err)	z2 (slotid)	z3 (valid)	z4 (fail 1)	1	
	z5 (fail 2)	z6 (fail 3)	z7 (fail 4)			

Display texts

Default display		Fct. no.	Code
Text 1:	RM_AO	80	B2

RM_DMS (RM 225 - DMS-module - Typ-Nr. 22)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Tfm 1	Filter time constant A1 1 [s]	0 .. 999999	0,000	FP	71	30	B3	0
X0 1	Value of A1 1 at 0%	-29999 .. 999999	0,00	FP	72	30		
X1001	Value of A1 1 at 100%	-29999 .. 999999	100,00	FP	73	30		
Cn 1	Sensitivity at nominal load [mV/V]1	-29999 .. 999999	100,00	FP	74	30		
Tfm 2	Filter time constant A1 2 [s]	0 .. 999999	0,000	FP	75	30		
X0 2	Value of A1 2 at 0%	-29999 .. 999999	0,00	FP	76	30		
X100 2	Value of A1 2 at 100%	-29999 .. 999999	100,00	FP	77	30		
Cn 2	Sensitivity at nominal load [mV/V]1	-29999 .. 999999	100,00	FP	78	30		
MTyp	Module type RM 225= DMS-Modul	0	0	INT	71	35		
Styp 1	input signal 1 -4 +4mV/V	0	0	INT	72	35		
Unit 1	Unit input 1 mV/V	71	71	INT	73	35		
Styp 2	Unit input 2 -4 +4mV/V	0	0	INT	74	35		
Unit 2	Einheit input 2 mV/V	71	71	INT	75	35		
Fail 1	Error handling z3=1,y1=x100	0	0	INT	76	35		
	Error handling z3=1,y1=x0	1						
Fail 2	Error handling z4=1,y1=x100	0	0	INT	77	35		
	Error handling z4=1,y1=x0	1						

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x1in 1	Meas.value correction P1 in of AI 1	-29999 .. 999999	0,000	FP	41	20	B2	0
x1out 1	Meas.value correction P1 out of AI 1	-29999 .. 999999	0,000	FP	42	20		
x2in 1	Meas.value correction P2 in of AI 1	-29999 .. 999999	100,00	FP	43	20		
x2out 1	Meas.value correction P2 out of AI 1	-29999 .. 999999	100,00	FP	44	20		
x1in 2	Meas.value correction P1 in of AI 2	-29999 .. 999999	0,000	FP	45	20		
x1out 2	Meas.value correction P1 out of AI 2	-29999 .. 999999	0,000	FP	46	20		
x2in 2	Meas.value correction P2 in of AI 2	-29999 .. 999999	100,00	FP	47	20		
x2out 2	Meas.value correction P2 out of AI 2	-29999 .. 999999	100,00	FP	48	20		

I/O-data

	Description				Fct. no.	Code
Analog inputs:	x1 (Slot x)				0	B1
Digital inputs:	d1 (set_t1)	d2 (res_t1)	d3 (zero_1)	d4 (set_t2)		
	d5 (res_t2)	d6 (zero_2)				
Analog outputs:	x1 (AI 1)	x2 (AI 1)			1	
Digital outputs:	z1 (et-err)	z2 (slotid)	z3 (valid)	z4 (fail 1)		
	z5 (fail 2)	z6 (ready)				

Display texts

Default display		Fct. no.	Code
Text 1:	RM_DMS	80	B2

CRCV (receive block s 22, 24, 26, 28 - Typ-Nr. 56))

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Nodeid	Node address of sending KS98	1 .. 42	1	INT	71	35	B3	0

I/O-data

	Description				Fct. no.	Code
Analog outputs:	y1	y2	y3	y4	1	B1
	y5	y6	y7	y8		
	y9					
Digital outputs:	z1 (id-err)	z2 (valid)	z3 (do 1)	z4 (do 2)		
	z5 (do 3)	z6 (do 4)	z7 (do 5)	z7 (do 6)		
	z5 (do 7)	z5 (do 8)	z5 (do 9)	z5 (do 10)		
	z5 (do 11)	z5 (do 12)	z5 (do 13)	z5 (do 14)		
	z7 (do 15)	z7 (do 16)				

Display texts

Default display		Fct. no.	Code
Text 1:	CRCV	80	B2

CSEND (send bock s 21, 23, 25, 27 - Typ-Nr. 57)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
delta	change, causing a new transmission	-29999 .. 999999	0.100	FP	71	30	B3	0

I/O-data

	Description				Fct. no.	Code
Analog inputs:	x1	x2	x3	x4	0	B1
	x5	x6	x7	x8		
	x9					
Digital inputs:	d1 (di 1)	d2 (di 2)	d3 (di 3)	d4 (di 4)		
	d5 (di 5)	d6 (di 6)	d7 (di 7)	d7 (di 8)		
	d5 (di 9)	d5 (di 10)	d5 (di 11)	d5 (di 12)		
	d5 (di 13)	d5 (di 14)	d5 (di 15)	d5 (di 16)		
Digital outputs:	z1 (valid)				1	

Display texts

Default display		Fct. no.	Code
Text 1:	CSEND	80	B2

C_KS8x (KS 800 and KS 816 node function - Typ-Nr. 58)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Nodeid	Node address of KS800/KS816	2 .. 42	2	INT	71	35	B3	0

I/O-data

	Description				Fct. no.	Code
Analog outputs:	y1 (C 1)	y2 (C 2)	y3 (C 3)	y4 (C 4)	1	B1
	y5 (C 5)	y6 (C 6)	y7 (C 7)	y8 (C 8)		
	y9 (C 9)	y10 (C 10)	y11 (C 11)	y12 (C 12)		
	y13 (C 13)	y14 (C 14)	y15 (C 15)	y16 (C 16)		
Digital outputs:	z1 (et-err)	z2 (id-err)	z3 (valid)	z4 (online)		
	z5 (fail 1)	z6 (fail 2)	z7 (fail 3)	z7 (di 1)		
	z5 (di 2)	z5 (di 3)	z5 (d1 4)			

Display texts

Default display		Fct. no.	Code
Text 1:	C_KS8x	80	B2

KS8x (KS 800 and KS 816 controller function - Typ_Nr. 59)

I/O-data

	Description				Fct. no.	Code
Analog inputs:	x1 (Cx)	x2 (W)	x3 (Yman)		0	B1
Digital inputs:	d1 (a/m)	d2 (C off)	d3 (w/w2)	d4 (we/wi)		
	d5 (ostart)					
Analog outputs:	y1 (X)	y2 (Y)	y3 (St1)	y4 (St2)	1	
Digital outputs:	z1 (et-err)	z2 (valid)	z3 (xfail)			

Display texts

Default display		Fct. no.	Code
Text 1:	KS8x	80	B2

CPREAD (CAN-PDO-read function - no 88)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Nodeid	Nodeaddress of producer	0	0	INT	71	35	B3	0
Guard	deactivate node guarding	0	0	INT	72	35		
	activate node guarding	1						
COBid1	COB-addresse of 1. receive PDO	385 .. 1320	-32000	INT	73	35		
COBid2	COB-addresse of 2. receive PDO	385 .. 1320	-32000	INT	74	35		

I/O-data

	Description				Fct. no.	Code
Digital inputs:	d1 (start)				0	B1
Analog outputs:	y1 (R1 1)	y2 (R121)	y3 (R1 3)	y4 (R14)	1	
	y5 (R1 5)	y6 (R1 6)	y7 (R1 7)	y8 (R1 8)		
	y8 (R2 1)	y8 (R2 2)	y8 (R2 3)	y8 (R2 4)		
	y8 (R2 5)	y8 (R2 6)	y8 (R2 7)	y8 (R2 8)		
Digital outputs:	z1 (id-err)	z2 (et-err)	z3 (valid)			

Display texts

Default display		Fct. no.	Code
Text 1:	CPREAD	80	B2

CPWRIT (CAN-PDO-write function - no 89)

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Nodeid	Nodeaddress of producer	0	0	INT	71	35	B3	0
Guard	deactivate node guarding	0	0	INT	72	35		
	activate node guarding	1						
COBid1	COB-addresse of 1. send PDO	385 .. 1320	-32000	INT	73	35		
COBid2	COB-addresse of 2. send PDO	385 .. 1320	-32000	INT	74	35		

I/O-data

	Description				Fct. no.	Code
Digital inputs:	d1 (start)				0	B1
Analog inputs:	x1 (T1 1)	x2 (T121)	x3 (T1 3)	x4 (T14)		
	x5 (T1 5)	x6 (T1 6)	x7 (T1 7)	x8 (T1 8)		
	x8 (T2 1)	x8 (T2 2)	x8 (T2 3)	x8 (T2 4)		
	x8 (T2 5)	x8 (T2 6)	x8 (T2 7)	x8 (T2 8)		
Digital outputs:	z1 (id-err)	z2 (et-err)	z3 (valid)		1	

Display texts

Default display		Fct. no.	Code
Text 1:	CPWRIT	80	B2

CSDO (CAN-SDO-function - no. 92)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Value	Set value	-29999 .. 999999	0,000	FP	41	20	B2	0
Access	Type of object access read	0	0	INT	41	25		
	Type of object access write	1						
Nodeid	Node address of target	2	2	INT	42	25		
D-Typ	Data type of object Uint8	0	0	INT	43	25		
	Data type of object Int8	1						
	Data type of object Uint16	2						
	Data type of object Int16	3						
	Data type of object Uint32	4						
	Data type of object Int32	5						
	Data type of object Float	6						
Subind	Object dictionary subindex	0	255	INT	44	25		
Index	Object dictionary index	1	65535	INT	45	25		

I/O-data

	Description				Fct. no.	Code
Analoge inputs:	x1 (Nodeid)	x2 (D-Type)	x3 (Subind)	x4 (Index)	0	B1
	x5 (Wert)					
Digital inputs:	d1 (r/w)	d2 (trig)				
Analog outputs:	y1 (Y1read)				1	
Digital outputs:	z1 (err)	z2 (ready)				

Display texts

Default display		Fct. no.	Code
Text 1:	CSDO	80	B2

6.15. Programmer

APROG (Analog programmer - no. 24)

Process data

Des.	Description	R/W	Type	Range	Rem.	Code	Fct. no.
Block	Block access	R	Block	01, 03 .. 09		00	0
Status 1	Programmer status	R	ST1		A	01	
Status 2	Programmer status	R	ST2		B	02	
PNreff	eff. program number	R	FP	1..99		03	
Tnet	Program time net	R	FP	0 .. 59999		04	
Tbrut	Program time gross	R	FP	0 .. 59999		05	
Wp	Programmer set-point	R	FP	-29999 .. 999999		06	
Trest	Remaining time programmer	R	FP	0 .. 59999		07	
Wend	End value active segment	R	FP	-29999 .. 999999		08	
Seg	Segment number	R	FP	1 .. 999		09	
Block	Block access	R		03		00	1
SegRest	Segment remaining time	R	BCD	-29999...200000		03	
Block	Block access	R	Block	21 .. 24		20	0
PRun	Program stop/run	R/W	INT	0 .. 1		21	
PRset	Programm continue / reset	R/W	INT	0 .. 1		22	
PSearch	Start program search run	R/W	INT	0 .. 1		23	
F-Key	F-key function (A/M switch-over	R/W	INT	0 .. 1		24	
manual	Program Auto / Manual	R/W	INT	0...1		25	
Block	Block access	R	Block	31, 35		30	0
Pnr	Program number effective	R/W	INT	1 .. 99		31	
PSet	Program preset value Pmode = Seg Pmode = time	R/W	FP	1 .. 999 0...59999		35	
Wp preset	Setpoint preset (inmanual operation!)	R/W		-29999...200000		36	

Rem. Programmer status 'Status 1'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	P_{Run}	Program run	stop	running
D1	P_{End}	Program end	no	yes
D2	P_{Res}	Program reset	off	on
D3	Err1	Faulty parameter block	o.k.	error
D4	Err2	Infinite loop with parameter blocks	o.k.	error
D5	'0'	always '0'		
D6	'1'	always '1'		
D7		Parity		

Rem.A Programmer status 'Status 2'

MSB							LSB
D7	D6	D5	D4	D3	**D2**	**D1**	**D0**

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	P_{Halt}	Program Halt	no Halt	Halt
D1	P_{Man}	Program Manual	Auto	Manual
D2		0		
D3		0		
D4		0		
D5	'0'	always '0'		
D6	'1'	always '1'		
D7		Parity		

Parameter data

Des.	Description	Range	Def.	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
WP0	Program set-point after reset	-29999 .. 999999	0.000	FP	41	20	B2	0
W0	Lower setpoint limit	-29999 .. 999999	-29999		42			
W100	Higher setpoint limit	-29999 .. 999999	999999		43			
WMode	Ramp function	0	0	INT	41	25		
	Step function	1						
PMode	Preset to segment	0	1	INT	42			
	Preset to time	1						
TPrio	Gradient priority	0	0	INT	43			
	Time priority	1						
Dp	Decimal point of setpoint	0...3	0		44			
RecMax	Max. recipes	1...99	99		45			
SMode	Search run in the segment	0	0		46			
	Search run in program/ sequence	1						
	No search run	2						

Configuration data

Des.	Description	Range	Def.	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
PwrUp	Program continue	0	0	INT	71	35	B3	0
	Search run in actual segment	1						
	Continue at actual time	2						
PEnd	After program end: stop	0	0	INT	72	35		
	After program end: reset	1						
	Reset and halt	2						
Turbo	Time = hours : minutes	0	0	INT	73	35		
	Time = minutes : seconds	1						
FKey	A/M-Key switches F-Key output	0	0	INT	74	35		
	A/M-Key gives oulse to F-Key output	1						
	A/M-Key contols the programmer	2						

I/O data

					Fct. no.	Code
Analog inputs:	x1 (PSet)	x2 (DBlock)	x3 (ProgNo)	x4 (XVal)	0	B1
	x5 (Slav No)					
Digital inputs:	d1 (hide)	d2 (lock)	d3 (run)	d4 (reset)		
	d5 (preset)	d6 (search)	d7 (p-show)	d8 (halt)		
	d9 (manfree)					
Analog outputs:	y1 (Wp)	y2 (TNetto)	y3 (TBrutt)	y4 (TRest)	1	
	y5 (SegNo)	y6 (WEnd)	y7 (ProgNo)			
	y9 (BI-no)					
Digital outputs:	z1 (run)	z2 (reset)	z3 (end)	z4 (fkey)		
	z5 (preset)	z6 (manual)				

Display texts

Default display		Fct. no.	Code
Text 1:	APROG	80	B2

APROGD (APROG data - no. 25)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct.no.
TP1	Time for segment 1	0,0 .. 59999	-32000	FP	41	20	B2	0
WP1	End value of segment 1	-29999 .. 999999	0,000	FP	42	20		
TP2	Time for segment 2	0,0 .. 59999	-32000	FP	43	20		
WP2	End value of segment 2	-29999 .. 999999	0,000	FP	44	20		
TP3	Time for segment 3	0,0 .. 59999	-32000	FP	45	20		
WP3	End value of segment 3	-29999 .. 999999	0,000	FP	46	20		
TP4	Time for segment 4	0,0 .. 59999	-32000	FP	47	20		
WP4	End value of segment 4	-29999 .. 999999	0,000	FP	48	20		
TP5	Time for segment 5	0,0 .. 59999	-32000	FP	49	20		
WP5	End value of segment 5	-29999 .. 999999	0,000	FP	51	20		
TP6	Time for segment 6	0,0 .. 59999	-32000	FP	52	20		
WP6	End value of segment 6	-29999 .. 999999	0,000	FP	53	20		
TP7	Time for segment 7	0,0 .. 59999	-32000	FP	54	20		
WP7	End value of segment 7	-29999 .. 999999	0,000	FP	55	20		
TP8	Time for segment 8	0,0 .. 59999	-32000	FP	56	20		
WP8	End value of segment 8	-29999 .. 999999	0,000	FP	57	20		
TP9	Time for segment 9	0,0 .. 59999	-32000	FP	58	20		
WP9	End value of segment 9	-29999 .. 999999	0,000	FP	59	20		
TP10	Time for segment 10	0,0 .. 59999	-32000	FP	61	20		
WP10	End value of segment 10	-29999 .. 999999	0,000	FP	62	20		

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1 (DBlock)	0	B1
Analog outputs:	y1 (DBlock)	1	

Display texts

Default display		Fct. no.	Code
Text 1:	APROGD	80	B2

APROGD 2 (APROG-Daten - Typ-Nr. 25)

Parameterdaten

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Type1	Time segment Gradient segment Hold segment Step segment Time segment, wait at the end Gradient segment, wait at the end Hold segment, wait at the end Step segment, wait at the end	0 1 2 3 4 5 6 7	←	INT	41	25	B2	0
Type2	Time segment Gradient segment Hold segment Step segment Time segment, wait at the end Gradient segment, wait at the end Hold segment, wait at the end Step segment, wait at the end	0 1 2 3 4 5 6 7	←	INT	42	25		
Type3	Time segment Gradient segment Hold segment Step segment Time segment, wait at the end Gradient segment, wait at the end Hold segment, wait at the end Step segment, wait at the end	0 1 2 3 4 5 6 7	←	INT	43	25		
: : : : :	Time segment Gradient segment Hold segment Step segment Time segment, wait at the end Gradient segment, wait at the end Hold segment, wait at the end Step segment, wait at the end	0 1 2 3 4 5 6 7	←	INT	: : : : : : : :	: : : : : : : :		
Type9	Time segment Gradient segment Hold segment Step segment Time segment, wait at the end Gradient segment, wait at the end Hold segment, wait at the end Step segment, wait at the end	0 1 2 3 4 5 6 7	←	INT	49	25		
Type10	Time segment Gradient segment Hold segment Step segment Time segment, wait at the end Gradient segment, wait at the end Hold segment, wait at the end Step segment, wait at the end	0 1 2 3 4 5 6 7	←	INT	51	25		
Tpar1	Time for Segment 1	0,0 .. 59999	-32000	FP	41	20		
WP1	End value for Segment 1	-29999 .. 999999	0,000	FP	42	20		
Tpar2	Time for Segment 2	0,0 .. 59999	-32000	FP	43	20		
WP2	End value for Segment 2	-29999 .. 999999	0,000	FP	44	20		
Tpar3	Time for Segment 3	0,0 .. 59999	-32000	FP	45	20		
WP3	End value for Segment 3	-29999 .. 999999	0,000	FP	46	20		
Tpar4	Time for Segment 4	0,0 .. 59999	-32000	FP	47	20		
WP4	End value for Segment 4	-29999 .. 999999	0,000	FP	48	20		
Tpar5	Time for Segment 5	0,0 .. 59999	-32000	FP	49	20		
WP5	End value for Segment 5	-29999 .. 999999	0,000	FP	51	20		
Tpar6	Time for Segment 6	0,0 .. 59999	-32000	FP	52	20		
WP6	End value for Segment 6	-29999 .. 999999	0,000	FP	53	20		
Tpar7	Time for Segment 7	0,0 .. 59999	-32000	FP	54	20		
WP7	End value for Segment 7	-29999 .. 999999	0,000	FP	55	20		
Tpar8	Time for Segment 8	0,0 .. 59999	-32000	FP	56	20		
WP8	End value for Segment 8	-29999 .. 999999	0,000	FP	57	20		
Tpar9	Time for Segment 9	0,0 .. 59999	-32000	FP	58	20		
WP9	End value for Segment 9	-29999 .. 999999	0,000	FP	59	20		
Tpar10	Time for Segment 10	0,0 .. 59999	-32000	FP	61	20		
WP10	End value for Segment 10	-29999 .. 999999	0,000	FP	62	20		

I/O data

	Description	Fct. no	Code
Analog inputs:	x1 (DBlock)	0	B1
Analog outputs:	y1 (DBlock)	1	

Display texts

	Default display	Fct. no	Code
Text 1:	APROGD2	80	B2

DPROG (Digital programmer - no. 27)

Process data

Des.	Description	R/W	Type	Range	Rem.	Code	Fct. no.
Block	Block access	R	Block	01 .. 05, 07, 09		00	
Status 1	Programmer status 1	R	ST1		**B**	01	
Status 2	Actual status of control outputs	R	ST1		**C**	02	
PNreff	Eff. Program number	R	FP	1..99		03	
Tnet	Program time net	R	FP	0 .. 59999		04	
Tbrut	Program time gross	R	FP	0 .. 59999		05	
Trest	Rest time programmer	R	FP	0 .. 59999		07	
Seg	Segment number	R	FP	1 .. 999		09	
Block	Block access	R		01, 03		00	
Status 3	Status 3	R	ST1		**D**	01	
SegRest	Segment remaining time	R	FP	-29999 .. 200000		03	0
Block	Block access	R	block	21, 22, 24		20	
PRun	Program stop/run	R/W	INT	0 .. 1		21	
PRset	Program continue / reset	R/W	INT	0 .. 1		22	
F-Key	F-key function (A/H switch-over	R/W	INT	0 .. 1		24	
manual	Program Auto / manual	R/W	INT	0 .. 1		25	
Block	Block access	R	block	31, 35		30	
Pnr	Program number effective	R/W	INT	1 .. 99		31	
PSet	Program preset value Pmode = Seg Pmode = time	R/W	FP	1 .. 999 0...59999		35	
do6...do1	Steuerspurvorgabe (im Handbetrieb!)	R/W	FP	000000...111111		36	

Rem.B Programmer status 'Status 1'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	P_{Run}	Program run	stop	running
D1	P_{End}	Program end	no	yes
D2	P_{Res}	Program reset	off	on
D3	Err1	Faulty parameter block	o.k.	error
D4	Err2	Infinite loop with parameter blocks	o.k.	error
D5	'0'	always '0'		
D6	'1'	always '1'		
D7		Parity		

Rem.C Actual statuses of control outputs 'Status 2'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	Stsp1	Control output 1	off	on
D1	Stsp2	Control output 2	off	on
D2	Stsp3	Control output 3	off	on
D3	Stsp4	Control output 4	off	on
D4	Stsp5	Control output 5	off	on
D5	Stsp6	Control output 6	off	on
D6	'1'	always '1'		
D7		Parity		

Rem.D Programmerstatus 'Status 3

MSB							LSB
D7	D6	D5	D4	D3	**D2**	**D1**	**D0**

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	P_{Halt}	Program Halt	no Halt	Halt
D1	P_{Man}	Program Manual	Auto	Manual
D2		0		
D3		0		
D4		0		
D5	'0'	always '0'		
D6	'1'	always '1'		
D7		Parity		

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct.no.
PwrUp	Continue program	0	0	INT	71	35	B3	0
	Continue at actual time	2						
PEnd	After end of program: stop	0	0	INT	72	35		
	After end of program: reset	1						
	Reset and stop	2						
Turbo	Time = hours : minutes	0	0	INT	73	35		
	Time = minutes : seconds	1						
FKey	A/M-Key switches F-Key output	0	0	INT	74	35		
	A/M-Key gives pulse to F-Key output	1						
	A/M-Key control Programmer	2						

Parameter data

Des.	Description	Range	Def.	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
D0	Reset value for control outputs 6...0 after reset	0 .. 111111	0	FP	41	20	B2	0
PMode	Preset to segment	0	1	INT	41	25		
	Preset to time	1						

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1 (PSet)	x2 (DBlock)	x3 (ProgNo)	x4 (SlavNo)	0	B1
Digital inputs:	d1 (hide)	d2 (lock)	d3 (run)	d4 (reset)		
	d5 (preset)	d6 (p-show)	d7 (halt)	d8 (manfree)		
Analog outputs:	y1 (TNetto)	y2 (TBrutt)	y3 (TRest)	y4 (SegNo)	1	
	y5 (ProgNo)	y6 (SegRest)	y7 (BI-no)			
Digital outputs:	z1 (run)	z2 (reset)	z3 (end)	z4 (fkey)		
	z5 (do1)	z6 (do2)	z7 (do3)	z8 (do4)		
	z9 (do5)	z10 (do6)	z11 (preset)	z12 (manual)		

Display texts

Default display		Fct. no.	Code
Text 1:	DPROG	80	B2

DPROGD (DPROG data - no. 28)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct.no.
tP1	Time for segment 1	0,0 .. 59999	-32000	FP	41	20	B2	0
d1	Control output values for segm. 1	0 .. 111111	0	FP	42	20		
tP2	Time for segment 2	0,0 .. 59999	-32000	FP	43	20		
d2	Control output values for segm. 2	0 .. 111111	0	FP	44	20		
tP3	Time for segment 3	0,0 .. 59999	-32000	FP	45	20		
d3	Control output values for segm. 3	0 .. 111111	0	FP	46	20		
tP4	Time for segment 4	0,0 .. 59999	-32000	FP	47	20		
d4	Control output values for segm. 4	0 .. 111111	0	FP	48	20		
tP5	Time for segment 5	0,0 .. 59999	-32000	FP	49	20		
d5	Control output values for segm. 5	0 .. 111111	0	FP	51	20		
tP6	Time for segment 6	0,0 .. 59999	-32000	FP	52	20		
d6	Control output values for segm. 6	0 .. 111111	0	FP	53	20		
tP7	Time for segment 7	0,0 .. 59999	-32000	FP	54	20		
d7	Control output values for segm. 7	0 .. 111111	0	FP	55	20		
tP8	Time for segment 8	0,0 .. 59999	-32000	FP	56	20		
d8	Control output values for segm. 8	0 .. 111111	0	FP	57	20		
tP9	Time for segment 9	0,0 .. 59999	-32000	FP	58	20		
d9	Control output values for segm. 9	0 .. 111111	0	FP	59	20		
tP10	Time for segment 10	0,0 .. 59999	-32000	FP	61	20		
d10	Control output values for segm. 10	0 .. 111111	0	FP	62	20		

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1 (DBlock)	0	B1
Analog outputs:	y1 (DBlock)	1	

Display texts

Default display		Fct. no.	Code
Text 1:	DPROGD	80	B2

6.16. Controller functions

CONTR (Control function - no. 90)

Process data

Des.	Description	R/W	Type	Range	Rem.	Code	Fct. no.
Block	Block access	R	block	01 .. 05, 07, 09		00	0
Status 1	status 1	R	ST1		A	01	
Status 2	status 2	R	ST1		B	02	
Weff	Eff. set-point	R	FP	-29999 .. 999999		03	
Xeff	Eff. process value	R	FP	-29999 .. 999999		04	
Yeff	Effective correcting variable	R	FP	-29999 .. 999999		05	
x-w	Control deviation	R	FP	-29999 .. 999999		06	
X1	Main variable 1	R	FP	-29999 .. 999999		07	
X2	Auxiliary variable 2	R	FP	-29999 .. 999999		08	
X3	Auxiliary variable 3	R	FP	-29999 .. 999999		09	
Block	Block access	R	block	01..03 05..07		00	1
Status 3	Status 3	R	ST1		C	01	
WStatus	Set-point status	R	ST1		D	02	
Yp	Position feedback	R	FP	-29999 .. 999999		03	
OVC+	Override control +	R	FP	-29999 .. 999999		05	
OVC-	Override control +	R	FP	-29999 .. 999999		06	
Wext	Ext. set-point	R	FP	-29999 .. 999999		07	
Block	Block access	R	block	01, 03		00	2
TStatus	Status Tuning 1	R/W	ST1		E	01	
POpt	Parameter set for self-tuning	R/W	FP	1 .. 6		03	
Block	Block access	R	block	21 .. 26, 28		20	0
y/Y2	Additional correcting value on/off	R/W	INT	0 / 1		21	
PI/P	PI/P switch-over	R/W	INT	0 / 1		22	
A/M	Auto/manual switch-over	R/W	INT	0 / 1		23	
OStart	Self-tuning start	R/W	INT	0 / 1		24	
We/i	Wext/Wint switch-over	R/W	INT	0 / 1		25	
w/W2	w/W2 switch-over	R/W	INT	0 / 1		26	
Coff	Controller on/off	R/W	INT	0 / 1		28	
Block	Block access	R	Block	31, 32, 35, 36		30	1
Wnvol	internal set-point, non volatile (EEPROM)	R/W	FP	-29999 .. 999999		31	
Wvol	internal set-point, volatile (RAM)	R/W	FP	-29999 .. 999999		32	
dYman	Difference correcting variable	R/W	FP	-210 .. 210		35	
Yman	Absolute correcting variable	R/W	FP	-105 .. 105		36	
Block	Block access	R	block	31 .. 39		30	2
ParNr	Effective parameter set number	R/W	FP	1 .. 6		31	
Tu1	Delay time heating	R	FP	0 ..200000		32	
Vmax1	Rate of change heating	R	FP	0 .. 9,999		33	
Kp1	Process gain heating	R	FP	0 .. 9,999		34	
MSG1	Error code of self-tuning heating	R	FP	0 .. 8		35	
Tu2	Delay time cooling	R	FP	0 ..200000		36	
Vmax2	Rate of change cooling	R	FP	0 .. 9,999		37	
Kp2	Process gain cooling	R	FP	0 .. 9,999		38	
MSG2	Error code of self-tuning cooling	R	FP	0 .. 8		39	

Rem. 'Status 1'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	Y1	Switching output 1	off	on
D1	Y2	Switching output 2	off	on
D2	A/M	Auto/manual	auto	manual
D3	y/Y2	y/Y2 switch-over	y	Y2
D4	Coff	Controller switched off	no	yes
D5	XFail	Sensor fail	no	yes
D6	'1'	always '1'		
D7		Parity		

Rem.A 'Status 2'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0..D3	'0'	always '0'		
D4	PI/P	Status PI/P	PI	P
D5	CFail	Status controller	ok	not ok
D6	'1'	always '1'		
D7		Parity		

Rem.B 'Status 3'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	'0'	always '0'		
D1	DOVC-	Override control-	off	on
D2	DOVC+	Override control+	off	on
D3..D5	'0'	always '0'		
D6	'1'	always '1'		
D7		Parity		

Rem.C Set-point status 'WStatus'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	w/W2	w/W2 switch-over	w	W2
D1	We/Wi	Wext/Wint switch-over	Wext	Wint
D2	HoldWeff	Weff frozen	no	yes
D3	GrwOff	Set-point gradient suppressed	no	yes
D4	Trk	Tracking	off	on
D5	'0'	always '0'		
D6	'1'	always '1'		
D7		Parity		

Rem.D Status Tuning 'TStatus'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	OStab	Process at rest	no	yes
D1	Orun	Self-tuning operation	off	on
D2	Oerr	Self-tuning result	ok	error
D3..D5	'0'	always '0'		
D6	'1'	always '1'		
D7		Parity		

Configuration data

Des.	Description	Range	Def.	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct.no.
Xn0	Span start	-29999 .. 999999	0	FP	71	30	B3	0
Xn100	Span end	-29999 .. 999999	100	FP	72	30		
SFac	Factor for stoichiometric ratio	0,010 .. 99,990	1,000	FP	73	30		
CFunc	Signaller, 1 output	0	9	INT	71	35		
	Signaller, 2 outputs	1						
	2-point controller	2						
	3-point controller: heating & cooling switch.	3						
	3-point controller: heating cont./cooling switch.	4						
	3-point controller: heating switch./cooling cont.	5						
	Δ / star / off controller	6						
	3-point stepping controller	7						
	3-point stepping controller with Yp	8						
	Cont. controller with position feedback Yp	9						
	Cont. controller with split-range	10						
	Cont. controller with position feedback Yp	11						
CType	Standard controller	0	0	INT	72	35		
	Ratio controller	1						
	3-element controller	2						
WFunc	Set-point control	0	0	INT	73	35		
	Set-point/cascade control	1						
CMode	Output action inverse	0	0	INT	74	35		
	Output action direct	1						
CDiff	Differentiate Xw	0	0	INT	75	35		
	Differentiate X	1						
CFail	Neutral	0	0	INT	76	35		
	Ypid = Ymin (0%)	1						
	Ypid = Ymax (100%)	2						
	Ypid = Y2 (not adjustable from front)	3						
	Ypid = Y2 (automatic) or Yman (manual)	4						
COVC	No override control	0	0	INT	77	35		
	Override control +	1						
	Override control -	2						
	Override control + / -	3						
WTrac	No tracking of Wint	0	0	INT	78	35		
	Set-point tracking	1						
	Process value tracking	2						
Ratio	Ratio controller:(x1 + N0) / x2	0	0	INT	79	35		
	Ratio controller:(x1 + N0) / (x1 + x2)	1						
	Ratio controller:(x2 -x1 + N0) / x2	2						
XDp	Digits behind decimal point (process value)	0 .. 3	0	INT	81	35		
Disp	Contents of bargraph line: correcting variable	0	0	INT	82	35		
	Contents of bargraph line: Control deviation	1						
	Contents of bargraph line: Xeff	2						
OMode	Self-tuning mode: Standard	0	0	INT	83	35		
OCond	Condition for process at rest: grad = 0	0	0	INT	84	35		
	grad <0 (controller inverse) grad >0 (controller direct)	1						
	grad ≠ 0	2						

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fkt.Nr.
W0	Lower set-point limit (Weff)	-29999 .. 999999	0	FP	41	20	B2	0
W100	Upper set-point limit (Weff)	-29999 .. 999999	100	FP	42	20		
W2	Additional set-point	-29999 .. 999999	100	FP	43	20		
Grw+	Set-point gradient plus	0,001 .. 999999	-32000	FP	44	20		
Grw-	Set-point gradient minus	0,001 .. 999999	-32000	FP	45	20		
Grw2	Set-point gradient for W2	0,001 .. 999999	-32000	FP	46	20		
N0	Zero offset ratio	-29999 .. 999999	0,0	FP	47	20		
a	Factor a (3-element control)	-9,99 .. 99,99	1,00	FP	48	20		
Xsh	Trigger point separation	0,2 .. 20,0	0,2	FP	49	20		
Tpuls	Minimum pos. step time	0,1 .. 2,0	0,3	FP	51	20		
Tm	Actuator response time	5 .. 999999	30	FP	52	20		
Xsd1	Switching difference of signaller	0,10 .. 999999	1,00	FP	53	20		
LW	Trigger point separation for additional contact	-29999 .. 999999	-32000	FP	54	20		
Xsd2	Switching difference for additional contact	0,10 .. 999999	1,00	FP	55	20		
Xsh1	Trigger point separation (PD)	0,0 .. 1000,0	0,0	FP	56	20		
Xsh2	Trigger point separation (PD)	0,0 .. 1000,0	0,0	FP	57	20		
Y2	Additional correcting value	-105,0 .. 105,0	0,0	FP	58	20		
Ymin	Lower correcting variable limit	-105,0 .. 105,0	0	FP	59	20		
Ymax	Upper correcting variable limit	-105,0 .. 105,0	100	FP	61	20		
Y0	Controller working point	-105,0 .. 105,0	0,0	FP	62	20		
YOptm	Corr. value with process at rest	-105,0 .. 105,0	0,0	FP	63	20		
dYopt	Step height with self-tuning	5 .. 100	100	FP	64	20		
WBlock	All setpoint switchover locked	0	←	INT	41	25		
	We switchover locked	1						
	W2 switchover locked	2						
	All setpoint switchover open	3						
Xp1	Proportional band 1	0,1 .. 999,9	100,0	FP	65	20		1
Xp2	Proportional band 2	0,1 .. 999,9	100,0	FP	66	20		
Tn	Integral time	0,0 .. 999999	10,0	FP	67	20		
Tv	Derivative time	0,0 .. 999999	10,0	FP	68	20		
Tp1	Cycle time heating	0,4 .. 999,9	5,0	FP	69	20		
Tp2	Cycle time cooling	0,4 .. 999,9	5,0	FP	41	21		

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1 (X1)	x2 (X2)	x3 (X3)	x4 (Wext)	0	B1
	x5 (OVC+)	x6 (OVC-)	x7 (Yp)	x8 (Yhm)		
	x9 (Yadd)					
Digital inputs:	d1 (hide)	d2 (lock)	d3 (inc)	d4 (dec)		
	d5 (x f)	d6 (yp f)	d7 (a/m)	d8 (w/w2)		
	d9 (we/wi)	d10 (pi/p)	d11 (d ovc+)	d12 (d ovc-)		
	d13 (track)	d14 (y/y2)	d15 (off)	d16 (sm/hm)		
	d17 (ostart)	d18 (w stop)	d19 (gr off)	d20 (rstart)		
	d21 (o_hide)					
Analog outputs:	y1 (Weff)	y2 (X)	y3 (Y)	y4 (XW)	1	
	y5 (W)	y6 (Yout1)	y7 (Yout2)			
Digital outputs:	z1 (y1)	z2 (y2)	z3 (c fail)	z4 (off)		
	z5 (a/m)	z6 (y/y2)	z7 (we/wi)	z8 (pi/p)		
	z9 (o run)	z10 (o stab)	z11 (o err)	z12 (xw sup)		

Display texts

Default display		Fct. no.	Code
Text 1:	CONTR	80	B2
Text 2:	X-UNIT		

CONTR+ (Extended control function - no. 91)

Process data

Des.	Description	R/W	Type	Range	Rem.	Code	Fct. no.
Block	Block access	R	block	01 .. 05, 07, 09		00	0
Status 1	Status 1	R	ST1		A	01	
Status 2	Status 2	R	ST1		B	02	
Weff	eff. Set-point	R	FP	-29999 .. 999999		03	
Xeff	eff. Process value	R	FP	-29999 .. 999999		04	
Yeff	effective correcting variable	R	FP	-29999 .. 999999		05	
x-w	Control deviation	R	FP	-29999 .. 999999		06	
X1	Main variable 1	R	FP	-29999 .. 999999		07	
X2	Auxialiary variable 2	R	FP	-29999 .. 999999		08	
X3	Auxiliary variable 3	R	FP	-29999 .. 999999		09	
Block	Block access	R	block	01..03 05..07		00	1
Status 3	Status 3	R	ST1		C	01	
WStatus	Set-point status	R	ST1		D	02	
Yp	Position feedback	R	FP	-29999 .. 999999		03	
OVC+	Override control +	R	FP	-29999 .. 999999		05	
OVC-	Override control +	R	FP	-29999 .. 999999		06	
Wext	Ext. set-point	R	FP	-29999 .. 999999		07	
Block	Block acces	R	block	01, 03		00	2
TStatus	Status Tuning 1	R/W	ST1		E	01	
POpt	Parameters set for self-tuning	R/W	FP	1 .. 6		03	
Block	Block access	R	block	21 .. 26, 28		20	0
y/Y2	Additional correcting value on/off	R/W	INT	0 / 1		21	
PI/P	PI/P switch-over	R/W	INT	0 / 1		22	
A/M	Auto/manual switch-over	R/W	INT	0 / 1		23	
OStart	Self-tuning start	R/W	INT	0 / 1		24	
We/i	Wext/Wint switch-over	R/W	INT	0 / 1		25	
w/W2	w/W2 switch-over	R/W	INT	0 / 1		26	
Coff	Controller on/off	R/W	INT	0 / 1		28	
Block	Block access	R	block	31, 32, 35, 36		30	1
Wnvol	Internal set-point, non volatile (EEPROM)	L/S	FP	-29999 .. 999999		31	
Wvol	Internal set-point, volatile(RAM)	R/W	FP	-29999 .. 999999		32	
dYman	Difference correcting variable	R/W	FP	-210 .. 210		35	
Yman	Absolute correcting variable	R/W	FP	-105 .. 105		36	
Block	Block access	R	block	31 .. 39		30	2
ParNr	Effective parameter set number	R/W	FP	1 .. 6		31	
Tu1	Delay time heating	R	FP	0 ..200000		32	
Vmax1	Rate of change heating	R	FP	0..9,999		33	
Kp1	Process gain heating	R	FP	0 .. 9,999		34	
MSG1	Error code for self-tuning heating	R	FP	0 .. 8		35	
Tu2	Delay time cooling	R	FP	0 ..200000		36	
Vmax2	Rate of change cooling	R	FP	0 .. 9,999		37	
Kp2	Process gain cooling	R	FP	0 .. 9,999		38	
MSG2	Error code of self-tuning cooling	R	FP	0 .. 8		39	

Rem. 'Status 1'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	Y1	Switching output 1	off	on
D1	Y2	Switching output 2	off	on
D2	A/M	Auto/manual	auto	hand
D3	y/Y2	y/Y2 switch-over	y	Y2
D4	Coff	Controller switched off	no	yes
D5	XFail	Sensor fail	no	yes
D6	'1'	always '1'		
D7		Parity		

Rem.A 'Status 2'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0..D3	'0'	always '0'		
D4	PI/P	Status PI/P	PI	P
D5	CFail	Status controller	ok	not ok
D6	'1'	always '1'		
D7		Parity		

Rem.B 'Status 3'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	'0'	always '0'		
D1	DOVC-	Override control-	off	on
D2	DOVC+	Override control+	off	on
D3..D5	'0'	always '0'		
D6	'1'	always '1'		
D7		Parity		

Rem.C Set-point status 'WStatus'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	w/W2	w/W2 switch-over	w	W2
D1	We/Wi	Wext/Wint switch-over	Wext	Wint
D2	HoldWeff	Weff frozen	no	yes
D3	GrwOff	set-point gradient suppressed	no	yes
D4	Trk	Tracking	off	on
D5	'0'	always '0'		
D6	'1'	always '1'		
D7		Parity		

Rem.D Status Tuning 'TStatus'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	OStab	Process at rest	no	yes
D1	Orun	Self-tuning operation	off	on
D2	Oerr	Self-tuning result	ok	error
D3..D5	'0'	always '0'		
D6	'1'	always '1'		
D7		Parity		

Configuration data

Des.	Description	Range	Def.	Type	Single acccess Code	Single acccess Fct. no.	Block access Code	Block access Fct.no.
Xn0	Span start	-29999 .. 999999	0	FP	71	30	B3	0
Xn100	Span end	-29999 .. 999999	100	FP	72			
SFac	Factor for stoichiometric ratio	0,010 .. 99,990	1,000	FP	73			
CFunc	Signaller with one output	0	9	INT	71	35		
	Signaller with two outputs	1						
	2-point controller	2						
	3-point controller: heating & cooling switch.	3						
	3-point controller: heating cont./cooling switch.	4						
	3-point controller: heating switch./cooling cont.	5						
	Δ / star / off controller	6						
	3-point stepping controller	7						
	3-point stepping controller with Yp	8						
	Cont. controller with position feedback Yp	9						
	Cont. Controller with split range	10						
	Cont. controller with position feedback Yp	11						
CType	Standard controller	0	0	INT	72			
	Ratio controller	1						
	3-element controller	2						
WFunc	Set-point control	0	0	INT	73			
	Set-point/cascade control	1						
CMode	Output action inverse	0	0	INT	74			
	Output action direct	1						
CDiff	Differentiate Xw	0	0	INT	75			
	Differentiate X	1						
CFail	Neutral	0	0	INT	76			
	Ypid = Ymin (0%)	1						
	Ypid = Ymax (100%)	2						
	Ypid = Y2 (not adjustable from front)	3						
	Ypid = Y2 (automatic) or Yman (manual)	4						
COVC	No override control	0	0	INT	77			
	Override control +	1						
	Override control -	2						
	Override control + / -	3						
WTrac	No tracking of Wint	0	0	INT	78			
	Set-point tracking	1						
	Process value tracking	2						
Ratio	Ratio controller:(x1 + N0) / x2	0	0	INT	79			
	Ratio controller:(x1 + N0) / (x1 + x2)	1						
	Ratio controller:(x2 -x1 + N0) / x2	2						
XDp	Digits behind decimal point (process value)	0 .. 3	0	INT	81			
Disp	Contents of bargraph line: correcting variable	0	0	INT	82			
	Contents of bargraph line: control deviation	1						
	Contents of bargraph line: Xeff	2						
OMode	Self-tuning mode: standard	0	0	INT	83			
OCond	Condition for process at rest: grad = 0	0	0	INT	84			
	grad <0 (controller inverse) grad >0 (controller direct)	1						
	grad ≠ 0	2						

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct.no.
W0	Lower set-point limit (Weff)	-29999 .. 999999	0	FP	41	20		
W100	Upper set-point limit (Weff)	-29999 .. 999999	100	FP	42	20		
W2	Additional set-point	-29999 .. 999999	100	FP	43	20		
Grw+	Set-point gradient plus	0,001 .. 999999	-32000	FP	44	20		
Grw-	Set-point gradient minus	0,001 .. 999999	-32000	FP	45	20		
Grw2	Set-point gradient for W2	0,001 .. 999999	-32000	FP	46	20		
N0	Zero offset ratio control	-29999 .. 999999	0,0	FP	47	20		
a	Factor a (3-element control)	-9,99 .. 99,99	1,00	FP	48	20		
Xsh	Trigger point separation	0,2 .. 20,0	0,2	FP	49	20		
Tpuls	Minimum pos. step time	0,1 .. 2,0	0,3	FP	51	20		
Tm	Actuator response time	5 .. 999999	30	FP	52	20		
Xsd1	Switching difference of signaller	0,10 .. 999999	1,00	FP	53	20		
LW	Trigger point separation for additional contact	-29999 .. 999999	-32000	FP	54	20		
Xsd2	Switching diff. for add. contact	0,10 .. 999999	1,00	FP	55	20	B2	0
Xsh1	Trigger point separation (PD)	0,0 .. 1000,0	0,0	FP	56	20		
Xsh2	Trigger point separation (PD)	0,0 .. 1000,0	0,0	FP	57	20		
Y2	Additional correcting value	-105,0 .. 105,0	0,0	FP	58	20		
Ymin	Lower correcting variable limit	-105,0 .. 105,0	0	FP	59	20		
Ymax	Upper correcting variable limit	-105,0 .. 105,0	100	FP	61	20		
Y0	Controller working point	-105,0 .. 105,0	0,0	FP	62	20		
YOptm	Corr. value with process at rest	-105,0 .. 105,0	0,0	FP	63	20		
dYopt	Step height with self-tuning	5 .. 100	100	FP	64	20		
POpt	Parameter set for self-tuning	1 .. 6	1	INT	41	25		
WBlock	All setpoint switchover locked	0	←	INT	41	25		
	We switchover locked	1						
	W2 switchover locked	2						
	All setpoint switchover open	3						
Xp1 1	Proportional band 1	0,1 .. 999,9	100,0	FP	65	20	B2	1
Xp2 1	Proportional band 2	0,1 .. 999,9	100,0	FP	66	20		
Tn 1	Integral time	0,0 .. 999999	10,0	FP	67	20		
Tv 1	Derivative time	0,0 .. 999999	10,0	FP	68	20		
Tp1 1	Cycle time heating	0,4 .. 999,9	5,0	FP	69	20		
Tp2 1	Cycle time cooling	0,4 .. 999,9	5,0	FP	41	21		
Xp1 2	Proportional band 1	0,1 .. 999,9	100,0	FP	65	20	B2	2
Xp2 2	Proportional band 2	0,1 .. 999,9	100,0	FP	66			
Tn 2	Integral time	0,0 .. 999999	10,0	FP	67			
Tv 2	Derivative time	0,0 .. 999999	10,0	FP	68			
Tp1 2	Cycle time heating	0,4 .. 999,9	5,0	FP	69			
Tp2 2	Cycle time cooling	0,4 .. 999,9	5,0	FP	41	21		
Xp1 3	Proportional band 1	0,1 .. 999,9	100,0	FP	65	20	B2	3
Xp2 3	Proportional band 2	0,1 .. 999,9	100,0	FP	66			
Tn 3	Integral time	0,0 .. 999999	10,0	FP	67			
Tv 3	Derivative time	0,0 .. 999999	10,0	FP	68			
Tp1 3	Cycle time heating	0,4 .. 999,9	5,0	FP	69			
Tp2 3	Cycle time cooling	0,4 .. 999,9	5,0	FP	41	21		
Xp1 4	Proportional band 1	0,1 .. 999,9	100,0	FP	65	20	B2	4
Xp2 4	Proportional band 2	0,1 .. 999,9	100,0	FP	66			
Tn 4	Integral time	0,0 .. 999999	10,0	FP	67			
Tv 4	Derivative time	0,0 .. 999999	10,0	FP	68			
Tp1 4	Cycle time heating	0,4 .. 999,9	5,0	FP	69			
Tp2 4	Cycle time cooling	0,4 .. 999,9	5,0	FP	41	21		
Xp1 5	Proportional band 1	0,1 .. 999,9	100,0	FP	65	20	B2	5
Xp2 5	Proportional band 2	0,1 .. 999,9	100,0	FP	66			
Tn 5	Integral time	0,0 .. 999999	10,0	FP	67			
Tv 5	Derivative time	0,0 .. 999999	10,0	FP	68			
Tp1 5	Cycle time heating	0,4 .. 999,9	5,0	FP	69			
Tp2 5	Cycle time cooling	0,4 .. 999,9	5,0	FP	41	21		

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct.no.
Xp1 6	Proportional band 1	0,1 .. 999,9	100,0	FP	65	20	B2	6
Xp2 6	Proportional band 2	0,1 .. 999,9	100,0	FP	66			
Tn 6	Integral time	0,0 .. 999999	10,0	FP	67			
Tv 6	Derivative time	0,0 .. 999999	10,0	FP	68			
Tp1 6	Cycle time heating	0,4 .. 999,9	5,0	FP	69			
Tp2 6	Cycle time cooling	0,4 .. 999,9	5,0	FP	41	21		

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1 (X1)	x2 (X2)	x3 (X3)	x4 (Wext)	0	B1
	x5 (OVC+)	x6 (OVC-)	x7 (Yp)	x8 (Yhm)		
	x9 (Yadd)	x10 (ParNo)	x11 (Casc)			
Digital inputs:	d1 (hide)	d2 (lock)	d3 (inc)	d4 (dec)		
	d5 (x f)	d6 (yp f)	d7 (a/m)	d8 (w/w2)		
	d9 (we/wi)	d10 (pi/p)	d11 (d ovc+)	d12 (d ovc-)		
	d13 (track)	d14 (y/y2)	d15 (off)	d16 (sm/hm)		
	d17 (ostart)	d18 (w stop)	d19 (gr off)	d20 (rstart)		
	d21 (o_hide)					
Analog outputs:	y1 (Weff)	y2 (X)	y3 (Y)	y4 (XW)	1	
	y5 (W)	y6 (Yout1)	y7 (Yout2)	y8 (ParNo)		
	y9 (bl-no)					
Digital outputs:	z1 (y1)	z2 (y2)	z3 (c fail)	z4 (off)		
	z5 (a/m)	z6 (y/y2)	z7 (we/wi)	z8 (pi/p)		
	z9 (o run)	z10 (o stab)	z11 (o err)	z12 (xw sup)		

Display texts

Default display		Fct. no.	Code
Text 1:	CONTR+	80	B2
Text 2:	X-UNIT		

PIDMA (controller function - Type-Nr. 93)

Process data

Des.	Description	L/S	Type	Bereich	Bem.	Code	Fct. no.
Block	Block access	L	Block	01 .. 05, 07, 09		00	0
Status 1	Status 1	L	ST1		A	01	
Status 2	Status 2	L	ST1		B	02	
Weff	Eff. setpoint	L	FP	-29999 .. 999999		03	
Xeff	Eff. measured value	L	FP	-29999 .. 999999		04	
Yeff	Eff actuator value	L	FP	-29999 .. 999999		05	
x-w	Control deviation	L	FP	-29999 .. 999999		06	
X1	Main process value 1	L	FP	-29999 .. 999999		07	
X2	Help process value 2	L	FP	-29999 .. 999999		08	
X3	Help process value 3	L	FP	-29999 .. 999999		09	
Block	Block access	L	Block	01..03 05..07		00	1
Status 3	Status 3	L	ST1		C	01	
WStatus	Setpoint status	L	ST1		D	02	
Yp	Position feedback	L	FP	-29999 .. 999999		03	
OVC+	Overridecontrol +	L	FP	-29999 .. 999999		05	
OVC-	Overridecontrol +	L	FP	-29999 .. 999999		06	
Wext	Ext. setpoint	L	FP	-29999 .. 999999		07	
Block	Block access	L	Block	01, 03		00	2
TStatus	Status Tuning 1	L/S	ST1		E	01	
POpt	Parameterset to be optimized	L/S	FP	1 .. 6		03	
Block	Block access	L	Block	21 .. 26, 28		20	0
y/Y2	Additional correcting value on/off	L/S	INT	0 / 1		21	
A/M	Manual-automatic switch-over	L/S	INT	0 / 1		23	
OStart	Start self optimizing	L/S	INT	0 / 1		24	
We/i	Switch over Wext/Wint	L/S	INT	0 / 1		25	
w/W2	Switch over w/W2	L/S	INT	0 / 1		26	
Coff	Controller on/off	L/S	INT	0 / 1		28	
Block	Block access	L	Block	31, 32, 35, 36		30	1
Wnvol	Internal setpoint, non volatile (EEPROM)	L/S	FP	-29999 .. 999999		31	
Wvol	Internal setpoint, volatile (RAM)	L/S	FP	-29999 .. 999999		32	
dYman	Differential actuator value	L/S	FP	-210 .. 210		35	
Yman	Absolute actuator value	L/S	FP	-105 .. 105		36	

Rem. ***'Status 1'***

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit-No.	Name	Allocation	Status '0'	Status '1'
D0	Y1	Switching output 1	off	on
D1	Y2	Switching output 2	off	on
D2	A/M	Automatic/manual	Auto	Man.
D3	y/Y2	y/Y2-switch over	y	Y2
D4	Coff	Controller switched off	no	yes
D5	XFail	Sensorfail	no	yes
D6	'1'	Always '1'		
D7		Parity		

Rem.A ***'Status 2'***

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit-No.	Name	Allocation	Status'0'	Status'1'
D0..D3	'0'	always '0'		
D4	-	-		
D5	CFail	Status controller	ok	not ok
D6	'1'	Always '1'		
D7		Parity		

Rem.B ***'Status 3'***

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit-No.	Name	Allocation	Status'0'	Status'1'
D0	'0'	Always '0'		
D1	-	-		
D2	-	-		
D3..D5	'0'	Always '0'		
D6	'1'	Always '1'		

D7		Parity

Rem.C Setpoint status 'WStatus'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit-No.	Name	Allocation	Status'0'	Status'1'
D0	w/W2	w/W2 Switch over	w	W2
D1	We/Wi	Wext/Wint Switch over	Wext	Wint
D2	HoldWeff	Weff frozen	no	yes
D3	GrwOff	Setpointgradient suppressed	no	yes
D4	Trk	Tracking	off	on
D5	'0'	Always '0'		
D6	'1'	Always '1'		
D7		Parity		

Rem.D Status tuning 'TStatus'

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit-No.	Name	Allocation	Status'0'	Status'1'
D0	-	-		
D1	Orun	Self optimization running	off	on
D2	Oerr	Self optimization result	ok	error
D3..D5	'0'	Always '0'		
D6	'1'	Always '1'		
D7		Parity		

Configuration data

Des.	Description	Range	Def.	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fkt.Nr.
Xn0	Span start	-29999 .. 999999	0	FP	71	30	B3	0
Xn100	Span end	-29999 .. 999999	100	FP	72	30		
SFac	Factor for stoichiometric ratio	0,010 .. 99,990	1,000	FP	73	30		
CFunc	2-point controller	0	9	INT	71	35		
	Continuous controller	1						
	3-point controller: heating & cooling switch.	2						
	3-point controller: heating cont./cooling switch.	3						
	3-point controller: heating switch./cooling cont.	4						
	Cont. Controller with split range	5						
	3-point stepping controller	6						
	3-point stepping controller with Yp	7						
	Cont. controller with position feedback Yp	8						
CType	Standard controller	0	0	INT	72	35		
	Ratio controller	1						
	3-element controller	2						
WFunc	Set-point control	0	0	INT	73	35		
	Set-point/cascade control	1						
CMode	Output action inverse	0	0	INT	74	35		
	Output action direct	1						
CFail	Neutral	0	0	INT	75	35		
	Ypid = Ymin (0%)	1						
	Ypid = Ymax (100%)	2						
	Ypid = Y2 (not adjustable from front)	3						
	Ypid = Y2 (automatic) or Yman (manual)	4						
COVC	No override control	0	0	INT	76	35		
	Override-Control +	1						
	Override-Control -	2						
	Override-Control + / -	3						
WTrac	No tracking of Wint	0	0	INT	77	35		
	Set-point tracking	1						
	Process value tracking	2						
Ratio	Ratio controller:(x1 + N0) / x2	0	0	INT	78	35		
	Ratio controller:(x1 + N0) / (x1 + x2)	1						
	Ratio controller:(x2 -x1 + N0) / x2	2						
XDp	Digits behind decimal point (process value)	0 .. 3	0	INT	79	35		
Disp	Contents of bargraph line: correcting variable	0	0	INT	80	35		
	Contents of bargraph line: control deviation	1						
	Contents of bargraph line: Xeff	2						

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fkt.Nr.
W0	Lower set-point limit (Weff)	-29999 .. 999999	0	FP	41	20		
W100	Upper set-point limit (Weff)	-29999 .. 999999	100	FP	42	20		
W2	Additional set-point	-29999 .. 999999	100	FP	43	20		
Grw+	Set-point gradient plus	0,001 .. 999999	-32000	FP	44	20		
Grw-	Set-point gradient minus	0,001 .. 999999	-32000	FP	45	20		
Grw2	Set-point gradient for W2	0,001 .. 999999	-32000	FP	46	20		
N0	Zero offset ratio control	-29999 .. 999999	0,0	FP	47	20		
a	Factor a (3-element control)	-9,99 .. 99,99	1,00	FP	48	20		
Tpause	Min pause duration	0,1 .. 999999	0,1	FP	49	20		
Tpuls	Min.pos.step time	0,1 .. 2,0	0,3	FP	51	20		
Tm	Actuator response time	5 .. 999999	30	FP	52	20		
thron	Switch-on point of step. output	0,10 .. 999999	1,00	FP	53	20		
throff	Switch-off point of step. output	-29999 .. 999999	-32000	FP	54	20		
Y2	Additional correcting value	-105,0 .. 105,0	0,0	FP	55	20		
Ymin	Min. output limiting	-105,0 .. 105,0	0	FP	56	20		
Ymax	Max. output limiting	-105,0 .. 105,0	100	FP	57	20		
Y0	Controller working point	-105,0 .. 105,0	0,0	FP	58	20		
dYopt	Self-tuning step height	5 .. 100	100	FP	59	20		
Xlimit	Switch-off point for dYopt	0,0 .. 999999	10	FP	61	20		
Tdrift	Drift estimation time	0,0 .. 999999	30	FP	62	20		
Tnoise	Noise estimation time	0,0 .. 999999	30	FP	63	20		
Kp	Control gain	0.1 ..999.9	1	FP	64	20		
Tn	Integral time set	0,0 .. 999999	10,0	FP	65	20		
Tv	Derivative time set	0,0 .. 999999	10,0	FP	66	20		
Tp1	Cycle time heating	0,4 .. 999,9	5,0	FP	67	20		
Tp2	Cycle time cooling	0,4 .. 999,9	5,0	FP	68	20		
VD	Derivative gain	1 .. 999999	4	FP	69	20		
bW_p	Set-point weighing factor p-part	0 .. 1	1	FP	41	21		
cW_d	Set-point weighing factor d-part	0 .. 1	0	FP	42	21		
Tsat	Time constant "Anti reset wind up"	1 .. 999999	50	FP	43	21		
Xsh	Trigger point separation	0 .. 999999	0	FP	44	21		
PType	Line type (with Compensation) Integral line	1 2	1	INT	41	25		
Drift	Drift compensation off Drift compensation on	0 1	0	INT	42	25		
CSpeed	Control dynamic slow normal fast	1 2 3	1	INT	43	25		
WBlock	All setpoint switchover locked We switchover locked W2 switchover locked All setpoint switchover open	0 1 2 3	←	INT	41	25		

I/O-Data

	Description	Fkt Nr.	Code
Analog inputs:	x1 (X1) x2 (X2) x3 (X3) x4 (Wext) x5 (OVC+) x6 (OVC-) x7 (Yp) x8 (Yhm) x9 (Yadd) x10 (Casc)	0	B1
Digital inputs:	d1 (hide) d2 (lock) d3 (inc) d4 (dec) d5 (x f) d6 (yp f) d7 (a/m) d8 (w/w2) d9 (we/wi) d10 (track) d11 (y/y2) d12 (off) d13 (sm/hm) d14 (ostart) d15 (w stop) d16 (gr off) d17 (rstart) d18 (o_hide) 19 (oplock)		
Analog outputs:	y1 (Weff) y2 (X) y3 (Y) y4 (XW) y5 (W) y6 (Yout1) y7 (Yout2) y8 (Bl-no)	1	
Digital outputs:	z1 (y1) z2 (y2) z3 (c fail) z4 (off) z5 (a/m) z6 (y/y2) z7 (we/wi) z8 (o run) z9 (o err) z10 (xw sup)		

Display texts

Default-display		Fct. no.	Code
Text 1:	PIDMA	80	B2
Text 2:	X-UNIT		

6.17. Inputs

AINP1 (Analog input 1 - no. 110) Fixed block number 63

Process data

Des.	Description	R/W	Type	Range	Rem.	Code	Fct. no.
X0t	Trigger for calibration X0	R/W	INT	0 / 1		21	0
X100t	Trigger for calibration X100	R/W	INT	0 / 1		22	0

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x0	Physical value at 0%	-29999 .. 999999	0,000	FP	71	30	B3	0
x100	Physical value at 100%	-29999 .. 999999	100,00	FP	72	30		
XFail	Substitute value with sensor fail	-29999 .. 999999	0,000	FP	73	30		
Tfm	Filter time constant [s]	0,0 .. 999999	0,5	FP	74	30		
Tkref	Reference temperature with STK = 2	0,000 .. 140,00	0,000	FP	75	30		
Typ	Type L -200...900 $C	0	0	INT	71	35		
	Type J -200...900 $C	1						
	Type K -200...1350 $C	2						
	Type N -200...1300 $C	3						
	Type S -50...1760 $C	4						
	Type R -50...1760 $C	5						
	Type T -200...400 $C	6						
	Type W 0...2300 $C	7						
	Type E -200...900 $C	8						
	Type B 0...1820 $C	9						
	Pt 100 -99,9...850,0 $C	20						
	Pt 100 -99,9...250,0 $C	21						
	2x Pt 100 -99,9...850 $C	25						
	2x Pt 100 -99,9...250,0 $C	26						
	0...20 mA	30						
	4...20 mA	31						
	0...10 V	32						
	2...10 V	33						
	Pot.transducer 0...500 Ω	40						
	Resistance 0...500 Ω (linear)	45						
	Resistance 0...250 Ω (linear)	46						
Fail	Fail function off	0	1	INT	72	35		
	z1 = 1, y1 = x100	1						
	z1 = 1, y1 = x0	2						
	z1 = 1, y1 = XFail	3						
Xkorr	Measured value correction off	0	0	INT	73	35		
	Measured value correction	1						
Unit	Unit = $C	1	1	INT	74	35		
	Unit = $F	2						
STK	Int. temperature compensation	0	1	INT	75	35		
	Ext. temperature compensation	1						

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x1in	Meas.value correct. P1, input	-29999 .. 999999	0,000	FP	41	20	B2	0
x1out	Meas.value correct. P1, output	-29999 .. 999999	0,000	FP	42	20		
x2in	Meas.value correct. P2, input	-29999 .. 999999	100,00	FP	43	20		
x2out	Meas.value correct. P2, output	-29999 .. 999999	100,00	FP	44	20		

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1 (Y)				0	B1
Digital inputs:	d1 (lock)	d2 (hide)				
Analog outputs:	y1 (Inp1)				1	
Digital outputs:	z1 (fail)	z2 (a/m)	z3 (inc)	z4 (dec)		

Display texts

Default display		Fct. no.	Code
Text 1:	AINP1	80	B2

AINP3 (Analog input 3 - no. 112) Fixed block number 63

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x0	Physical value at 0%	-29999 .. 999999	0,000	FP	71	30	B3	0
x100	Physical value at 100%	-29999 .. 999999	100,00	FP	72	30		
XFail	Substitute value at sensor fail	-29999 .. 999999	0,000	FP	73	30		
Tfm	Filter time constant [s]	0,0 .. 999999	0,5	FP	74	30		
Typ	0...20 mA	30	30	INT	71	35		
	4...20 mA	31						
Fail	Fail function disabled	0	1	INT	72	35		
	z1 = 1, y1 = x100	1						
	z1 = 1, y1 = x0	2						
	z1 = 1, y1 = XFail	3						
Xkorr	Meas.value correction disabled	0	0	INT	73	35		
	Measured value corection	1						

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x1in	Meas.value correct. P1, input	-29999 .. 999999	0,000	FP	41	20	B2	0
x1out	Meas.value correct. P1, output	-29999 .. 999999	0,000	FP	42	20		
x2in	Meas.value correct. P2, input	-29999 .. 999999	100,00	FP	43	20		
x2out	Meas. value correct. P2, output	-29999 .. 999999	100,00	FP	44	20		

I/O data

		Fct. no.	Code
Analog outputs:	y1 (Inp3)	1	B1
Digital outputs:	z1 (fail)		

Display texts

Default display		Fct. no.	Code
Text 1:	AINP3	80	B2

AINP4 (Analog input 4 - no. 113) Fixed block number 64

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x0	Physical value at 0%	-29999 .. 999999	0,000	FP	71	30	B3	0
x100	Physical value at 100%	-29999 .. 999999	100,00	FP	72	30		
XFail	Substitute value with sensor fail	-29999 .. 999999	0,000	FP	73	30		
Tfm	Filter time constant [s]	0,0 .. 999999	0,5	FP	74	30		
Typ	0...20 mA	30	30	INT	71	35		
	4...20 mA	31						
Fail	Fail function off	0	1	INT	72	35		
	z1 = 1, y1 = x100	1						
	z1 = 1, y1 = x0	2						
	z1 = 1, y1 = XFail	3						
Xkorr	Meas. value correction off	0	0	INT	73	35		
	Measured value correction	1						

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x1in	Meas.value correct. P1, input	-29999 .. 999999	0,000	FP	41	20	B2	0
x1out	Meas.value correct. P1, output	-29999 .. 999999	0,000	FP	42	20		
x2in	Meas.value correct. P2, input	-29999 .. 999999	100,00	FP	43	20		
x2out	Meas.value correct. P2, output	-29999 .. 999999	100,00	FP	44	20		

I/O data

		Fct. no.	Code
Analog outputs:	y1 (Inp4)	1	B1
Digital outputs:	z1 (fail)		

Display texts

Default display		Fct. no.	Code
Text 1:	AINP4	80	B2

AINP5 (Analog input 5 - no. 114) Fixed block number 65

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x0	Physical value at 0%	-29999 .. 999999	0,000	FP	71	30	B3	0
x100	Physical value at 100%	-29999 .. 999999	100,00	FP	72	30		
XFail	Substitute value with sensor fail	-29999 .. 999999	0,000	FP	73	30		
Tfm	Filter time constant [s]	0,0 .. 999999	0,5	FP	74	30		
Typ	0...20 mA	30	30	INT	71	35		
	4...20 mA	31						
	0...10 V	32						
	2...10 V	33						
Fail	Fail function off	0	1	INT	72	35		
	z1 = 1, y1 = x100	1						
	z1 = 1, y1 = x0	2						
	z1 = 1, y1 = XFail	3						
Xkorr	Meas.value correct. disabled	0	0	INT	73	35		
	Measured value correction	1						

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x1in	Meas.value correct. P1, input	-29999 .. 999999	0,000	FP	41	20	B2	0
x1out	Meas.value correct. P1, output	-29999 .. 999999	0,000	FP	42	20		
x2in	Meas.value correct. P2, input	-29999 .. 999999	100,00	FP	43	20		
x2out	Meas.value correct. P2, output	-29999 .. 999999	100,00	FP	44	20		

I/O data

		Fct. no.	Code
Analog outputs:	y1 (Inp5)	1	B1
Digital outputs:	z1 (fail)		

Display texts

Default display	Fct. no.	Code
Text 1: AINP3	80	B2

AINP6 (Analog input 6 - no. 115) Fixed block number 66

Process data

Des.	Description	R/W	Type	Range	Rem.	Code	Fct. no.
X0t	Trigger for calibration X0	R/W	INT	0 / 1		21	0
X100t	Trigger for calibration X100	R/W	INT	0 / 1		22	0

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x0	Physical value at 0%	-29999 .. 999999	0,000	FP	71	30	B3	0
x100	Physical value at 100%	-29999 .. 999999	100,00	FP	72	30		
XFail	Substitute value with sensor fail	-29999 .. 999999	0,000	FP	73	30		
Tfm	Filter time constant [s]	0,0 .. 999999	0,5	FP	74	30		
Typ	0...20 mA	30	30	INT	71	35		
	4...20 mA	31						
	Pot. transducer 0...500 Ω	40						
Fail	Fail function off	0	1	INT	72	35		
	z1 = 1, y1 = x100	1						
	z1 = 1, y1 = x0	2						
	z1 = 1, y1 = XFail	3						
Xkorr	Meas. value correct. disabled	0	0	INT	73	35		
	Measured value correction	1						

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x1in	Meas.value correct. P1, input	-29999 .. 999999	0,000	FP	41	20	B2	0
x1out	Meas.value correct. P1, output	-29999 .. 999999	0,000	FP	42	20		
x2in	Meas.value correct. P2, input	-29999 .. 999999	100,00	FP	43	20		
x2out	Meas.value correct. P2, output	-29999 .. 999999	100,00	FP	44	20		

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1 (Y)				0	B1
Digital inputs:	d1 (lock)	d2 (hide)				
Analog outputs:	y1 (Inp6)				1	
Digital outputs:	z1 (fail)	z2 (a/m)	z3 (inc)	z4 (dec)		

Display texts

Default display		Fct. no.	Code
Text 1:	AINP6	80	B2

DINPUT (Digital inputs - no. 121) Fixed block number 91

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Inv1	Output direct (z1 = di1)	0	0	INT	71	35	B3	0
	Output inverse (z1 = $\overline{di1}$)	1						
Inv2	Output direct (z2 = di2)	0	0	INT	72	35		
	Output inverse (z2 = $\overline{di2}$)	1						
Inv3	Output direct (z3 = di3)	0	0	INT	73	35		
	Output inverse (z3 = $\overline{di3}$)	1						
Inv4	Output direct (z4 = di4)	0	0	INT	74	35		
	Output inverse (z4 = $\overline{di4}$)	1						
Inv5	Output direct (z5 = di5)	0	0	INT	75	35		
	Output inverse (z5 = $\overline{di5}$)	1						
Inv6	Output direct (z6 = di6)	0	0	INT	76	35		
	Output inverse (z6 = $\overline{di6}$)	1						
Inv7	Output direct (z7 = di7)	0	0	INT	77	35		
	Output inverse (z7 = $\overline{di7}$)	1						
Inv8	Output direct (z8 = di8)	0	0	INT	78	35		
	Output inverse (z8 = $\overline{di8}$)	1						
Inv9	Output direct (z9 = di9)	0	0	INT	79	35		
	Output inverse (z9 = $\overline{di9}$)	1						
Inv10	Output direct (z10 = di10)	0	0	INT	81	35		
	Output inverse (z10 = $\overline{di10}$)	1						
Inv11	Output direct (z11 = di11)	0	0	INT	82	35		
	Output inverse (z11 = $\overline{di11}$)	1						
Inv12	Output direct (z12 = di12)	0	0	INT	83	35		
	Output inverse (z12 = $\overline{di12}$)	1						

I/O data

	Description				Fct. no.	Code
Digital outputs:	z1	z2	z3	z4	1	B1
	z5	x6	x7	x8		
	z9	x10	x11	x12		

Display texts

Default display		Fct. no.	Code
Text 1:	DINPUT	80	B2

6.18. Outputs

OUT1 (Process output 1 - no. 116) Fixed block number 81

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x0	Value of x1 at 0%	-29999 .. 999999	0,000	FP	71	30	B3	0
x100	Value of x1 at 100%	-29999 .. 999999	100,00	FP	72	30		
Src	Signal source: d1 (digital)	0	0	INT	71	35		
	Signal source: x1 (analog)	1						
Mode	direct / normally open	0	1	INT	72	35		
	inverse / normally closed	1						
Typ	Logic 0/20mA	0	0	INT	73	35		
	0 .. 20mA	1						
	4 .. 20mA	2						

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Digital inputs:	d1		

Display texts

Default display		Fct. no.	Code
Text 1:	OUT1	80	B2

OUT2 (Process output 2 - no. 117) Fixed block number 82

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x0	Value of x1 at 0%	-29999 .. 999999	0,000	FP	71	30	B3	0
x100	Value of x1 at 100%	-29999 .. 999999	100,00	FP	72	30		
Src	Signal source: d1 (digital)	0	0	INT	71	35		
	Signal source: x1 (analog)	1						
Mode	Direct / normally open	0	1	INT	72	35		
	Inverse / normally closed	1						
Typ	Logic 0/20mA	0	0	INT	73	35		
	0 .. 20mA	1						
	4 .. 20mA	2						

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Digital inputs:	d1		

Display texts

Default display		Fct. no.	Code
Text 1:	OUT2	80	B2

OUT3 (Process output 3 - no. 118) Fixed block number 83

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x0	Value of x1 at 0%	-29999 .. 999999	0,000	FP	71	30	B3	0
x100	Value of x1 at 100%	-29999 .. 999999	100,00	FP	72	30		
Src	Signal source: d1 (digital)	0	0	INT	71	35		
	Signal source: x1 (analog)	1						
Mode	Direct / normally open	0	1	INT	72	35		
	Inverse / normally closed	1						
Typ	Logic 0/20mA	0	0	INT	73	35		
	0 .. 20mA	1						
	4 .. 20mA	2						

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Digital inputs:	d1		

Display texts

Default display		Fct. no.	Code
Text 1:	OUT3	80	B2

OUT4 (Process output 4 - no. 119) Fixed block number 84

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x0	Value of x1 at 0%	-29999 .. 999999	0,000	FP	71	30	B3	0
x100	Value of x1 at 100%	-29999 .. 999999	100,00	FP	72	30		
Src	Signal source: d1 (digital)	0	0	INT	71	35		
	Signal source: x1 (analog)	1						
Mode	Direct / normally open	0	1	INT	72	35		
	Inverse / normally closed	1						

I/O data

	Description	Fct. no.	Code
Analog inputs:	x1	0	B1
Digital input:	d1		

Display texts

Default display		Fct. no.	Code
Text 1:	OUT4	80	B2

OUT5 (Process output 5 - no. 120) Fixed block number 85

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
x0	Value of x1 at 0%	-29999 .. 999999	0,000	FP	71	30	B3	0
x100	Value of x1 at 100%	-29999 .. 999999	100,00	FP	72	30		
Src	Signal source: d1 (digital)	0	0	INT	71	35		
	Signal source: x1 (analog)	1						
Mode	Direct / normally open	0	1	INT	72	35		
	Inverse / normally closed	1						

I/O data

	Description	Fct. no.	Code
Analog input:	x1	0	B1
Digital inputs:	d1		

Display texts

Default display		Fct. no.	Code
Text 1:	OUT5	80	B2

DIGOUT (Digital outputs - no. 122) Fixed block number 95

Configuration data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Inv1	Output direct (do1 = d1)	0	0	INT	71	35	B3	0
	Output inverse (do1 = $\overline{d1}$)	1						
Inv2	Output direct (do2 = d2)	0	0	INT	72	35		
	Output inverse (do2 = $\overline{d2}$)	1						
Inv3	Output direct (do3 = d3)	0	0	INT	73	35		
	Output inverse (do3 = $\overline{d3}$)	1						
Inv4	Output direct (do4 = d4)	0	0	INT	74	35		
	Output inverse (do4 = $\overline{d4}$)	1						
Inv5	Output direct (do5 = d5)	0	0	INT	75	35		
	Output inverse (do5 = $\overline{d5}$)	1						
Inv6	Output direct (do6 = d6)	0	0	INT	76	35		
	Output inverse (do6 = $\overline{d6}$)	1						

I/O data

	Description				Fct. no.	Code
Digital inputs:	d1	d2	d3	d4	0	B1
	d5	d6				

Display texts

Default display		Fct. no.	Code
Text 1:	DIGOUT	80	B2

6.19. Supplementary functions

LED (LED display - no. 123) Fixed block number 96

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Inv1	No inversion (LED1 = d1) Inverted status (LED1 = d1)	0 1	0	INT	41	25	B2	0
Inv2	No inversion (LED2 = d2) Inverted status (LED2 = d2)	0 1	0	INT	42	25		
Inv3	No inversion (LED3 = d3) Inverted status (LED3 = d3)	0 1	0	INT	43	25		
Inv4	No inversion (LED4 = d4) Inverted status (LED4 = d4)	0 1	0	INT	44	25		

I/O data

	Description				Fct. no.	Code
Digital inputs:	d1	d2	d3	d4	0	B1

Display texts

Default display		Fct. no.	Code
Text 1:	LED	80	B2

INFO (Information function - no. 124) Fixed block number 97

I/O data

	Description				Fct. no.	Code
Digital inputs:	d1	d2	d3	d4	0	B1
	d5	d6	d7	d8		
	d9	d10	d11	d12		

Display texts

Default display		Fct. no.	Code
Text 1:	>INFORMATION 1<	80	B2
Text 2:	>INFORMATION 2<		
...			
Text 12:	>INFORMATION 12<		

STATUS (Status function - no. 125) Fixed block number 98

I/O data

	Description				Fct. no.	Code
Digital inputs:	d1 (p-hide)	d2 (c-hide)	d3 (m-hide)	d4 (b-lock)	0	B1
	d5 9 (n.c.)	d6 (n.c.)				
Analog outputs:	Y1 (minute)	Y2 (hour)	Y3 (day)	Y4 (month)	1	
	Y5 (year)	Y6 (week-d)	Y7 (langu.)	Y8 (n.c.)		
Digital outputs:	z1 (p-hide)	z2 (c-hide)	z3 (m-hide)	z4 (b-lock)		
	z5 (switch)	z6 (fail)	z7 (safe)	z8 (pwrchk)		
	z9 (start)	z10 (n.c.)	z11 (n.c.)	z12 (n.c.)		

Display texts

Default display		Fct. no.	Code
Text 1:	STATUS	80	B2

CONST (Constants function - no. 126) Fixed block number 99

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
C1	Analog constant 1	-29999 .. 999999	0,000	FP	41	20	B2	0
C2	Analog constant 2	-29999 .. 999999	0,000	FP	42	20		
C3	Analog constant 3	-29999 .. 999999	0,000	FP	43	20		
C4	Analog constant 4	-29999 .. 999999	0,000	FP	44	20		
C5	Analog constant 5	-29999 .. 999999	0,000	FP	45	20		
C6	Analog constant 6	-29999 .. 999999	0,000	FP	46	20		
C7	Analog constant 7	-29999 .. 999999	0,000	FP	47	20		
C8	Analog constant 8	-29999 .. 999999	0,000	FP	48	20		
C9	Analog constant 9	-29999 .. 999999	0,000	FP	49	20		
C10	Analog constant 10	-29999 .. 999999	0,000	FP	51	20		
C11	Analog constant 11	-29999 .. 999999	0,000	FP	52	20		
C12	Analog constant 12	-29999 .. 999999	0,000	FP,53	20			
C13	Analog constant 13	-29999 .. 999999	0,000	FP	54	20		
C14	Analog constant 14	-29999 .. 999999	0,000	FP	55	20		
C15	Analog constant 15	-29999 .. 999999	0,000	FP	56	20		
C16	Analoge constant 16	-29999 .. 999999	0,000	FP	57	20		

I/O data

	Description				Fct.no.	Code
Analog outputs:	Y1	Y2	Y3	Y4	1	B1
	Y5	Y6	Y7	Y8		
	Y9	Y10	Y11	Y12		
	Y13	Y14	Y15	Y16		
Digital outputs:	z1	z2				

Display texts

Default display		Fct. no.	Code
Text 1:	CONST	80	B2

SAFE (Safety function - no. 94)

Parameter data

Des.	Description	Range	Default	Type	Single access Code	Single access Fct. no.	Block access Code	Block access Fct. no.
Y1	Output value for analog output 1	-29999 .. 999999	0.000	FP	41	20	B2	0
Y2	Output value for analog output 2	-29999 .. 999999	0.000	FP	42			
Y3	Output value for analog output 3	-29999 .. 999999	0.000	FP	43			
Y4	Output value for analog output 4	-29999 .. 999999	0.000	FP	44			
Y5	Output value for analog output 5	-29999 .. 999999	0.000	FP	45			
Y6	Output value for analog output 6	-29999 .. 999999	0.000	FP	46			
Y7	Output value for analog output 7	-29999 .. 999999	0.000	FP	47			
Y8	Output value for analog output 8	-29999 .. 999999	0.000	FP	48			
z1	Output value for digital output 1	0 /1	0	INT	41	25		
z2	Output value for digital output 2	0 /1	0	INT	42			
z3	Output value for digital output 3	0 /1	0	INT	43			
z4	Output value for digital output 4	0 /1	0	INT	44			
z5	Output value for digital output 5	0 /1	0	INT	45			
z6	Output value for digital output 6	0 /1	0	INT	46			
z7	Output value for digital output 7	0 /1	0	INT	47			
z8	Output value for digital output 8	0 /1	0	INT	48			

I/O data

	Description				Fct. no.	Code
Analog inputs:	x1	x2	x3	x4	0	B1
	x5	x6	x7	x8		
Digital inputs:	d1	d2	d3	d4		
	d5	d6	d7	d8		
	d9 (select)					
Analog outputs:	y1	y2	y3	y4	1	
	y5	y6	y7	y8		
Digital outputs:	z1	z2	z3	z4		
	z5	z6	z7	z8		

Display texts

Default display		Fct. no.	Code
Text 1:	SAFE	80	B2

7. Annex

7.1. Expressions

FB	Abbr. for function block
FU	Abbr. for production support
ET	Abbr. for engineering tool
Function	function block division for transmission purposes seen from the interface
Function block	self-contained processing unit
HW	Abbr. for hardware
ISO1745	Standard communication protocol ISO 1745, ASCII-based
KS92, KS94, KS98	new controller series
KSX	Common type name for the new controller series
PC-interface	front-panel interface on the KSX controller for connection of an engineering tool
PCI	Process Control Instrument
PCI protocol	ISO 1745-based protocol, implemented for Philips + PMA controllers
Calculation function	executable action, adressable via a function block
RS422	Standard 4-wire connection, full duplex, (EIA RS 422); in this case: separate send/receive channels with up to 32 units
RS485	Standard 2-wire connection, half duplex, (EIA RS 485)
SW	Abbr. for software
SIU	Serial Interface Unit
TTL	Signal level at module level
UART	Universal Asynchronous Receiver Transmitter

7.2. Diagnosis

For test purposes, an additional debug access which signals the error messages of the last write or read access is available. The following items can be read (/Σ see also page 18):

WrErr	Error number of last write access	0 = no error	Code = 21	Fct. no. = 2
WrErPos	Position of faulty datum at last write access (with block accesses)	0 = no error or error in addressing 1 = first datum is faulty n = nth datum is faulty	Code = 22	Fct. no. = 2
ReErr	Error number of last read access	0 = no error	Code = 23	Fct. no. = 2

The following error messages are defined:

Err. Nr.	Description	Error name
101	non-defined error	ERR_UNSPECIFIED
102	reading not permitted	ERR_RD_NOTALLOWED
103	writing not defined	ERR_WR_NOTALLOWED
104	local operation/no write access	ERR_LOCOPERAT
105	non-defined key code	ERR_KEYIDENT
106	function block number overflow	ERR_FB_OVERFL
107	function no. overflow	ERR_FCT_OVERFL
108	write or range overflow	ERR_WR_RANGE_OV
109	char is no digit	ERR_NODIGIT
110	no '\0' found in the correct position	ERR_ENDDELIMITER
111	no '=' in the correct position	ERR_NO_EQUALSIGN
112	faulty ST1 format (status)	ERR_NO_ST1FORMAT
113	no ',' in the correct position	ERR_NO_COMMA
114	byte overflow	ERR_BYTE_OVERFL
115	digit no. exceeded	ERR_DIGIT_OVERFL
116	range 9999 exceeded	ERR_RG9999_OVERFL
117	undefined protocol type	ERR_UNDEF_PRTCTYPE
118	undefined parameter reference	ERR_UNDEF_PARAMREF
119	undefined decimal point	ERR_UNDEF_DECPNT
120	no STX in the write message	ERR_NO_STX
121	INT number faulty	ERR_INT_ANZ
122	REAL number faulty	ERR_REAL_ANZ
123	faulty access mode	ERR_ZUGRIFF
124	no config level	ERR_WR_NO_CONF
125	local operation	ERR_WR_LOCAL
126	error FU switch-over	ERR_WR_FU_UM
127	faulty BCC value received	ERR_BCC_INVALID
128	function type does not exist	ERR_TYP_OVERFL
129	number of analog inputs faulty	ERR_AI_ANZ
130	number of digital inputs faulty	ERR_DI_ANZ
131	memory capacity exceeded (RAM or EEPROM)	ERR_MEMORY

8. Index

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