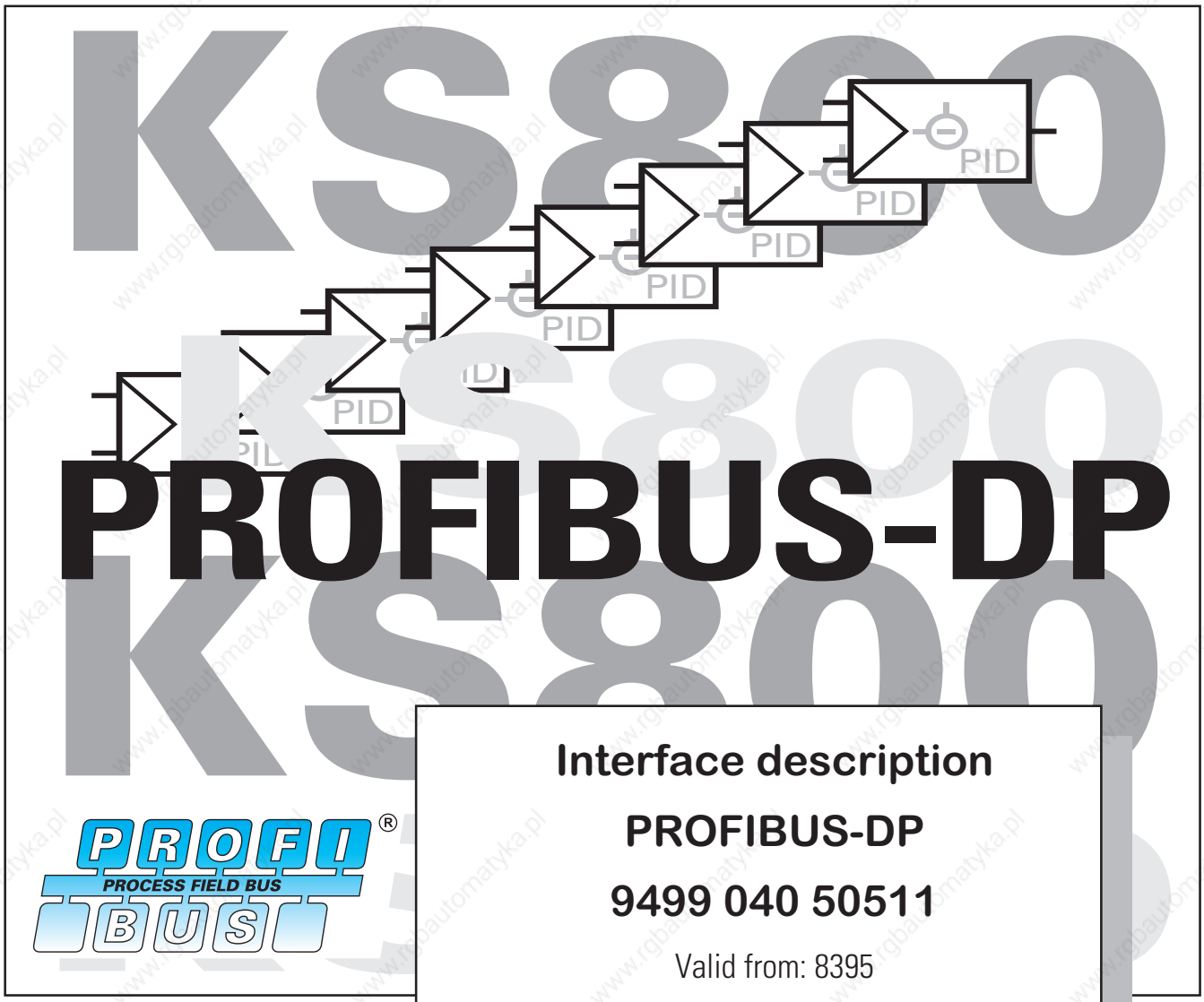
PMA Prozeß- und Maschinen-Automation GmbH

Multi Temperaturecontroller KS800



PROFIBUS-DP

Interface description

PROFIBUS-DP

9499 040 50511

Valid from: 8395

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Postfach 310229
D-34058 Kassel
Germany

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1 General

The KS800 multi-temperature controller versions (9407-480-30001) are equipped with a PROFIBUS-DP interface for transmission of process parameter and configuration data. Connection is via the 9-pole sub-D connector socket. The serial communication interface permits connections to supervisory systems, visualization tools, etc.

Another interface, which is always provided as standard, is the PC interface. This interface serves for connecting an engineering tool, which runs on a PC.

Communication is according to the master/slave principle. KS800-DP is always slave.

Cable medium as well as physical and electrical interface proporties:

- Network topologie
  Linear bus with active bus termination at both ends. Stub lines are possible (dependent of cable type, a maximum overall stub line length of 6,6m with 1,5Mbit/s and of 1,6m with 3-12Mbit/s is possible).
- Transmission medium
  screened, twisted 2-wire cable (/ EN 50170 vol.2).
- Baudrates and cable lengths (without repeater)
  The maximum cable length is dependent of transmission rate.
  The Baudrate is determined by the master configuration.

Automatic Baudrate detection

Baudrate	Maximum cable length
9,6 / 19,2 / 93,75 kbit/s	1200 m
187,5 kbit/s	1000 m
500 kbit/s	400 m
1,5 Mbit/s	200 m
3 ... 12 Mbit/s	100m

- Interface
  RS485 connectable with sub-D connector (9-pole).
- Address settings
  Address setting is possible as follows:
  - Adjustment via coding switches, range 00 ... 99, default 00
  - adjustment via software, range 0 ... 126, default 126
  With the coding switches set to ‘00’, the adjusted software address is valid.
  A modified coding switch address is active only after switching on the supply voltage again.
- 32 instruments in one segment. Extension to 127 by means of a repeater is possible.

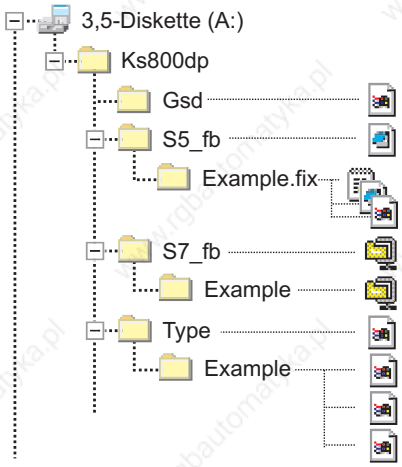
KS800 with PROFIBUS-DP interface offers many advantages with respect to handling and integration into a PROFIBUS network.

- Diagnosis and monitoring via COM-LED
  LED off: error identification for ‘no bus access’ (so far not addressed by the master)
  LED on: OK, cyclic data exchange running
  LED blinks: (2Hz) Data exchange interrupted
  LED blinks: (4Hz) PROFIBUS parameter setting and configuration error.
- Particularities
  Configurable process data modules
  Direct input and output reading and writing
  Output forcing
  Easy connection to PLCs

1.1 *Scope of delivery*

The engineering set comprises:

- Disk



Pma_0800.gsd	GSD file
Pmadp1st.s5d	STEP® 5-FB for parameter channel
Pmadm3*.*	project example in STEP® 5 for FixPoint
Pma_parm.arj	STEP® 7-FB for parameter channel
Ks800dmo.arj	project example in STEP® 7
Ks800_1x.200	type file
Demo308i.et2	configuration example COM PROFIBUS for IM308-C
Demo95ui.et2	configuration example COM PROFIBUS for S5 CPU 95U
Ks800dem.et2	configuration example COM PROFIBUS for PC-Karte

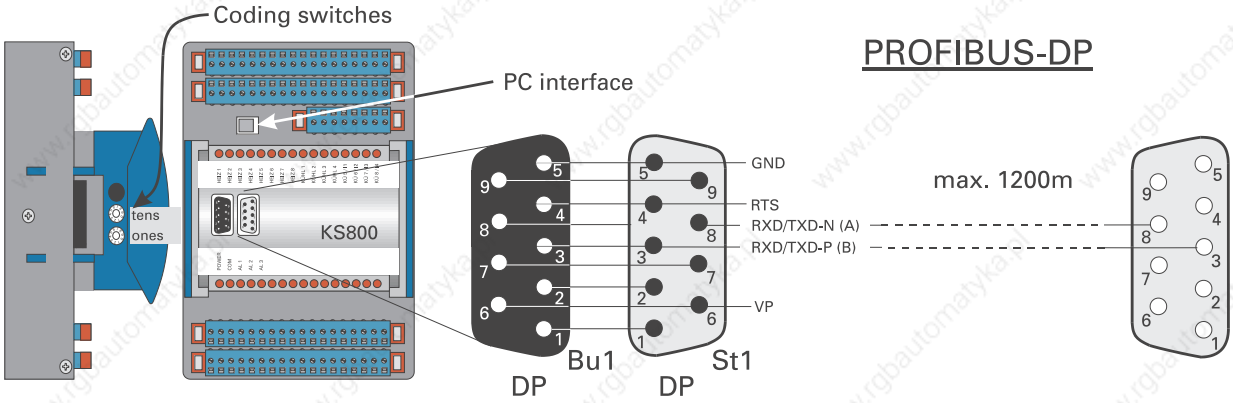
- Interface description for PROFIBUS-DP

2 Hints on operation

2.1 *Interface connection*

The PROFIBUS must be connected to the 9-pole sub-D socket.
Serial interface, physical RS485-based signals.

Fig.: 1 Connecting PROFIBUS-DP



The construction of suitable cabling must be provided by the user, whereby the general cable specifications to EN 50170 vol.2 must be taken into account.

2.1.1 Installation of cables

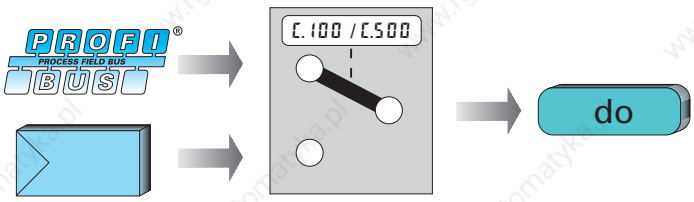
When laying the cables, the general hints for cable installation given by the supplier of the master module must be followed:

- Cable run in buildings (inside and outside cabinets)
- Cable run inside and outside buildings
- Potential compensation
- Cable screening
- Measures against interference voltages
- Stub line length
- Bus termination resistors are not contained in KS800-DP, but must be realized via the connector, if necessary.
- Earthing

Special hints for installation of PROFIBUS cables are given in the PNO technical guideline “Installation guidelines for PROFIBUS-DP/FMS” (Order no. 2.111 [dt]; 2.112 [engl.]).

2.2 *Forcing*

Digital outputs can be written directly after configuring them accordingly.



3 Process data

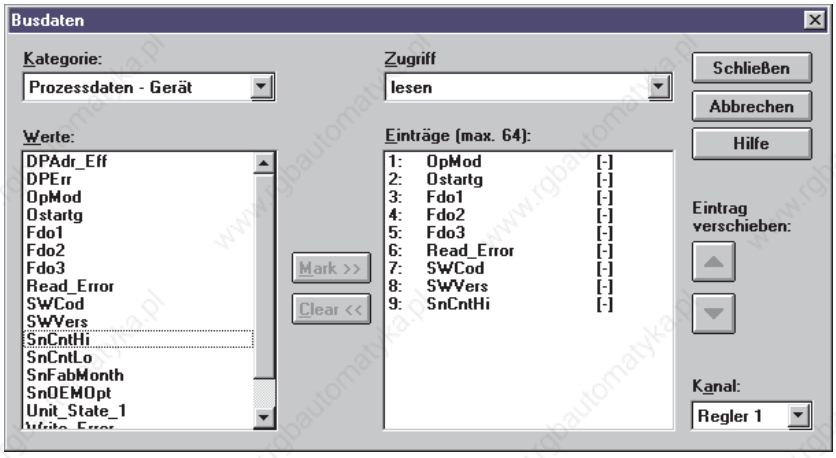
During data transmission, distinction of process data to be transmitted cyclically and parameter / configuration data to be transmitted acyclically is made. The I/O data field is structured modularly for matching it to the requirements of the control task.
Selection of the process data module is via configuration tools of the master circuits (e.g. with Siemens S5 via COM PROFIBUS).

The following process data modules can be configured:

Process data module A:	read (66 bytes) [1)] Instrument status, (process value, output value, status, ..)	write [1)] (52 bytes) Instrument control, (set-point, output value, ...)	without parameter channel
Process data module B:	read (74 bytes)[1)] Instrument status, (process value, output value, status, ..)	write [1)] (60 bytes)* Instrument control, (set-point, output value, ...)	with parameter channel
Process data module C:	only parameter channel [1)] (8/8 bytes)		
Process data module D:	read (74 Byte) [1)] Instrument status, (process value, output value, status, ..)	write (60 Byte) [1)] Instrument control, (set-point, output value, ...)	with parameter channel
Process data module E:	read (116 Byte) [1)] Instrument status, (52 variable process data)	write (116Byte) [1)] Instrument control, (52 variable process data)	with parameter channel
Process data module F:	read (92 Byte) [1)] Instrument status, (40 variable process data)	write (92 Byte) [1)] Instrument control, (40 variable process data)	with parameter channel
Process data module G:	read (28 Byte) [1)] Instrument status, (8 variable process data)	write (28 Byte) [1)] Instrument control, (8 variable process data)	with parameter channel
Process data module H:	read (16 Byte) [1)] Instrument status, (multiplexing 64 variable process data)	write (16 Byte) [1)] Instrument control, (multiplexing 64 variable process data)	with parameter channel

The parameter channel is used for sequential transmission of parameter and configuration data. The values to be adjusted and data significations are given in the following tables:

For the process data modules (module E - H), the cyclical transmission data must be selected by means of the 'KS800' engineering tool via `General instrument settings` → `Communication` → `Bus data`.



Max. 64 data for reading and 64 data for writing can be selected. Dependent of selected process data module, the first 52 data (module E), the first 40 data (module F), the first 8 data (module H) or all data are used (module G).

1) Number of required bytes in the I/O field

❑ Module A (process data of all 8 channels)

No.	Descr.	R/W	FIX point format			Rem.
			Number of bytes	Value		
				Hex	COM PROFIBUS	
	Inputs		Σ 66			
0	Unit_State	R	2	11	16DE	A
1	Xeff_1	R	2	50	1AE	
2	Yeff_1	R	2	50	1AE	
3	HC_1	R	2	50	1AE	
4	Alarm_1	R	1	10	8DE	B
5	Status_1	R	1	10	8DE	C
6	Xeff_2	R	2	50	1AE	
7	Yeff_2	R	2	50	1AE	
8	HC_2	R	2	50	1AE	
9	Alarm_2	R	1	10	8DE	B
10	Status_2	R	1	10	8DE	C
...						
36	Xeff_8	R	2	50	1AE	
37	Yeff_8	R	2	50	1AE	
38	HC_8	R	2	50	1AE	
39	Alarm_8	R	1	10	8DE	B
40	Status_8	R	1	10	8DE	C
	Outputs		Σ 52			
41	Unit_Cntrl	W	4	23	32DA	D
42	Wvol_1	W	2	60	1AA	
43	Yman_1	W	2	60	1AA	
44	Cntrl_1	W	2	21	16DA	E
45	Wvol_2	W	2	60	1AA	
46	Yman_2	W	2	60	1AA	
47	Cntrl_2	W	2	21	16DA	E
...						
63	Wvol_8	W	2	60	1AA	
64	Yman_8	W	2	60	1AA	
65	Cntrl_8	W	2	21	16DA	E

❑ Module B (process data of all 8 channels + parameter channel)

No.	Descr.	R/W	FIX point format			Rem.
			Number of bytes	Value		
				Hex	COM PROFIBUS	
	Inputs		Σ 66			
0	Unit_State	R	2	11	16DE	A
1	Xeff_1	R	2	50	1AE	
2	Yeff_1	R	2	50	1AE	
3	HC_1	R	2	50	1AE	
4	Alarm_1	R	1	10	8DE	B
5	Status_1	R	1	10	8DE	C
6	Xeff_2	R	2	50	1AE	
7	Yeff_2	R	2	50	1AE	
8	HC_2	R	2	50	1AE	
9	Alarm_2	R	1	10	8DE	B
10	Status_2	R	1	10	8DE	C
...						
36	Xeff_8	R	2	50	1AE	
37	Yeff_8	R	2	50	1AE	
38	HC_8	R	2	50	1AE	
39	Alarm_8	R	1	10	8DE	B
40	Status_8	R	1	10	8DE	C

Outputs			Σ 52			
41	Unit_Cntrl	W	4	23	32DA	D
42	Wvol_1	W	2	60	1AA	
43	Yman_1	W	2	60	1AA	
44	Cntrl_1	W	2	21	16DA	E
45	Wvol_2	W	2	60	1AA	
46	Yman_2	W	2	60	1AA	
47	Cntrl_2	W	2	21	16DA	E
...						
63	Wvol_8	W	2	60	1AA	
64	Yman_8	W	2	60	1AA	
65	Cntrl_8	W	2	21	16DA	E
Inputs/outputs						
66	Parameter channel	R/W	8 / 8	F3	4AX	

❑ Module C (only parameter channels)

No.	Descr.	R/W	FIX Point-Format		
			Number of bytes	Value	
				Hex	COM PROFIBUS
Inputs/outputs					
0	Parameter channel	R/W	8 / 8	F3	4AX

Transmission of the analog values is in the 16-bit fix point format (FIX). In FIX format, all values are interpreted with one digit behind the decimal point (range -3000,0 to 3200,0).

❑ Module D (Like Module B, but more compact Configurationformat)

No.	Descr.	R/W	FIX Point-Format			Rem.
			Number of Bytes	Value		
				Hex	COM PROFIBUS	
Inputs			Σ 74			
0	Unit_State	R	2	11	16DE	A
1	Xeff_1, Yeff_1, HC_1, Alarm_1, Status_1	R	8	53	4AE	
2	Xeff_2, Yeff_2, HC_2, Alarm_2, Status_2	R	8	53	4AE	
...						
8	Xeff_8, Yeff_8, HC_8, Alarm_8, Status_8	R	8	53	4AE	
Outputs			Σ 60			
9	Unit_Cntrl	W	4	23	32DA	B
10	Wvol_1, Yman_1, Cntrl_1	W	6	62	3AA	
11	Wvol_2, Yman_2, Cntrl_2	W	6	62	3AA	
...						
17	Wvol_8, Yman_8, Cntrl_8	W	6	62	3AA	
In- /Outputs						
18	Parameterchannel	R/W	8 / 8	F3	4AX	

❑ Module E (52 variable processdata and parameterchannel)

No..	Descr..	R/W	FIX Point-Format			Rem.
			Number of Bytes	Value		
				Hex	COM PROFIBUS	
	Inputs		Σ 116			
0	Unit_State, Digital_Outputs	R	4	13	32DE	A, F
1	IN_1 … IN_8	R	16	57	8AE	
2	IN_9 … IN_16	R	16	57	8AE	
▪ ▪ ▪						
6	IN_41 … IN_48	R	16	57	8AE	
7	IN_49 … IN_52	R	8	53	4AE	
	Outputs		Σ 116			
8	Unit_Cntrl I, Unit_Cntrl II	W	4	23	32DA	B
9	OUT_1 … OUT_8	W	16	67	8AA	
10	OUT_9 … OUT_16	W	16	67	8AA	
▪ ▪ ▪						
14	OUT_41 … OUT_48	W	16	67	8AA	
15	OUT_49 … OUT_52	W	8	63	4AA	
	In- /Outputs					
16	Parameterchannel	R/W	8 / 8	F3	4AX	

❑ Module F (40 variable processdata and parameterchannel)

No..	Descr..	R/W	FIX Point-Format			Rem.
			Number of Bytes	Value		
				Hex	COM PROFIBUS	
	Inputs		Σ 92			
0	Unit_State, Digital_Outputs	R	4	13	32DE	A, F
1	IN_1 … IN_8	R	16	57	8AE	
2	IN_9 … IN_16	R	16	57	8AE	
▪ ▪ ▪						
5	IN_33 … IN_40	R	16	57	8AE	
	Outputs		Σ 92			
6	Unit_Cntrl I, Unit_Cntrl II	W	4	23	32DA	B
7	OUT_1 … OUT_8	W	16	67	8AA	
8	OUT_9 … OUT_16	W	16	67	8AA	
▪ ▪ ▪						
11	OUT_33 … OUT_40	W	16	67	8AA	
	In- /Outputs					
12	Parameterchannel	R/W	8 / 8	F3	4AX	

❑ Module G (8 variable processdata and parameterchannel)

No..	Descr..	R/W	FIX Point-Format			Rem.
			Number of Bytes	Value		
				Hex	COM PROFIBUS	
	Inputs		Σ 28			
0	Unit_State, Digital_Outputs	R	4	13	32DE	A, F
1	IN_1 … IN_8	R	16	57	8AE	
	Outputs		Σ 28			
2	Unit_Cntrl I, Unit_Cntrl II	W	4	23	32DA	B
3	OUT_1 … OUT_8	W	16	67	8AA	
	In- /Outputs					
4	Parameterchannel	R/W	8 / 8	F3	4AX	

❑ Module H (Multiplexing of all 64 variable processdata and parameterchannel)

No..	Descr.	R/W	FIX Point-Format			Rem.
			Number of Bytes	Value		
				Hex	COM PROFIBUS	
Inputs			Σ 16			
0	Unit_State, Digital_Outputs	R	4	13	32DE	A, F
1	Index IN (Read / Write)	R	2	50	1AE	
2	Read Value	R	2	50	1AE	
Outputs			Σ 16			
3	Unit_Cntrl I, Unit_Cntrl II	W	4	23	32DA	B
4	Index OUT (Read / Write)	W	2	60	1AA	
5	Write Value	W	2	60	1AA	
In- /Outputs						
6	Parameterchannel	R/W	8 / 8	F3	4AX	

Operating principle (reading):

- Enter the index number into 'Index OUT' (Read).
- After the index number is mirror-inverted in 'Index IN' (Read), the read value is stored in 'Read Value' .

Operating principle (writing):

- Enter the index number into 'Index OUT' (Write)
- Enter the value to be written into 'Write Value'.
- After the index number is mirror-inverted in 'Index IN' (Write), the value was transmitted.

ⓘ To ensure consistent data transmission, 'Index OUT' (Write) and 'Write Value' must have been updated safely before a PROFIBUS data cycle. If this cannot be ensured, proceed as follows: '0' in 'Index OUT' (Write), write the value to be transmitted into 'Write Value' and write the index number into 'Index OUT' (Write). With entry '0' in 'Index OUT' (Read) / 'Index OUT' (Write), no data are transmitted.

3.1 *Defined as status byte are:*

Unit_State

MSB							LSB
D15	D14	D13	..	..	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	IN13	Digital input IN13 (ParNo)	off	on
D1	IN14	Digital input IN14 (Coff)	off	on
D2	IN15	Digital input IN15 (Leck)	off	on
D3	IN16	Digital input IN16 (w/w2)	off	on
D4		always '0'		
D5	Dex	Changed ComRead or ComWrite data	no	yes
D6, D7		Always '0'		
D8	Err1	Transmission error channel 1	no	yes
D9	Err2	Transmission error channel 2	no	yes
D10	Err3	Transmission error channel 3	no	yes
D11	Err4	Transmission error channel 4	no	yes
D12	Err5	Transmission error channel 5	no	yes
D13	Err6	Transmission error channel 6	no	yes
D14	Err7	Transmission error channel 7	no	yes
D15	Err8	Transmission error channel 8	no	yes

Rem. B1 Alarm_x

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	Lim HH	Alarm HH	off	on
D1	Lim H	Alarm H	off	on
D2	Lim L	Alarm L	off	on
D3	Lim LL	Alarm LL	off	on
D4	Fail	Alarm Sensor Fail	no	yes
D5	HCAl	Heating current alarm	off	on
D6	LeckAl	Leakage current alarm	off	on
D7	do1_8Al	Alarm OUT1 ... 8	off	on

Rem. C Status_x

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/w	External/internal switch-over	external	internal
D2	w/Wanf	Start-up set-point switch-over	w	Wanf
D3	Orun	Optimization active	no	yes
D4	A/M	Automatic/manual switch-over	auto	manual
D5	Coff	Controller switched off	no	yes
D6	Y1	Switching output 1	off	on
D7	Y2	Switching output 2	off	on

Rem. D Unit_Contrl I

MSB							LSB
D31	D30	D29	...	...	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	OUT1	Forcing of output OUT1	off	on
D1	OUT2	Forcing of output OUT2	off	on
D2	OUT3	Forcing of output OUT3	off	on
D3	OUT4	Forcing of output OUT4	off	on
D4	OUT5	Forcing of output OUT5	off	on
D5	OUT6	Forcing of output OUT6	off	on
D6	OUT7	Forcing of output OUT7	off	on
D7	OUT8	Forcing of output OUT8	off	on
D8	OUT9	Forcing of output OUT9	off	on
D9	OUT10	Forcing of output OUT10	off	on
D10	OUT11	Forcing of output OUT11	off	on
D11	OUT12	Forcing of output OUT12	off	on
D12	OUT13	Forcing of output OUT13	off	on
D13	OUT14	Forcing of output OUT14	off	on
D14	OUT15	Forcing of output OUT15	off	on
D15	OUT16	Forcing of output OUT16	off	on

Rem. E Unit_Contrl II

MSB							LSB
D31	D30	D29	...	...	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	OUT17	Forcing of output OUT17	off	on
D1	OUT18	Forcing of output OUT18	off	on
D2	OUT19	Forcing of output OUT19	off	on
D3	OstartG	Start optimizing all group controllers	no start	start
D4	OStopG	Forcing of output OUT5	no stop	stop
D5	Dval	Forcing of output OUT6	flank 0->1	
D6- D15		always "0"		

Rem. F Cntrl_x

MSB							LSB
D15	D14	D13	...	...	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	A/M	Automatic/manual switch-over	auto	manual
D1	Coff	Controller switched off	no	yes
D2	w/W2	w/W2 switch-over	w	W2
D3	We/w	External/internal switch-over	external	internal
D4	OStart	Start optimization [1)]	no start	start
D5	OStop	Stop optimization [1)]	no stop	stop
D6 .. D15		unused, always '0'		

Rem. G Digital_Outputs

MSB							LSB
D15	D14	D13	...	...	D2	D1	D0

Bit-No.	Name	Allocation	Status '0'	Status '1'
D0	Y1_7	Y1-Output Channel 7	off	on
D1	Y2_7	Y2-Output Channel s 7	off	on
D2	Y1_6	Y1-Output Channel 6	off	on
D3	Y2_6	Y2-Output Channel 6	off	on
D4	Y1_5	Y1-Output Channel 5	off	on
D5	Y2_5	Y2-Output Channel 5	off	on
D6	Y1_4	Y1-Output Channel 4	off	on
D7	Y2_4	Y2-Output Channel 4	off	on
D8	Y1_3	Y1-Output Channel 3	off	on
D9	Y2_3	Y2-Output Channel 3	off	on
D10	Y1_2	Y1-Output Channel 2	off	on
D11	Y2_2	Y2-Output Channel 2	off	on
D12	Y1_1	Y1-Output Channel 1	off	on
D13	Y2_1	Y2-Output Channel 1	off	on
D14	Y1_0	Y1-Output Channel 0	off	on
D15	Y2_0	Y2-Output Channel 0	off	on

1) Signals are active only with change from 0 / 1. The signal must be available, until a change of Orun (see Status_x) has occurred.

2)See chapter 3.3 page 15 "Disabling mechanism with changes".

3.2 *Status and diagnosis messages*

For KS800 instrumwent status signalling, the external (user-specific) diagnosis must be used. The format corresponds to the instrument-related diagnosis (EN50170 volume 2 PROFIBUS).

Instrument-specific diagnosis Octet 1

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'	Type
D0	Online/Conf	On-line / configuration	on-line	configuration	status
D1	DO1_12Fail	Error do1 ... do12	no	yes	diagnosis
D2	D=13_16Fail	Error do13 ... do16	no	yes	diagnosis
D3	HCFail	Heating current short circuit	no	yes	diagnosis
D4 .. D7		unused, always '0'			

Instrument-specific diagnosis Octet 2

MSB							LSB
D7	D6	D5	D4	D3	D2	D1	D0

Bit no.	Name	Allocation	Status '0'	Status '1'	Type
D0	InpF1	Input fail channel 1	no	yes	diagnosis
D1	InpF2	Input fail channel 2	no	yes	dianosis
D2	InpF3	Input fail channel 3	no	yes	diagnosis
D3	InpF4	Input fail channel 4	no	yes	diagnosis
D4	InpF5	Input fail channel 5	no	yes	diagnosis
D5	InpF6	Input fail channel 6	no	yes	diagnosis
D6	InpF7	Input fail channel 7	no	yes	diagnosis
D7	InpF8	Input fail channel 8	no	yes	diagnosis

3.3 *Disabling mechanism with changes*

Changing the reference to a datum to be transmitted during operation, e.g. on-line via parameter channel or via the engineering interface, implies a hazard of value misinterpreting by bus master and KS800. This can be prevented by a disabling mechanism.

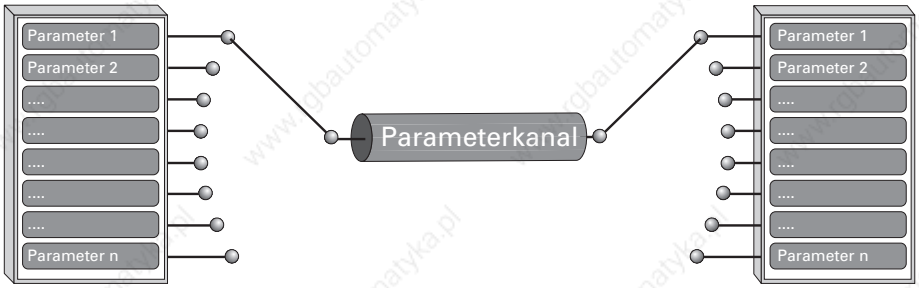
- When changing a reference, the controller module sets bit Dex = 1.
- The master must evaluate bit Dex.
- Acknowledgement and a statement that there are only valid write data also on the master side, are generated via a positive flank for bit Dval.
- When receiving a positive flank, the controller module sets Dex = 0 and stores the data which were sent.
- Resetting Dex is also possible by switching the voltage off and on again.

3.4 *Process data transmission*

Process data are transmitted cyclically by the controller, whereby compliance with the minimum poll time of 570ms is ensured, if no simultaneous access via the parameter channel is made. Output data sent to KS800 are compared with the previously transmitted values and processed by the controller with deviation. If one of the data is faulty, bit 8 with error in channel 1, bit 9 with error in channel 2 ... or bit 15 with error in channel 8 is set in the 'Unit_State', until no faulty accesses are pending any more.

3.5 *Parameter transmission*

For parameter transmission, the ‘parameter channel’ via which data can be exchanged transparently via the function block protocol is available. Thereby, all possible protocol access modes are supported (individual access, tens block and overall block). Communication to the controller is transparent, i.e. the user himself is responsible for monitoring ranges, operating modes (auto/hand) etc.
The parameter channel is designed for large amounts of data with low requirements on the transmission speed.



3.5.1 Message elements

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

Element	Description	Rem.
ID	Telegram mode identification	A
ID1	Format of data to be transmitted or to be received	B
Code	Addressing code of a datum	C
FB no.	Function block number	D
Fct no.	Function number	E
Type	d.c. (always ‘0’)	

Rem. A ID
This element identifies the telegram type: ID = 0x10 ≙ start telegram [1)]
ID = 0x68 ≙ data telegram
ID = 0x16 ≙ end telegram

Rem. B ID1
This element identifies the file format: ID1 = 0 ≙ Integer
ID1 = 1 ≙ Real value as fixpoint

Rem. C Code
The code identification is decimal and the range includes ‘00’...’99’ as well as ‘178’ ≙ B2 and ‘179’ ≙ B3.
Rem. D FB no. (function block number)
A function block is addressed with a function block number. It is within ‘0’ and ‘250’. Channel addressing is also via the function block number.
Function block number ranges:

- 0general data for the overall instrument
- 1 - 99 fixed function blocks

Rem. E Fct. no. (function number)
A function as a partial address of a function block is also addressed with a function number. It is within ‘0’ and ‘99’.
Function number ranges:

- 0function general
- 1 - 99 other functions

1) 0x10 means 10 in hexadecimal

3.5.2 General communication structure

For transmission of the parameters required for the function block protocol via an 8-byte data window, the access is composed of three parts:

- Order header with specification of code, FB no., fct. no., type and the following real and integer values.
  Start telegram structure:

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
ID	ID1	Code	FB no.	Fct._no.	Type	Numb.real values	Numb.integer values

- n data blocks with the data to be transmitted
  Data telegram structure:

Transmission of real data as fixedpoint and of integer values

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

- An end block provides the operation result
  Structure of the end telegram:

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

Signification of result	
0	OK
4	NAK

The read or write operation is always started by the master. With the number of real and integer values ≠ 0, a write service, otherwise, a read service is started.

The code determines the access type:

Code < 100, no multiple of 10	/Σ	individual access
Code < 100, multiple of 10	/Σ	tens block access
Code > 100	/Σ	overall block access

3.5.3 Data write sequence

Start telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Master sends:	0x10	ID1	Code	FB no.	Fct._no.	Type	Numb.real values	Numb.integer values
Controller replies:	0x10							

Data telegrams:

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

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

Thereby, the first value is sent with Count = 1. For flow control, Count is reflected by KS800 (≥ once). The values are transmitted in the order real - integer.

End telegram:

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

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

3.5.4 Data read procedure

Start telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Master sends:	0x10	ID1	Code	FB no.	Fct._no.	Type	0	0
Controller replies:	0x10						Numb. real values [1]	Numb. integer values [1]

Data telegrams:

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

Thereby, the first value is sent with Count = 1. For flow control, count is reflected by KS800 (≥ once). The values are transmitted in the order real - integer.

End telegram:

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

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

3.6 Examples

3.6.1 Function block protocol principles

A function block has input and output data (process data) as well as parameter and configuration data. It is addressable via a function block number.

The following access mechanisms are used:

3.6.2 Individual access

This access (code xx) can be used for reading or writing an individual value of a function.

Valid values for ID1:

Configuration as FixPoint:	0 = integer	real values are transmitted as integer (without digits behind the decimal point)
	1 = real	real values are transmitted as FixPoint (1 digit behind the decimal point)

Example 1: (message structure with data sending)
Transmission of parameter set number (ParNr = 1) to the controller (channel 2).

Start telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Master sends:	0x10	0	31	52	5	0	0	1
Controller replies:	0x10							

Data telegrams:

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

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

End telegram:

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

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

1) If a Read Service was refused, these values = 0

Example 2: (message structure with data request)
Reading the error code of self-tuning heating (MSG1) of controller (channel 2).
Start telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Master sends:	0x10	0	35	52	5	0	0	0
Controller replies:	0x10						0	1

Datentelegramme:

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

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

End telegram:

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

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

3.6.3 Block access (tens block)

This access (code x0) can be used for reading max. nine process values (always as REAL values) of a function.

Example:(message structure with data request)
Reading the set-points (W_{nvol} and W_{vol}) of controller (channel3).

Start telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Master sends:	0x10	0	30	53	1	0	0	0
Controller replies:	0x10						2	0

Data telegrams:

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

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Controller replies:	0x68	1			150

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

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Controller replies:	0x68	2			140

End telegram:

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

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

3.6.4 Block acces (overall block)

This access can be used for reading or writing all parameter (code 178) and configuration data (code 179) of a function. The following conditions are applicable to this access:

- For writing the data with 'code B3 ≙ 179', the instrument must be switched to the configuration mode (/ see page 27 'OpMod'). All entered new configuration data and parameters are effective only, when the instrument was switched back to on-line.
- All data of a message must be defined, omissions are not permissible.
- The complete message must be transmitted also, if parts of a message in the controller are not used (HW and SW options). Checking of the non-existing data is omitted.
- With faulty block write accesses, the following is valid: a message is replied with NAK, if at least one datum is faulty. Already valid values are accepted.

The message structure with block accesses with code B2/B3 is shown using two examples below. The order of data to be transmitted is given in the relevant code table.

Valid values for ID1:

Configuration as FixPoint:	0, 1	Transmission of real values each as a FixPoint value

Example 1: (message structure with data request)
Reading set-point parameters (W0, W100, W2, Grw+, Grw− and Grw2) of controller (channel 7).
Start telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Master sends:	0x10	0	0xB2	57	1	0	0	0
Controller replies:	0x10						6	0

Data telegrams:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7		Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Master sends:	0x68	1				Controller replies:	0x68	1			0
Master sends:	0x68	2				Controller replies:	0x68	2			700
Master sends:	0x68	3				Controller replies:	0x68	3			100
Master sends:	0x68	4				Controller replies:	0x68	4			-32000
Master sends:	0x68	5				Controller replies:	0x68	5			-32000
Master sends:	0x68	6				Controller replies:	0x68	6			-32000

End telegram:

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

Example 2: (Message structure with data specification)
Writing the alarm configuration (C.600, C.601) to the controller (channel 1).
Start telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Master sends:	0x10	0	0xB3	70	0	0	0	2
Controller replies:	0x10						0	0

Data telegram:

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7		Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 - 7
Master sends:	0x68	1			0120	Controller replies:	0x68	1			
Master sends:	0x68	2			0110	Controller replies:	0x68	2			

End telegram:

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

3.7 *Data types*

Data values are classified in data types for transmission.

- FP
  Floating point number (Real)
  Range:as integer (in individual access) -9999 ... 0 ... 9999
  as fix point-3000,0 ... 0,0 ... 3200,0
  Exception:switch-off value '-32000'
- INT
  positive integer number
  Range: 0 ... 32767
  Range with configuration words: 0000 ... 9999 (/ Page 27)
  Exception: Switch-off value '-32000'
- ST1
  Status, bit-oriented, 1 byte Length
  Range: 00H ... 3FH, transmitted: 40H...7FH
  Only 6 bits can be used for information transmission, i.e. bit 0...5 (LSB = bit 0). Bit 6 must always be set to '1', in order to avoid confusion with the control characters. Bit 7 contains the parity bit.
- ICMP (Integer Compact)
  Bit information as integer transmission, max. 15 bits
  Range: 0...32767; integer transmission is in ASCII format.

	fixed to '0'	Bit signification														
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'

4 Quick entrance

The disk enclosed in the engineering set includes the GSD file, project examples for a SIMATIC® S5 / S7, the type file and configuration examples for COM PROFIBUS. Communication with a KS800-DP can be built up easily by means of the configuration and a project.

4.1 *Quick entrance with S5*

Test environment

The following components are required for the test set-up:

- Programming unit (PG740 recommended)
- Automation unit
  - S5-115U, S5-135U or S5-155U with IM 308-C
- KS800-DP
- Engineering set (order no. 9407 999 09x11)
- Cable
  - PROFIBUS cable automation unit / IM 308-C ↔ KS800-DP
  - programming unit ↔ automation unit

4.1.1 Example of a test environment:

A KS800-DP with address 5 is to be connected to an IM 308-C via PROFIBUS-DP. Process data module B is selected (8 process data channels and parameter channel). Data shall be transmitted in fix point format. The I/O addresses in the S5 start with 0 in the P area.

Before taking the test environment into operation, ensure that the automation units do not contain user software (“initial clear”). The same applies to the IM 308-C memory card.

Procedure:

- Establishing the communications
- Instrument configuration
  - Adjust address 5 on KS800-DP (via coding switches or engineering tool) and connect it to the network.
  - Activate bus termination resistors at the controller connector and at the (S5) PLC connector.
- PROFIBUS network configuration
  - Insert the disk (engineering set) into programming unit.
  - Call up COM PROFIBUS and load example (A:\KS800dp\type\example\Demo308i.et2)
    - Select the correct CPU type with IM308C.
  - If necessary, adapt addressings and DP network and transmit them to the DP master (/ Fig.:).
- Load S5 program
  - Insert disk (engineering set) into the programming unit.
  - Call up STEP® 5.
  - Load program example, e.g. (A:\KS800dp\s5_fb\example.fix\...)
  - If necesary, match the addresses for send / receive window (A-A/E-A in FB) and transmit them to the automation unit.
  - Switch automation unit to run

Konfigurieren: KS 800-DP #5 <Module B: Process data(8) + parameter>

	Kennung	Kommentar	E-Adr.	A-Adr.
0	16DE	Unit_State	P000	
1	1AE	Xeff_1	P002	
2	1AE	Yeff_1	P004	
3	1AE	HC_1	P006	
4	8DE	Alarm_1	P008	
5	8DE	Status_1	P009	
6	1AE	Xeff_2	P010	
7	1AE	Yeff_2	P012	
8	1AE	HC_2	P014	
9	8DE	Alarm_2	P016	
10	8DE	Status_2	P017	
11	1AE	Xeff_3	P018	
12	1AE	Yeff_3	P020	
13	1AE	HC_3	P022	

OK | Abbrechen | Bestellnr. ... | Kennung... | Daten... | Reservieren | Autoadr. | Löschen | Adr.-Raum... | Param. ... | Hilfe

After taking the test set-up into operation, testing of the I/O area and parameter channel call-up are possible by means of the graphic modules enclosed in the project.

Graphic module 1:
Shows all process data of channel 1 (fix point).
Example: (specified set-point = 30)
Value 300 is written in AW 4.

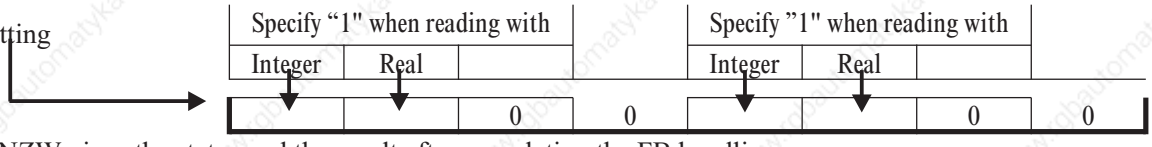
```
Operanden:                    Signalzustände:
-Unit_Sta     EW    0         KM=00000000 00000000
-UnitCntA     AW    0         KM=00000000 00000000
-UnitCntB     AW    2         KM=00000000 00000000

-Xeff_1       EW    2         KF=+290
-Yeff_1       EW    4         KF=+400
-HC_1         EW    6         KF=+0
-Alarm_1      EB    8         KM=00001100
-Status_1     EB    9         KM=00010010

-Wvol_1       AW    4         KF=+300
-Yman_1       AW    6         KF=+400
-Cntrl_1      AW    8         KM=00000000 00000001
```

Graphic module 2:
Access to the function module parameters for parameter channel mapping is possible by means of this graphic module.

```
Operanden:                    Signalzustände:
-DWLR         MW   52         KF=+1
-DWLI         MW   54         KF=+0
-DWLC         MW   56         KF=+0
-Read/Wr      MW   58         KH=0001

-Code         MW   60         KF=+32
-FBno.        MW   62         KF=+50
-FCTno.       MW   64         KF=+1
-Type         MW   66         KF=+0

-ANZW         MW   68         KM=00000000 00000010

-Setting      MB    0         KM=00000000

.........    DB   12
-DBval1       DW   11         KF=+300
```

Specify e.g. when reading values:

- Code
- Fbno
- FCTno
- Setting



- ANZW gives the status and the result after completing the FB handling.
- DWLR, DWLI, DWLC indicates the number of read values.

Graphic module 3:
This graphic module indicates the first data of the data module into which data of the parameter channel are written, or from which values are read.

```
Operanden:                    Signalzustaende:
.........    DB   12
-DBval1       DW   11         KF=+0
-DBval2       DW   12         KF=+9000
-DBval3       DW   13         KF=+1000
-DBval4       DW   14         KF=-32000
-DBval5       DW   15         KF=-32000
-DBval6       DW   16         KF=-32000
-DBval7       DW   17         KF=+0
-DBval8       DW   18         KF=+0
-DBval9       DW   19         KF=+0
-DBval10      DW   20         KF=+0
-DBval11      DW   21         KF=+0
-DBval12      DW   22         KF=+0
-DBval13      DW   23         KF=+0
-DBval14      DW   24         KF=+0
.........    DW   25         KF=+0
.........    DW   26         KF=+0
.........    DW   27         KF=+0
.........    DW   28         KF=+0
.........    DW   29         KF=+0
```

4.2 *Quick entrance with S7*

Test environment

The following components are required for the test set-up:

- Programming unit (PG740 recommended)
- Automation unit
  - CPU315-2 DP
- KS800-DP
- Engineering set (order no. 9407 999 09x11)
- Cable
  - PROFIBUS cable automation unit ↔ KS800-DP
  - programming unit ↔ automation unit

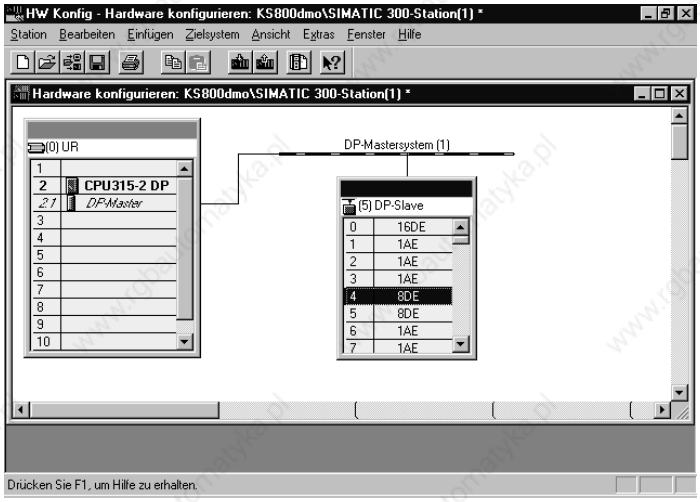
4.2.1 Example of a test environment:

A KS800-DP with address 5 shall be connected to a CPU315-2 DP via PROFIBUS-DP. Process data module B is selected (8 process data channels and parameter channel). Data shall be transmitted in fix point format.

Before taking the test environment into operation, you should ensure that the automation units do not contain user software (“initial clear”).

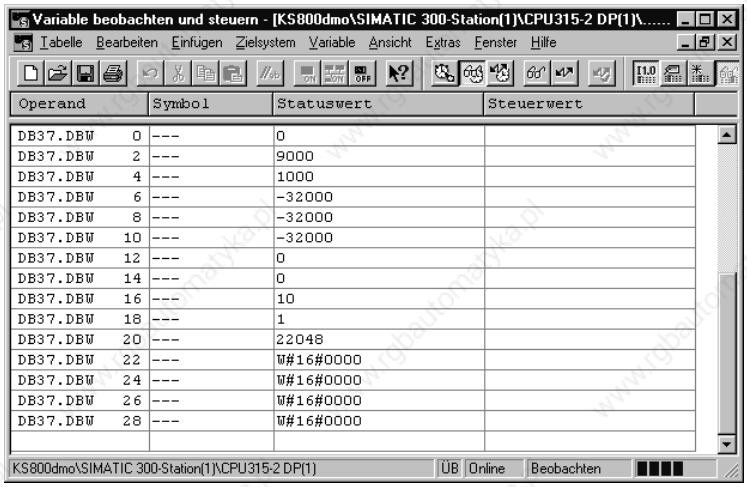
Procedure:

- Establishing the communications
- Configuring the instruments
  - Adjust address 5 on KS800-DP (via coding switch or engineering tool) and connect it to the network.
  - Activate bus terminating resistors at the controller connector and at the (S7) PLC connector.
- PROFIBUS network configuration
  - Insert the disk (engineering set) into the programming unit.
  - De-archive the project example. (A:\KS800DP\S7_FB \EXAMPLE \KS800dmo.arj)
  - Open project KS800dmo
  - If necessary, match addressings and CPU hardware configuration and transmit them to the DP master (CPU315-2 DP).
  - Switch the automation unit to run.



After taking the test set-up into operation, I/O testing and calling up the parameter channel are possible by means of the variable tables (VAT x) enclosed in the project.

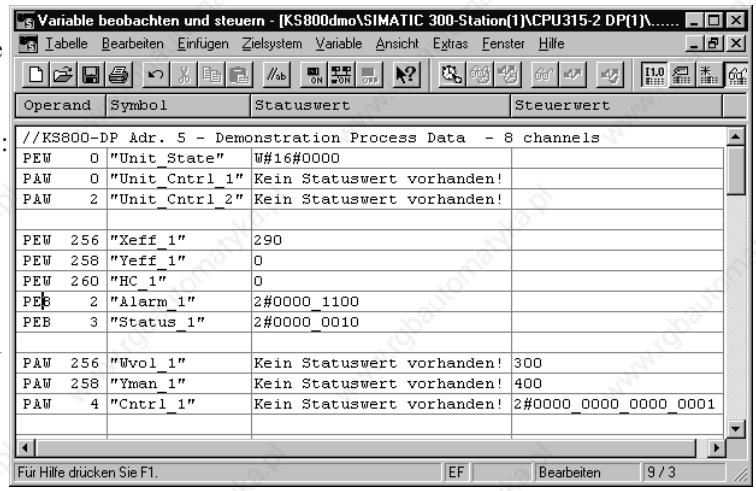
VAT 1:
Shows the process data of all channels (fix point). Only channel 1 can be seen in the figure opposite.
Example channel 1:
(set-point specification = 30
output variable = 40 %
manual operation)



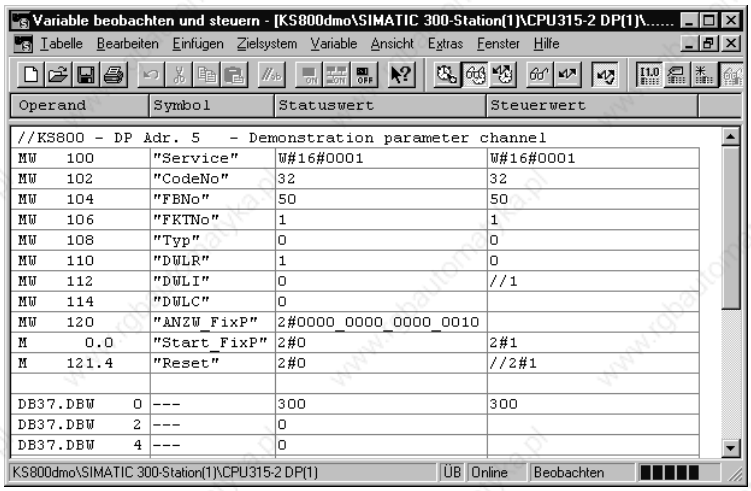
VAT 2:
Access to the function module parameters for parameter channel mapping is possible by means of this variable table.

Specify e.g. when reading fix point values:

- CodeNo, FBNo, FKTNo, Type = 0 (/ Chapter)
- Service = 0x 0001
- Start_FixP = 1
- ANZW_FixP indicates the status and the result after completing the FB handling.
- DWLR, DWLI, indicate the number of read values.



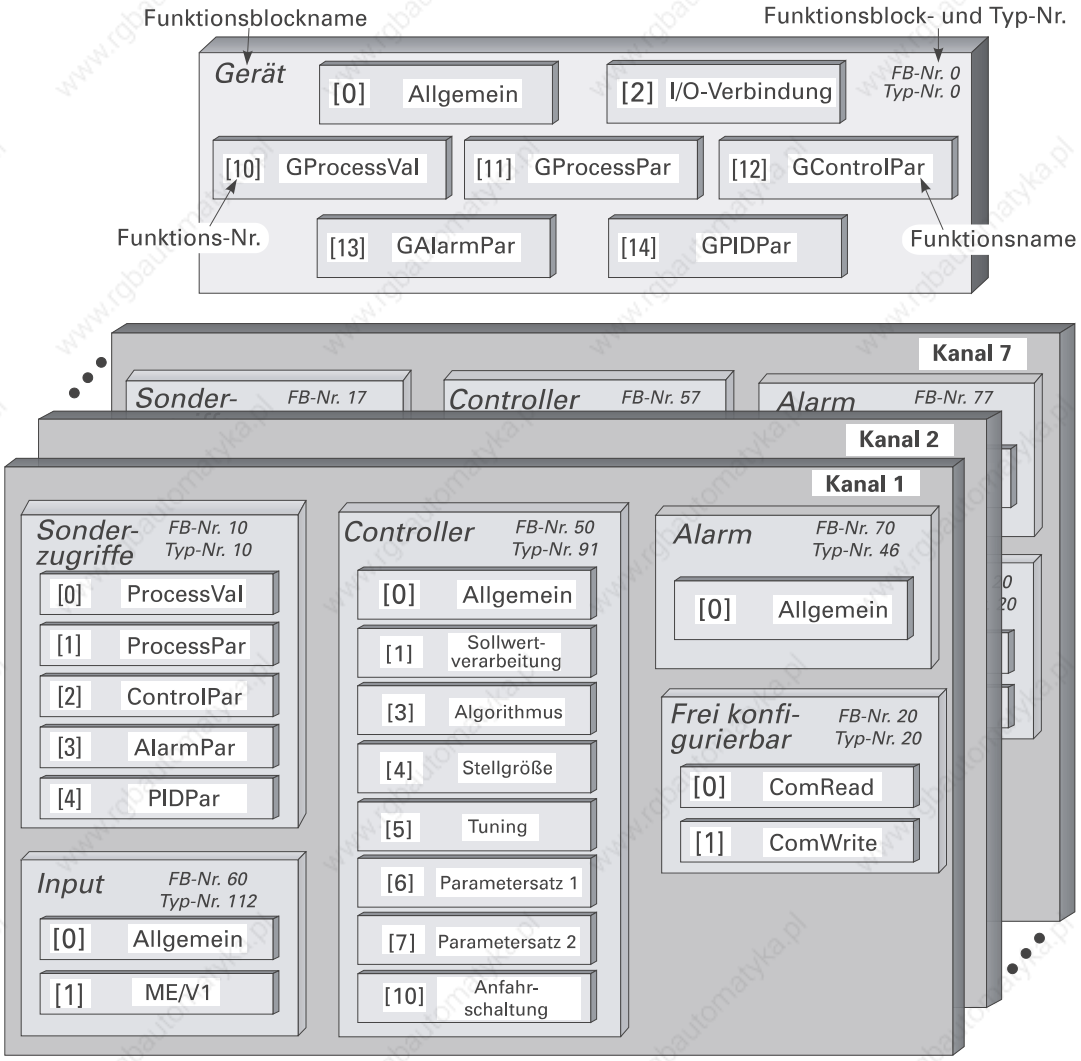
The bottommost figure shows the first data of a data module into which the parameter channel data are written, or from which values are read.



5 Function block protocol

5.1 *Data structuring*

Due to the variety of information to be processed in KS800, logically related data and actions are grouped into function blocks. A function block has input data, output data, parameters and configuration data. 25 function blocks are defined for KS800. They are addressed via fixed block addresses (FB no.). Each block is also grouped in individual functions. Functions are addressed via function numbers (fct. no.). Function number 0 addresses function-specific data.



5.2 *CODE tables*

5.2.1 Structure of configuration words (C.xxxx)

The configuration words given in the following code tables comprise several partial components, which can be transmitted only in common.
The data in the table must be interpreted as follows:

Example (C100):

Code	Descr.	R/W	Type	Description	Range
71	C100	R/W	INT	CFunc: Controller function (T,H) WFunc:Set-point function (E)	0..xx0z

Description	CFunc		WFunc
	Thousands	Hundreds	Ones
Range	x	x	z
	00 ... 07		0...1
Example: 2-pnt. controller; Set-point / cascade	0 2 0 4		

- For transmission of configuration words, see chapter page 19.
- The possible settings of the configuration words are given in the KS800 function description (order no.: 9499 040 49218)

5.2.2 INSTRUMENT (FB no.: 0 type no.: 0)

All data which are valid for the overall instrument are grouped in function block 'INSTRUMENT'.

Process data

General (Function no.: 0)

Code	Descr.	R/W	Type	Description	Range	Rem.
01	Unit_State 1	R	ST1	Status 1		A
10	Block 13..15, 18	R	Block			
13	Write Error	R	INT	Error during last write access	0, 100...127	
14	Write Error Position	R	INT	Position of last write access error	0...99	
15	Read Error	R	INT	Error during last read access	0, 100...127	
16	DPErr	R	ICMP	Error messages from DP module		B
17	DPAdr_eff	R	INT	Effective PROFIBUS address	0...126	
18	Type	R	INT	Type no. of function block	0	
20	Block 21...27	R	Block			
21	HWbas	R	INT	Basic HW options: module A, P		C
23	SWopt	R	INT	SW options 1		D
24	SWcod	R	INT	SW code no. 7th-10th digit of 12NC	wxyz	E
25	SWvers	R	INT	SW code no. 11th-12th digit of 12NC	00xy	F
26	OPVers [1)]	R	INT	Operating version		
27	EEPVers[1)]	R	INT	EEPROM version		
31	OpMod	R/W	INT	Instrument switch-over to configuration mode (only after 1)	0	
				Instrument switch-over to online mode (only after 0)	1	
				Cancellation of configuration mode (only after 0)	2	
32	Ostartg	R/W	INT	Stop/start self-tuning for all group controllers	0..1	
33	UPD	R/W	INT	Acknowledgement of local data change	0..1	G
34	HC_reset	R/W	INT	Heating-current-reset / Quicktest	0...3	G2

1) Data are reserved for distinction of internal versions in future applications.

Rem. A Unit_State1

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

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	'0'	always '0'		
D1	CNF	Instrument status	online	configuration
D2...D4	'0'	always '0'		
D5	UPD	Parameter update	no	yes
D6	'1'	always '1'		
D7		Parity		

Rem. B DPErr

MSB															LSB
D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	**D3**	**D2**	**D1**	**D0**

Bit no.	Name	Allocation	Status '0'	Status '1'
D0		Bus access not successful	no error	error
D1		Faulty parameter setting telegram	no error	error
D2		Faulty configuration	no error	error
D3		No more data exchange	no error	error
D4...D15		always '0'		

Rem. C HWbas

COM2		0	0
T	H	Z	E

Basic version without COM2	0	0	0	0
COM2 with CANopen	0	1	0	0
COM2 with PROFIBUS-DP	0	2	0	0
COM2 with ISO1745	0	3	0	0

Example: Value 'HWbas = 0200' means that the addressed instrument has a COM2 interface with PROFIBUS connection.

Rem. D SWopt

Version		0	0
T	H	Z	E

Basic version	0	0	0	0
Water cooling (so far not available)	0	1	0	0

Rem. E SWCod

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

Example: Value 'SWCod= 7239' means that the software for the addressed instrument contains code number 4012 157 239xx.

Rem. F SWvers

T	H	Z	E
0	0	11th digit	12th digit

Example: Value 'SWVers= 11' means that the software for the addressed instrument contains code number 4012 15x xxx11.

Rem. G UPD

Changing a parameter value or a configuration value via an interface is indicated in the UPD flag. After power recovery, this bit is also set. The flag which can be read also via code UPD can be reset (value =0).

Rem. G2 HC_reset

Hc_reset = 0 normal
= 1 Reset of all heating currents
= 2 Starting a quicktest
= 3 Reset of all heating currents with following quicktest

After finishing of the chosen softwareroutine, the value of HC_reset is set 0 automatically.

I/O connection (function no.: 2)

Code	Descr.	R/W	Type	Description	Range	Rem.
0	Block 1...2	R	Block			
1	State_alarm_out	R	ST1	Status alarm outputs		H
2	State_dio	R	ST1	Status digital inputs/outputs		I
20	Block 21...24	R	Block			
21	SnOEMOpt	R	INT	Serialnumber OEM-Field		
22	SnFabMonth	R	INT	Serialnumber Produktion month		
23	SnCntHi	R	INT	Serialnumber Counter High		
24	SncntLo	R	INT	Serialnumber Counter Low		
30	Block 31...33	R	Block			
31	Fdo1	R/W	INT	Forced digital outputs: OUT1 ... OUT8		J
32	Fdo2	R/W	INT	Forced digital outputs: OUT9 ... OUT16		K
33	Fdo3	R/W	INT	Forced digital outputs: OUT17 ... OUT19		L

Rem. H State_alarm_out

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

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	R1	Relay 1	off	on
D1	R2	Relay 2	off	on
D2	R3	Relay 3	off	on
D3	do1_12 AL	Alarm outputshort circuit OUT1 ... OUT12	off	on
D4	HCscAL	Alarm message heating current short circuit	off	on
D5	'0'	always '0'		
D6	'1'	always '1'		
D7		Parity		

Rem. I State_dio

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

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	Par_Nr	Parameter set number	set 0	set 1
D1	w/w2	w/w2 switch-over	w	w2
D2	Coff	Controller off	off	on
D3	Leck	Leakage current	off	on
D4	'0'	always '0'		
D5	do13_16f	OUT13 ... OUT16 Fail	no	yes
D6	'1'	always '1'		
D7		Parity		

Rem. J Data structure

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Signification	0	0	0	0	0	0	0	0	OUT8	OUT7	OUT6	OUT5	OUT4	OUT3	OUT2	OUT1

Rem. K Data structure

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Signification	0	0	0	0	0	0	0	0	OUT16	OUT15	OUT14	OUT13	OUT12	OUT11	OUT10	OUT9

Rem. L Data structure

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Signification	0	0	0	0	0	0	0	0	0	0	0	0	0	OUT19	OUT18	OUT17

GProcessVal (Funktions-Nr: 10)

Code	Descr..	Channel	R/W	Type	Description	Range	Rem.
B2	Xeff	1	R	INT	Effective process value of channel 1		
	Yeff	1	R	INT	Effective correcting variable of channel 1		
	HC	1	R	INT	Heating current of channel 1		
	Xeff	2	R	INT	Effective process value of channel 2		
	Yeff	2	R	INT	Effective correcting variable of channel 2		
	HC	2	R	INT	Heating current of channel 2		
	...						
	Xeff	8	R	INT	Effective process value of channel 8		
	Yeff	8	R	INT	Effective correcting variable of channel 8		
	HC	8	R	INT	Heating current of channel 8		
	State_alarm_out	1	R	ST1	Alarm output status of channel 1		H
	State_alarm_out	2	R	ST1	Alarm output status of channel 2		H
	...						
	State_alarm_out	8	R	ST1	Alarm output status of channel 8		H

GProcessPar (Funktions-Nr: 11)

Code	Descr..	Channel	R/W	Type	Description	Range	Rem.
B2	Wvol	1	R/W	INT	Volatile set-point of channel 1		
	W2	1	R/W	INT	Additional set-point of channel 1		
	Yman	1	R/W	INT	Absolute correcting variable of channel 1		
	Wboost	1	R/W	INT			
	Tboost	1	R/W	INT			
	Wvol	2	R/W	INT	Volatile set-point of channel 2		
	W2	2	R/W	INT	Additional set-point of channel 2		
	Yman	2	R/W	INT	Absolute correcting variable of channel 2		
	Wboost	2	R/W	INT			
	Tboost	2	R/W	INT			
	...						
	Wvol	8	R/W	INT	Volatile set-point of channel 8		
	W2	8	R/W	INT	Additional set-point of channel 8		
	Yman	8	R/W	INT	Absolute correcting variable of channel 8		
	Wboost	8	R/W	INT			
	Tboost	8	R/W	INT			

GControlPar (Funktions-Nr: 12)

Code	Descr.	Channel	R/W	Type	Description	Range	Rem.
B2	A/M	1	R/W	INT	Automatic / manual switch-over of channel 1		
	Coff	1	R/W	INT	Controller on/off of channel 1		
	w/W2	1	R/W	INT	Switch-over w/W2 of channel 1		
	Ostart	1	R/W	INT	Self-tuning start of channel 1		
	SoftStartEnable	1	R/W	INT			
	BoostStartEnable	1	R/W	INT			
	A/M	2	R/W	INT	Automatic / manual switch-over of channel 2		
	Coff	2	R/W	INT	Controller on/off of channel 2		
	w/W2	2	R/W	INT	Switch-over w/W2 of channel 2		
	Ostart	2	R/W	INT	Self-tuning start of channel 2		
	SoftStartEnable	2	R/W	INT			
	BoostStartEnable	2	R/W	INT			
	...						
	A/M	8	R/W	INT	Automatic / manual switch-over of channel 8		
	Coff	8	R/W	INT	Controller on/off of channel 8		
	w/W2	8	R/W	INT	Switch-over w/W2 of channel 8		
	Ostart	8	R/W	INT	Self-tuning start of channel 8		
	SoftStartEnable	8	R/W	INT			
	BoostStartEnable	8	R/W	INT			

GAlarmPar (Funktions-Nr: 13)

Code	Descr.	Channel	R/W	Type	Description	Range	Rem.
B2	LimL	1	R/W	INT	Low Alarm of channel 1		
	LimH	1	R/W	INT	High Alarm of channel 1		
	LimLL	1	R/W	INT	Low Low Alarm of channel 1		
	LimHH	1	R/W	INT	High High Alarm of channel 1		
	LimL	2	R/W	INT	Low Alarm of channel 2		
	LimH	2	R/W	INT	High Alarm of channel 2		
	LimLL	2	R/W	INT	Low Low Alarm of channel 2		
	LimHH	2	R/W	INT	High High Alarm of channel 2		
	...						
	LimL	8	R/W	INT	Low Alarm of channel 8		
	LimH	8	R/W	INT	High Alarm of channel 8		
	LimLL	8	R/W	INT	Low Low Alarm of channel 8		
	LimHH	8	R/W	INT	High High Alarm of channel 8		

GPIDPar

(Funktions-Nr: 14)

Code	Descr.	Channel	R/W	Type	Description	Range	Rem.
B2	Xp1	1	R/W	INT	Proportional band of channel 1		
	Tn1	1	R/W	INT	Integral time of channel 1		
	Tv1	1	R/W	INT	Derivative time of channel 1		
	T1	1	R/W	INT	min. cycle time of channel 1		
	Xp1	2	R/W	INT	Proportional band of channel 2		
	Tn1	2	R/W	INT	Integral time of channel 2		
	Tv1	2	R/W	INT	Derivative time of channel 2		
	T1	2	R/W	INT	min. cycle time of channel 2		
	...						
	Xp1	8	R/W	INT	Proportional band of channel 8		
	Tn1	8	R/W	INT	Integral time of channel 8		
	Tv1	8	R/W	INT	Derivative time of channel 8		
	T1	8	R/W	INT	min. cycle time of channel 8		

Parameter a. configuration data

General

(function no.: 0)

Code		Descr.	R/W	Type	Description	Range	Rem.
B3	71	C900 [1] COM1	R/W	INT	Prot: Protocol type (T) Baud: Baudrate (H,Z)	0..xyy0	
	72	Adr1 [1]	R/W	INT	COM1: Instrument address:	0..99	
	73	C904	R/W	INT	Freq: Mains frequency 50/60 (T) Alm-Ver: Alarm version (H) Mode-out:Configuration-version of the analog outputs (old/new) (Z) Mode-out current zero 0/4 mA (E)	0..x000	
	74	C902 [1] COM2	R/W	INT	Prot: Protocol type (T) Baud: Baudrate (omitted with PROFIBUS) (H,Z)	0..wxyz	
	75	Adr2 [1]	R/W	INT	COM2: Instrument address: ISO1745 (def. 0) CAN-BUS PROFIBUS (def. 126)	0..99 0..255 0..126	

I/O connection

(function no.: 2)

Code		Descr.	R/W	Type	Description	Range	Rem.
B3	71	HC100	R/W	FP	Span end for HC	1...9999	
	72	C500	R/W	INT	Main configuration IN1/OUT13 ... IN4/OUT16 Fkt_dio1: IN1 / OUT13 (T) Fkt_dio2: IN2 / OUT14 (H) Fkt_dio3: IN3 / OUT15 (Z) Fkt_dio4: IN4 / OUT16 (E)	0..wxyz	
	73	C530	R/W	INT	Main configuration OUT17 ... OUT19 mode_do17 (T) mode_do18 (H) mode_do19 (Z)	0...xyz0	
	74	C151	R/W	INT	Allocation HC/leakage current Alarm DestHC (T) DestLeck (H) DestOutError (Z)	0...xyz0	
	75	HCycl	R/W	INT	Heating current cycle time	0...999	

1) Baudrate and address setting are effective only after initialization, e.g. protocol switch-over.

5.2.3 Special accesses (FB no.: 10 ... 17 type no.: 10)

Alternatively, access to the KS800 data is possible via function block 'Special accesses' .
In this case, access is only via code B2.

ProcessVal (Funktions-Nr: 0)

Code	Descr.	R/W	Type	Description	Range	Rem.
B2	Xeff	R	INT	Effective process value		
	Yeff	R	INT	Effective correcting variable		
	HC	R	INT	Heating current		
	State_alarm_out	R	ST1	Alarm output status		

ProcessPar (Funktions-Nr: 1)

Code	Descr.	R/W	Type	Description	Range	Rem.
B2	Wvol	R/W	INT	Volatile set-point		
	W2	R/W	INT	Additional set-point		
	Yman	R/W	INT	Absolute correcting variable		
	Wboost	R/W	INT	Momentarily no funktion		
	Tboost	R/W	INT	Momentarily no funktion		

ControlPar (Funktions-Nr: 2)

Code	Descr.	R/W	Type	Description	Range	Rem.
B2	A/M	R/W	INT	Automatic/manual switch-over		
	Coff	R/W	INT	Controller on/off		
	w/W2	R/W	INT	Switch-over w/W2		
	Osart	R/W	INT	Start selftuning		
	SoftStartEnable	R/W	INT	Momentarily no funktion		
	BoostStartEnable	R/W	INT	Momentarily no funktion		

AlarmPar (Funktions-Nr: 3)

Code	Descr.	R/W	Type	Description	Range	Rem.
B2	LimL	R/W	INT	Low Alarm		
	LimH	R/W	INT	High Alarm		
	LimLL	R/W	INT	Low Low Alarm		
	LimHH	R/W	INT	High High Alarm		

PIDPar (Funktions-Nr: 4)

Code	Descr.	R/W	Type	Description	Range	Rem.
B2	Xp1	R/W	INT	Proportional band 1		
	Tn1	R/W	INT	Integral time1		
	Tv1	R/W	INT	Derivative time 1		
	T1	R/W	INT	min. cycle time		

5.2.4 Freely configurable (FB no.: 20 ... 27 type no.: 20)

Function block ”Freely definable” defines data, which can be read only by block access 20 or 30. The ComWrite data can also be changed by mean of keys 31 – 38. Additionally, this Profibus interface setting provides the values for the relevant data modules.

ComRead (Funktions-Nr: 0)

Code	Descr.	R/W	Type	Description	Range	Rem.
20	Block	R	Block		21... 28	
21	Val 1	R	dataspecific	Value 1		A
22	Val 2	R	dataspecific	Value 2		
23	Val 3	R	dataspecific	Value 3		
24	Val 4	R	dataspecific	Value 4		
25	Val 5	R	dataspecific	Value 5		
26	Val 6	R	dataspecific	Value 6		
27	Val 7	R	dataspecific	Value 7		
28	Val 8	R	dataspecific	Value 8		

ComWrite (Funktions-Nr: 1)

Code	Descr.	R/W	Type	Description	Range	Rem.
30	Block	R	Block		31... 38	
31	Val 1	R/W	dataspecific	Value 1		A
32	Val 2	R/W	dataspecific	Value 2		
33	Val 3	R/W	dataspecific	Value 3		
34	Val 4	R/W	dataspecific	Value 4		
35	Val 5	R/W	dataspecific	Value 5		
36	Val 6	R/W	dataspecific	Value 6		
37	Val 7	R/W	dataspecific	Value 7		
38	Val 8	R/W	dataspecific	Value 8		

Rem. A Data-specific

Dependent of the adjusted parameter, the value is output as INT or status. Undefined values are output in INT format with –31000.

Parameter- a. Configuration-Data

ComRead (Funktionsnr: 0)

Code		Descr.	R/W	Type	Description	Range	Rem.
B2	41	ComReadBlock1	R/W	INT	Functionblocknumber for value 1	0 … 77	B
	42	ComReadFctKey1	R/W	INT	Funktionnumber and code for value 1	0 … 2999	
	43	ComReadBlock1	R/W	INT	Functionblocknumber for value 2	0 … 77	
	44	ComReadFctKey1	R/W	INT	Funktionnumber and code for value 2	0 … 2999	
	45	ComReadBlock1	R/W	INT	Functionblocknumber for value 3	0 … 77	
	46	ComReadFctKey1	R/W	INT	Funktionnumber and code for value 3	0 … 2999	
	47	ComReadBlock1	R/W	INT	Functionblocknumber for value 4	0 … 77	
	48	ComReadFctKey1	R/W	INT	Funktionnumber and code for value 4	0 … 2999	
	49	ComReadBlock1	R/W	INT	Functionblocknumber for value 5	0 … 77	
	51	ComReadFctKey1	R/W	INT	Funktionnumber and code for value 5	0 … 2999	
	52	ComReadBlock1	R/W	INT	Functionblocknumber for value 6	0 … 77	
	53	ComReadFctKey1	R/W	INT	Funktionnumber and code for value 6	0 … 2999	
	54	ComReadBlock1	R/W	INT	Functionblocknumber for value 7	0 … 77	
	55	ComReadFctKey1	R/W	INT	Funktionnumber and code for value 7	0 … 2999	
	56	ComReadBlock1	R/W	INT	Functionblocknumber for value 8	0 … 77	
	57	ComReadFctKey1	R/W	INT	Funktionnumber and code for value 8	0 … 2999	

ComRead (Funktionsnr: 0)

Code		Descr.	R/W	Type	Description	Range	Rem.
B2	41	ComWriteBlock1	R/W	INT	Functionblocknumber for value 1	0 … 77	B
	42	ComWriteFctKey1	R/W	INT	Funktionnumber and code for value 1	0 … 2999	
	43	ComWriteBlock1	R/W	INT	Functionblocknumber for value 2	0 … 77	
	44	ComWriteFctKey1	R/W	INT	Funktionnumber and code for value 2	0 … 2999	
	45	ComWriteBlock1	R/W	INT	Functionblocknumber for value 3	0 … 77	
	46	ComWriteFctKey1	R/W	INT	Funktionnumber and code for value 3	0 … 2999	
	47	ComWriteBlock1	R/W	INT	Functionblocknumber for value 4	0 … 77	
	48	ComWriteFctKey1	R/W	INT	Funktionnumber and code for value 4	0 … 2999	
	49	ComWriteBlock1	R/W	INT	Functionblocknumber for value 5	0 … 77	
	51	ComWriteFctKey1	R/W	INT	Funktionnumber and code for value 5	0 … 2999	
	52	ComWriteBlock1	R/W	INT	Functionblocknumber for value 6	0 … 77	
	53	ComWriteFctKey1	R/W	INT	Funktionnumber and code for value 6	0 … 2999	
	54	ComWriteBlock1	R/W	INT	Functionblocknumber for value 7	0 … 77	
	55	ComWriteFctKey1	R/W	INT	Funktionnumber and code for value 7	0 … 2999	
	56	ComWriteBlock1	R/W	INT	Functionblocknumber for value 8	0 … 77	
	57	ComWriteFctKey1	R/W	INT	Funktionnumber and code for value 8	0 … 2999	

Rem. B Data structure

Definition to which data an access is made, the following entries are required:

- Function block number → ComReadBlock or ComWriteBlock
- Function number + individual code → ComReadFctKey or ComWriteFctKey

Example::

If the Wvol value for controller 2 (controller description 1 - 8) for ComRead must be selected, the values are composed as follows:

Functionblocknumber	Controller 2	= 51	ComReadBlock = 51
Funktionnumber	Wvol	= 01	ComReadFctKey = 0132
Single-Code	Wvol	= 32	

5.2.5 INPUT (FB no.: 60 ... 67 Type no.: 112)

All data which concern acquisition and processing of all input values (analog/digital) are grouped in function block 'INPUT'. The data are available once per controller channel.

Process data

General — input processing of analog signals (function no.: 0)

Code	Descr.	R/W	Type	Description	Range	Rem.
00	Block	R	Block	Block access (1, 3)		
1	Input_x_Fail	R	ST1	Signal input x fail		A
3	x1	R	FP	Main variable		
10	Block	R	Block	Block access (13, 18)		
13	INP1	R	FP	Raw measurement value before measured value correction		
18	Function Type	R	INT	Type no. of function block	112	

Rem. A Status byte Input_X_Fail:

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

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	INP1F	Input 1 fail	no	yes
D1...D5	'0'	always '0'		
D6	'1'	always '1'		
D7		Parity		

Parameter a. configuration data

ME/V1 — Measured value INP1 : acquisition and processing (function no.: 1)

Code		Descr.	R/W	Type	Description	Range	Rem.
B2	41	$X1_{in}$	R/W	FP	Measured value correction X1 input	-999..9999	
	42	$X1_{out}$	R/W	FP	Measured value correction X1 output	-999..9999	
	43	$X2_{in}$	R/W	FP	Measured value correction X2 input	-999..9999	
	44	$X2_{out}$	R/W	FP	Measured value correction X2 output	-999..9999	
B3	71	X0	R/W	FP	Phys. value at 0%	-999..9999	
	72	X100	R/W	FP	Phys. value at 100%	-999..9999	
	73	X_{Fail}	R/W	FP	Substitute value with sensor fail	-999..9999	
	74	T_{fm}	R/W	FP	Filter time const. measured value process.	0.0 .. 999.9	
	75	T_{kref}	R/W	FP	Reference TC	0...60 °C / 32...140°F	
	76	C200	R/W	INT	Type: sensor type (T,H) Unit: unit (Z)	0..xxy0	
	77	C205	R/W	INT	Fail: sensor break behaviour (T) STk: Source Tk (H) XKorr: enable process value corr. (Z)	1..wxy0	
	78	C190	R/W	INT	Signal allocation of digital signals: Controller off (Z) w/w2 (E)	0...00xy	

5.2.6 CONTR (FB no.: 50 ... 57 Type no.: 91)

All data which concern the controller are grouped in function block 'CONTR'. They are available once for each controller channel.

Process data

General

(function no.: 0)

Code	Descr.	R/W	Type	Description	Range	Rem.
00	Block	R	Block	Block access (1...9)		
1	Status 1	R	ST1	Status 1		A
3	W	R	FP	Eff. set-point		
4	X	R	FP	Eff. process value		
5	Y	R	FP	Effective output value		
6	xw	R	FP	Control deviation		
13	Status Alarm x	R	INT	Status x and Alarm x		**B1**
18	Type	R	INT	Type no. of function block	90	
20	Block	R	Block	Block access (21...26)		
21	Xeff	R	FP	Eff. process value		
22	Yeff	R	FP	Effective output variable		
23	HC	R	FP	Heating current measureement value		
24	Unit_State	R	ICMP	Input values (di)	/ page 12	
25	Alarm_x	R	ICMP	Alarm values	/ page 13	**B2**
26	Status_x	R	ICMP	Status information	/ page 13	
30	Block	R	Block	Block access (31...38)		
33	A/M	R/W	INT	Automatic/manual switch-over	0..1	
34	OStart	R/W	INT	Optimization start	0..1	
35	We/i	R/W	INT	Wext/Wint switch-over	0..1	
36	w/w2	R/W	INT	w/w2 switch-over	0..1	
38	Coff	R/W	INT	Controller off/on	0..1	**C**

Rem. A Status1: (code 01)

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

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	Y1	Switching output	off	on
D1	Y2	Switching output	off	on
D2	A/M	Auto/manual	auto	manual
D3	CFail	Controller status	ok	not ok
D4	Coff	Controller switched off	no	yes
D5	XFail	Sensor fail	no	yes
D6	'1'	always '1'		
D7		Parity		

Rem. B1 Status_alarm_x: Code 13

MSB															LSB
D15	D14	D13	D12	D11	D10	D9	D8	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	extern/intern switch over	extern	intern
D2	w/wanf	Start-setpoint switch over	w	wanf
D3	Orun	Optimisation activ	no	yes
D4	A/M	Automatic/Manuel switch over	Auto	Man
D5	Coff	Controller off	no	yes
D6	Y1	Switchung output 1	off	on
D7	Y2	Switching output 2	off	on
D8	Lim HH	Alarm HH	off	on
D9	Lim H	Alarm H	off	on
D10	Lim L	Alarm L	off	on
D11	Lim LL	Alarm LL	off	on
D12	Fail	Alarm sensor fail	no	yes
D13	HCAl	Heating current alarm	off	on
D14	LoopAl	Loop alarm	off	on
D15	"0"	always "0"		

Rem. B2 Cntrl_x: (Code 39)

MSB															LSB
D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	**D3**	**D2**	**D1**	**D0**

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	A/M	Automat/Manuel	Auto	Manuel
D1	Coff	Switch the controller off	no	yes
D2	w/w2	w/w2 switch over	w	w2
D3	we/wi	wext/wint	wext	wint
D4	OStart	Start the optimisation	no start	start
D5	Ostop	Stop the optimisation	no stop	stop
D6...D15	"0"	Always "0"		

Set-point — Set-point processing (function no.:1)

Code	Descr.	R/W	Type	Description	Range	Rem.
00	Block	R	Block	Block access (1, 3)		
01	WState	R	ST1	Set-point status		B
03	Wint	R	FP	Effective internal set-point		
30	Block	R	Block	Block access (31...32)		
31	Wnvol	R/W	FP	Int. set-point, non-volatile	-999..9999	
32	Wvol	R/W	FP	Int. set-point, volatile	-999..9999	

Rem. C WState: (code 01)

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	wext	wint
D2	w/wanf	start-up set-point switch-over	w	wanf
D3	GRW	Gradient function active	no	yes
D4	Weff_fail	Error effective set-point	no	yes
D5	'0'	always '0'		
D6	'1'	always '1'		
D7		Parity		

Output variable — Output variable processing(function no.:4)

Code	Descr.	R/W	Type	Description	Range	Rem.
30	Block	R	Block	Block access (31, 35)		
31	dYman	R/W	FP	Difference output variable	-210..210	
32	Yman	R/W	FP	Absolute output variable	-105..105	
33	Yinc	R/W	INT	Increment. output variable	0, 1	
34	Ydec	R/W	INT	Decrement. output variable	0, 1	
35	Ygrw_ls	R/W	INT	Speed for incr./decr. output variable offset	0, 1	

Tuning — Self-tuning(function no.:5)

Code	Descr.	R/W	Type	Description	Range	Rem.
00	Block	R	Block	Block access (1, 3)		
1	State_Tune1	R	ST1	Status Tuning		D
3	ParNeff	R	INT	Eff. parameter set number	0...1	
30	Block	R	Block	Block access (31...39)		
31	ParNr	R/W	INT	Parameter set number effective	0 .. 1	
32	Tu1	R	FP	Delay time heating	0...9999 s	
33	Vmax1	R	FP	Rate of increase heating	0,000...9,999 %/s	
34	Kp1	R	FP	Process gain heating	0,000...9,999	
35	MSG1	R	INT	Error code of self-tuning heating	0...8	
36	Tu2	R	FP	Delay time cooling	0...9999 s	
37	Vmax2	R	FP	Rate of increase cooling	0,000...9,999 %/s	
38	Kp2	R	FP	Process gain cooling	0,000...9,999	
39	MSG2	R	INT	Error code of self-tuning cooling	0...8	

Rem. D Status 1 Tuning 'State_Tune1'

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	Optimization run	off	on
D2	Oerr	Optimization result	Ok	error
D3...D5	'0'	always '0'		
D6	'1'	always '1'		
D7		Parity		

Parameter a. configuration data

General

(function no.: 0)

Code		Descr.	R/W	Type	Description		Range	Rem.
B3	71	C100	R/W	INT	CFunc: Controller function CType: Controller type WFunc:set-point function	(T,H) (Z) (E)	0..xxyz	
	72	C101	R/W	INT	CMode:Controller output action CDiff: x/x-w Differentiat. CFail: Behaviour with sensor fail CAnf: Start-up circuit	(T) (H) (Z) (E)	0..wxyz	
	73	C700	R/W	INT	OMode:Optimization mode OCond: Process at rest. OGrp: Allocation group opt. OCntr: Controlled adaptation mode	(T) (H) (Z) (E)	0..wxyz	
	74	C180	R/W	INT	SWext: Source for Wext	(T)	0..x000	

Set-point

Set-point processing(function no.: 1)

Code		Descr.	R/W	Type	Description	Range	Rem.
B2	41	W0	R/W	FP	Min. set-point limit f. Weff	-999..9999	
	42	W100	R/W	FP	Max. set-point limit f. Weff	-999..9999	
	43	W2	R/W	FP	Additional set-point	-999..9999	
	44	Grw+	R/W	FP	Set-point gradient plus	>0..9.999	1)
	45	Grw-	R/W	FP	Set-point gradient minus	>0..9.999	
	46	Grw2	R/W	FP	Set-point gradient W2	>0..9.999	

Algo

Control algorithm (function no.: 3)

Code		Descr.	R/W	Type	Description	Range	Rem.
B2	41	Xsh	R/W	FP	Neutral zone	0.2 .. 20,0 %	
	42	Tpuls	R/W	FP	Min. pulse length	0.1..2,0 s	(1)
	43	Tm	R/W	FP	Actuator response time	10..300 s	
	44	Xsd1	R/W	FP	Switching difference signaller	0,1..9999 %	
	45	LW	R/W	FP	Trigger point separation add. cont.	-999..9999	
	46	Xsd2	R/W	FP	Switching difference add. cont.	0,1..9999 %	
	47	Xsh1	R/W	FP	Neutral zone	0.0 .. 999.9%	
	48	Xsh2	R/W	FP	Neutral zone	0.0 .. 999.9 %	

1) Datum has swich-off function; additional data value '-32000'

Output variable

Output variable processing(function no.: 4)

Code		Descr.	R/W	Type	Description	Range	Rem.
B2	41	Y_{min}	R/W	FP	Min. output limiting	-105..105 %	
	42	Y_{max}	R/W	FP	Max. output limiting	-105..105 %	
	43	Y0	R/W	FP	Working point f. output variable	-105..105 %	
	44	Yh	R/W	FP	Max. mean value of output	5..100%	
	45	LYh	R/W	FP	Limit for mean value formation	0,1 .. 10,0	

Tuning

Self-tuning(function no.: 5)

Code		Descr.	R/W	Type	Description	Range	Rem.
B2	41	YOptm	R/W	FP	Output variable during process at rest	-105..105	
	42	dYopt	R/W	FP	Step height during identification	5..100	
	43	POpt	R/W	INT	Parameter set to be optimized	0...1	
	44	OXsd	R/W	FP	Hysteresis with parameter switch-over	0.0..9999	
	45	Trig1	R/W	FP	Trigger point 1	0.0..9999	

Paramset x

Control parameter set 1 / 2(function no.: 6,7)

Code		Descr.	R/W	Type	Description	Range	Rem.
B2	41	Xp1	R/W	FP	Proportional band 1	0.1..999.9	
	42	Tn1	R/W	FP	Integral time 1	0..9999	
	43	Tv1	R/W	FP	Derivative time 1	0..9999	
	44	T1	R/W	FP	Min. cycle time 1	0.4..999.9	
	45	Xp2	R/W	FP	Proportional band 2	0.1..999.9	
	46	Tn2	R/W	FP	Integral time 2	0..9999	
	47	Tv2	R/W	FP	Derivative time 2	0..9999	
	48	T2	R/W	FP	Min. cycle time 2	0.4..999.9	

Start-up circuit

(function no.: 10)

Code		Descr.	R/W	Type	Description	Range	Rem.
B2	41	Ya	R/W	FP	Maximum output value	5 .. 100 %	
	42	Wa	R/W	FP	Start-up set-point	-999 .. 9999	
	43	TPa	R/W	FP	Start-up holding time	0 .. 9999 min	

5.2.7 ALARM (FB no.: 70 ... 77 Type no.: 46)

Function block 'ALARM' defines the overall alarm processing of the relevant controller. The data are available once per controller.

Process data

General (function no.: 0)

Code	Descr.	R/W	Type	Description	Range	Rem.
00	Block	R	Block	Block access (1 .. 3)		
1	Status_Al1	R	ST1	Alarm status 1		A
2	Status_Al2	R	ST1	Heating current alarm		B
3	HC	R	FP	Heating current meas. value		
18	Type	R	INT	Type no. of function block	46	

Rem A Status_Al1

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

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	Lim HH	Alarm HH	off	on
D1	Lim H	Alarm H	off	on
D2	Lim L	Alarm L	off	on
D3	Lim LL	Alarm LL	off	on
D4	Fail	Fail	no	yes
D5	'0'	always '0'		
D6	'1'	always '1'		
D7		Parity		

Rem B Status_Al2

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

Bit no.	Name	Allocation	Status '0'	Status '1'
D0	HCAl	Heating current alarm channel	off	on
D1	LeckAl	Leakage current alarm channel	off	on
D2	LoopAl	Loop-alarm channel	off	on
D3	SSRAl	Short circuit alarm channel	off	on
D4	Fail_H	Fail-alarm H	off	on
D5	Fail_HH	Fail alarm HH	off	on
D6	'1'	always '1'		
D7		Parity		

Parameter a. configuration data

General (function no.: 0)

Code		Descr.	R/W	Type	Description	Range	Rem.
B2	41	LimL	R/W	FP	Low alarm	-999..9999	1)
	42	LimH	R/W	FP	High alarm	-999..9999	
	43	xsd1	R/W	FP	High/low alarm switch. difference	0..9999	
	44	LimLL	R/W	FP	Low low alarm	-999..9999	1)
	45	LimHH	R/W	FP	High high alarm	-999..9999	
	46	LimHC	R/W	FP	Heating current limit value	0..HC100	
B3	71	C600	R/W	INT	Alarm or LL-Alarm Src: Signal source (T,H) Fnc: Function (Z) DestFail: Fail Destination (E)	0..xxyz	
	72	C601	R/W	INT	DestLL : (T) DestL : (H) DestH : (Z) DestHH : (E)	0..wxyz	

General (function no.: 0)

Code		Descr.	R/W	Type	Description	Range	Rem.
B2	41	LimL	R/W	FP	Low alarm	-999..9999	
	42	LimH	R/W	FP	High alarm	-999..9999	
	43	xsd1	R/W	FP	High/low alarm switch. difference	0..9999	
	44	LimLL	R/W	FP	Low low alarm	-999..9999	1)
	45	LimHH	R/W	FP	High high alarm	-999..9999	
	46	LimHC	R/W	FP	Heating current limit value	0..HC100	
B3	71	C600	R/W	INT	Alarm or LL-Alarm Src: Signal source (T,H) Fnc: Function (Z) DestFail: Fail Destination (E)	0..xxyz	
	72	C601	R/W	INT	DestLL : (T) DestL : (H) DestH : (Z) DestHH : (E)	0..wxyz	

General (function no.: 0)

Code		Descr.	R/W	Type	Description	Range	Rem.
B2	41	LimL	R/W	FP	Low alarm	-999..9999	
	42	LimH	R/W	FP	High alarm	-999..9999	
	43	xsd1	R/W	FP	High/low alarm switch. difference	0..9999	
	44	LimLL	R/W	FP	Low low alarm	-999..9999	1)
	45	LimHH	R/W	FP	High high alarm	-999..9999	
	46	LimHC	R/W	FP	Heating current limit value	0..HC100	
B3	71	C600	R/W	INT	Alarm or LL-Alarm Src: Signal source (T,H) Fnc: Function (Z) DestFail: Fail Destination (E)	0..xxyz	
	72	C601	R/W	INT	DestLL : (T) DestL : (H) DestH : (Z) DestHH : (E)	0..wxyz	

1) Datum has swich-off function; additional data value '-32000'

6 Function modules

6.1 *Function module for SIMATIC® S5*

Function module FB206 serves for easy access to the controller parameter and configuration data (in P area).

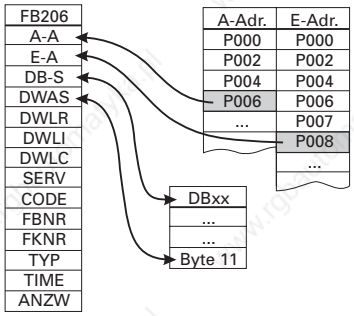
6.1.1 Structure

The parameters of the function module are:

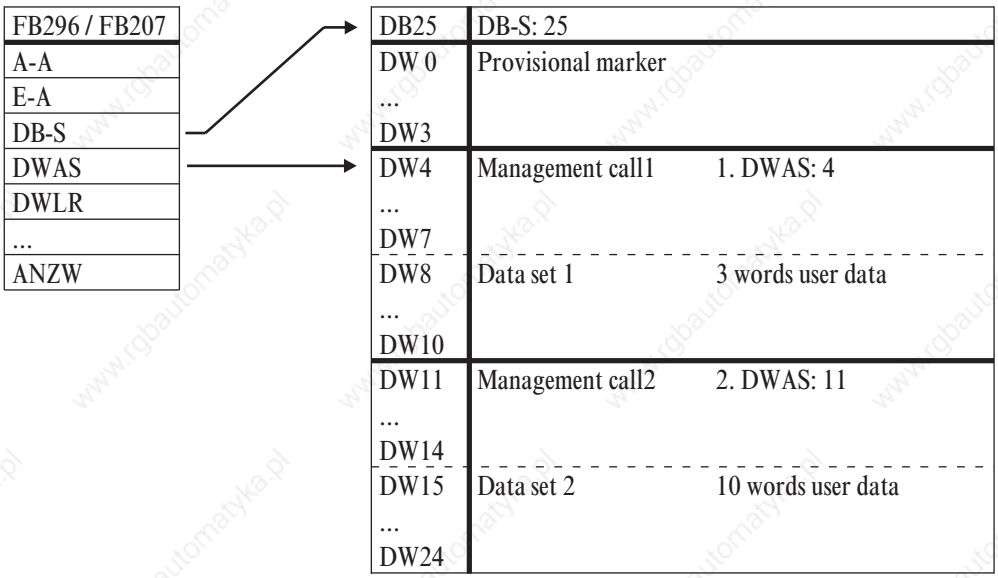
Name	Type	Description / function
A-A	KF	Start of output bytes for send window
E-A	KF	Start of input bytes for receive window
DB-S	B	Data module for parameter data
DWAS	W	Data word start for order in DB
DWLR	W	Number of real values
DWLI	W	Number of integer values
DWLC	W	d.c. always '0'
SERV	W	Service (read/write)
CODE	W	Code
FBNR	W	Function block no.
FKNR	W	Function no.
TYP	W	d.c. (always '0')
TIME	KH	Timeout in time units, decremented with each FB call, must be higher than timeout in DP module.
ANZW	W	The current transmission status for the selected data area is given in the display word. The structure of the display word is:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Timeout (FB)	Service faulty				NAK (access by controller not accepted)	Parity error	Timeout internal (controller)		Wait for end telegram	Service (0=Read; 1=Write)	Reset order	Waits for acknowledgement	Order ready with error	0<%-2>rder ready without error	Order running

The function module reads or writes KS800 parameter/configuration data.



- A-A, E-A
  The input addresses or output addresses of the parameter channel are entered into these parameters. The addresses are determined during configuration of the unit connected to the PROFIBUS (/ Fig.: S.23)
- DB-S
  DB-S is used for allocation of the data module pertaining to the function module, in which all FB operations are handled. It must have been opened previously.
  Data words 0...3 of the data module are "provisional markers", which are enabled again after FB handling.
- DWAS
  DWAS identifies the start of the data area in the data module. The first 4 words after DWAS are required for internal use in the function module and must not be used for other purposes.Example: 2 data sets shall be stored with high packing density in DB25.



- DWLR (real), DWLI (integer)
  These parameters contain the relevant number of received data after a read access. With a write access, the number of data to be transmitted is specified. DWLC is not required in KS800, value must be set to 0.

- SERV
  This parameter determines the access type (write / read) /⊠ ID1.

Write access:	F0	≙	Integer	Read access:	0	≙	Integer
	F1	≙	Real		1	≙	Real

Individual access

This access (code xx) can be used for reading or writing an individual value of a function.

Valid values for ID1:

Configuration as FixPoint:	0 = integer	real values are transmitted as integer (without digits behind the decimal point)
	1 = real	real values are transmitted as FixPoint (1 digit behind the decimal point)

Block access (tens block)

This access (code x0) can be used for reading max. nine process values (always as REAL values) of a function.

Block acces (overall block)

This access can be used for reading or writing all parameter (code 178) and configuration data (code 179) of a function. The following conditions are applicable to this access:

- For writing the data with 'code B3 ≙ 179', the instrument must be switched to the configuration mode (/⊠ see page 27 'OpMod'). All entered new configuration data and parameters are effective only, when the instrument was switched back to on-line.
- All data of a message must be defined, omissions are not permissible.
- The complete message must be transmitted also, if parts of a message in the controller are not used (HW and SW options). Checking of the non-existing data is omitted.
- With faulty block write accesses, the following is valid: a message is replied with NAK, if at least one datum is faulty. Already valid values are accepted.

The message structure with block accesses with code B2/B3 is shown using two examples below. The order of data to be transmitted is given in the relevant code table.

Valid values for ID1:

Configuration as FixPoint:	0, 1	Transmission of real values each as a FixPoint value

- CODE
  The code identification is decimal and the range is within '00'...'99'
  as well as '178' = B2 and '179' = B3.

- FBNR. (function block number)
  A function block is addressed by means of a function block number. This function block number can be within ‘0’ and ‘250’.
  Function block number ranges:
  0 general data for the overall instrument
  1 - 99 fixed function blocks
- FKTNR (function number)
  A function as a partial address of a function block is also addressed with a function number. This function number can be within ‘0’ and ‘99’.
  Function number ranges:
  0 Function General
  1 - 99 other functions
- TYP (function type)
  A function type number is also assigned to each function block. This function type number is within ‘0’ and ‘111’.
  Function type range:
  0 Function type General
  1 - 111 other function types
- TIME
  Timeout counter: Range 0x0000 ß TIME ß 0x7FFF
  - is decremented during each PLC cycle (max. 32767)
  - with 0 Timeout.
  If the CPU is too fast, call up FB206/FB207 with delay via timer module.
- ANZW
  This display word represents the current transmission status. Bit 4 can be used as an input for resetting the FB 206 / FB 207.

6.1.2 Function module call

List representation:

```
          :SPA     FB 206
Name      :PMA-FIX
A-A       :
E-A       :
DB-S      :
DWAS      :
DWLR      :
DWLI      :
DWLC      :
SERV      :
CODE      :
FBNR      :
FKNR      :
TYP       :
TIME      :
NZW       :
```

6.2 *Function module for SIMATIC® S7*

The S7-FB handling principle corresponds to the S5 variant. When starting an order and as long as the order is active, calling up the FB is indispensable.
Dependent of S7-CPU and DP-Master, the I/O handling is different. With a CPU315-2 DP with on-board DP interface, SFC modules 14 and 15 must be used for consistent data transmission. SFC modules 14 and 15 copy the I/O areas into the marker or data module area. When using an external CP (CP 342-5 DP), the relevant DP-SEND and DP-RECEIVE FBs at the cycle start and end must be called up.
The FB has an instance DB, which must also be specified with FB call.

6.2.1 Structure

The call parameters of the function module are:

Name	Type	Description / function
A-start	Pointer	Output word address area start (e.g. address data area 'RECORD' of SFC 15, Ax, y when using an external CP). The DB no. must also be transmitted when specifying a data word (e.g. DB4.DBX0.0)
E-start	Pointer	Input word address area start (e.g. address data area 'RECORD' of SFC 15, Ex, y when using an external CP). The DB no. must also be transmitted when specifying a data word (e.g. DB4.DBX0.0)
DB-Para	Pointer	Specification of data module with the parameter setting data. The entry comprises the data module no. and the data word no. at which the parameter data start. Thereby,no offset needs being taken into account. The data are interpreted as parameter data (useful data) by the specified address. The DB must be specified in the following form e.g. DB6.DBX10.0
Service	WORD	Service (Read/Write)
Code_nr	WORD	Code
FB_nr	WORD	Function block no. (channel addressing)
FKT_nr	WORD	Function no.
Typ	WORD	No function (always '0')
Timeout	DWORD	Timeout value, is decremented with each call. With a value of = 1, the order is cancelled with error message 'timeout'.
DWLR	WORD	Length of real values
DWLI	WORD	Length of integer values
DWLC	WORD	D.c. always '0'
ANZW	W	The current transmision status for the selected data area is given in the display word. The structure of the display word is:

15	**14**	13	12	11	**10**	**9**	**8**	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Timeout (FB)	Service faulty				NAK (access by controller not accepted)	Parity error	Timeout internal (controller)		Waiting for end telegram	Service (0=Read; 1=Write)	Reset order	Waits for acknowledgement	Order finished with error	Order finished without error	Order running

The function module reads or writes KS800 parameter/configuration data.

- A-start, E-start
  The parameter channel input addresses or output addresses are entered into these parameters. The addresses are determined during configuration of the unit connected to the PROFIBUS (STEP 7 - hardware configuration)
- DB-Para
  DB-Para is a pointer to the data module, into which read data are written or from which data are taken when writing.

- Service
  This parameter determines the access type (write / read) /⊠ ID1.

Write access:	F0	≙	Integer	Read access:	0	≙	Integer
	F1	≙	Real		1	≙	Real

Individual access

This access (code xx) can be used for reading or writing an individual value of a function.

Valid values for ID1:

Configuration as FixPoint:	0 = integer	real values are transmitted as integer (without digits behind the decimal point)
	1 = real	real values are transmitted as FixPoint (1 digit behind the decimal point)

Block access (tens block)

This access (code x0) can be used for reading max. nine process values (always as REAL values) of a function.

Block acces (overall block)

This access can be used for reading or writing all parameter (code 178) and configuration data (code 179) of a function. The following conditions are applicable to this access:

- For writing the data with 'code B3 ≙ 179', the instrument must be switched to the configuration mode (/⊠ see page 27 'OpMod'). All entered new configuration data and parameters are effective only, when the instrument was switched back to on-line.
- All data of a message must be defined, omissions are not permissible.
- The complete message must be transmitted also, if parts of a message in the controller are not used (HW and SW options). Checking of the non-existing data is omitted.
- With faulty block write accesses, the following is valid: a message is replied with NAK, if at least one datum is faulty. Already valid values are accepted.

The message structure with block accesses with code B2/B3 is shown using two examples below. The order of data to be transmitted is given in the relevant code table.

Valid values for ID1:

Configuration as FixPoint:	0, 1	Transmission of real values each as a FixPoint value

- CODE
  The code identification is decimal and the range is within '00'...'99'
  as well as '178' = B2 and '179' = B3.
- FBNR. (function block number)
  A function block is addressed by means of a function block number. This function block number can be within '0' and '250'.
  Function block number ranges:
  0 general data for the overall instrument
  1 - 99 fixed function blocks
- FKTNR (function number)
  A function as a partial address of a function block is also addressed with a function number. This function number can be within '0' and '99'.
  Function number ranges:
  0 Function General
  1 - 99 other functions
- TYP (function type)
  A function type number is also assigned to each function block. This function type number is within '0' and '111'.
  Function type range:
  0 Function type General
  1 - 111 other function types
- TIME
  Timeout counter: Range 0x0000 ß TIME ß 0x7FFF
  - is decremented during each PLC cycle (max. 32767)
  - with 0 Timeout.
  If the CPU is too fast, call up FB206/FB207 with delay via timer module.
- DWLR (Real), DWLI (Integer)
  These parameters contain the relevant number of received data after a read access. With a write access,

the relevant number of data to be transmitted is filled in. DWLC is not required in KS800, value must be set to 0.

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

7 Annex

7.1 *Terms*

COM PROFIBUS	Configuration tool (formerly COM ET200) of the Siemens company for PROFIBUS
FB	Abbr. f. function block
Fkt	Abbr. f. function
ET	Abbr. f. Engineering Tool
Function	a self-contained partial function of a function block seen from the interface
Function block	self-contained processing unit
GSD file	Device-Database-File
HW	Abbr. f. hardware
ISO1745	Standard communication protocol ISO 1745, ASCII-based
PC-interface	front-panel controller interface for connecting an engineering tool
PCI	Process Control Instrument
PCI protocol	ISO 1745-based protocol, implemented for PMA controllers
PNO	PROFIBUS user organisation
PROFIBUS-DP	Standard communication protocol acc. to EN50170 vol.2 (DP: decentral periphery)
RS422	Standard 4-wire connection, full duplex, (EIA RS 422); in this case: separate send/receive channels with up to 32 connected units
RS485	Standard 2-wire connection, half duplex, (EIA RS 485)
S5 / S7	Siemens AG PLC series
Serial interface	bussable rear-panel controller interface
SW	Abbr. f. software
Type file	Configuration file for COM ET200

7.2 *GSD file*

```
;===============================================================
; Device Database File for product  K S   8 0 0 - D P
; Copyright (C) PMA Prozeß- und Maschinen Automation GmbH 1998
; D-34123 Kassel, Miramstr. 87, Tel. +49 (0) 561/ 505 -1307
; Release : V1.1
; File:     PMA_0800.gsd
;===============================================================
#Profibus_DP
GSD_Revision = 1
Vendor_Name = "PMA GmbH"
Model_Name = "KS 800-DP"
Revision = "V 1.1"
Ident_Number = 0x0800
Protocol_Ident = 0      ; DP
Station_Type = 0        ; Slave
FMS_supp = 0
Hardware_Release = "HV 01.00"
Software_Release = "SV 01.01"
;supported baud rates:
9.6_supp = 1
19.2_supp = 1
93.75_supp = 1
187.5_supp = 1
500_supp = 1
1.5M_supp = 1
3M_supp = 1
6M_supp = 1
12M_supp = 1
;max. time to answer after a request
MaxTsdr_9.6 = 60
MaxTsdr_19.2 = 60
MaxTsdr_93.75 = 60
MaxTsdr_187.5 = 60
MaxTsdr_500 = 100
MaxTsdr_1.5M = 150
MaxTsdr_3M = 250
```

```
MaxTsdr_6M = 450
MaxTsdr_12M = 800
Redundancy = 0          ; not supported
Repeater_Ctrl_Sig = 2   ; TTL
24V_Pins = 0            ; not available
;
;—DP-Slave related key words——-
;
Freeze_Mode_supp = 1    ; supported
Sync_Mode_supp = 1      ; supported
Auto_Baud_supp = 1
Set_Slave_Add_supp = 0
User_Prm_Data_Len = 0   ; no user prm data
;minimum slave poll cycle (Basis 100us):
Min_Slave_Intervall = 1
Modular_Station = 1     ; modular device
Max_Module = 0x01       ; max. number of modules
Max_Input_Len = 116
Max_Output_Len = 116
Max_Data_Len = 232
; Module description
; 1. process data for 8 channels
Module = "A: Process data(8)"     0x11,\
                                  0x50,0x50,0x50,0x10,0x10,\
                                  0x50,0x50,0x50,0x10,0x10,\
                                  0x50,0x50,0x50,0x10,0x10,\
                                  0x50,0x50,0x50,0x10,0x10,\
                                  0x50,0x50,0x50,0x10,0x10,\
                                  0x50,0x50,0x50,0x10,0x10,\
                                  0x50,0x50,0x50,0x10,0x10,\
                                  0x50,0x50,0x50,0x10,0x10,\
                                  0x23,\
                                  0x60,0x60,0x21,\
                                  0x60,0x60,0x21,\
                                  0x60,0x60,0x21,\
                                  0x60,0x60,0x21,\
                                  0x60,0x60,0x21,\
                                  0x60,0x60,0x21,\
                                  0x60,0x60,0x21,\
                                  0x60,0x60,0x21
EndModule
;
; 2. Process data for 8 channels + parameter channel
Module = "B: Process data(8) + parameter"     0x11,\
                                  0x50,0x50,0x50,0x10,0x10,\
                                  0x50,0x50,0x50,0x10,0x10,\
                                  0x50,0x50,0x50,0x10,0x10,\
                                  0x50,0x50,0x50,0x10,0x10,\
                                  0x50,0x50,0x50,0x10,0x10,\
                                  0x50,0x50,0x50,0x10,0x10,\
                                  0x50,0x50,0x50,0x10,0x10,\
                                  0x50,0x50,0x50,0x10,0x10,\
                                  0x23,\
                                  0x60,0x60,0x21,\
                                  0x60,0x60,0x21,\
                                  0x60,0x60,0x21,\
                                  0x60,0x60,0x21,\
                                  0x60,0x60,0x21,\
                                  0x60,0x60,0x21,\
                                  0x60,0x60,0x21,\
                                  0x60,0x60,0x21,\
                                  0xF3
EndModule
;
; 3. Only parameter channel
Module = "C: Parameter" 0xF3
```

```
EndModule
;
; 4. As process data B in compact form
Module = "D: Compact Process data(8) + parameter"     0x11,\
                              0x53, 0x53, 0x53, 0x53, 0x53, 0x53, 0x53, 0x53,\
                              0x23,\
                              0x62, 0x62, 0x62, 0x62, 0x62, 0x62, 0x62, 0x62,\
                              0xF3
EndModule
; 5. Process data for 52 Variable data + parameter channel
Module = "E: 52 Variable data + parameter"     0x13,\
                              0x57, 0x57, 0x57, 0x57, 0x57, 0x57, 0x53,\
                              0x23,\
                              0x67, 0x67, 0x67, 0x67, 0x67, 0x67, 0x63,\
                              0xF3
EndModule
;
; 6. Process data for 40 Variable data + parameter channel
Module = "F: 40 Variable data + parameter"     0x13,\
                              0x57, 0x57, 0x57, 0x57, 0x57,\
                              0x23,\
                              0x67, 0x67, 0x67, 0x67, 0x67,\
                              0xF3
EndModule
;
; 7. Process data for 8 Variable data + parameter channel
Module = "G: 8 Variable data + parameter"     0x13,\
                              0x57,\
                              0x23,\
                              0x67,\
                              0xF3
EndModule
;
; 8. Multipexing of Process data for 1 Variable data + parameter channel
Module = "H: Multipexed data + parameter"     0x13,\
                              0x50, 0x50,\
                              0x23,\
                              0x60, 0x60,\
                              0xF3
EndModule
;
; Device related diagnostic data
Unit_Diag_Bit(0) = "Configuration state"
Unit_Diag_Bit(1) = "Fault on do1 ... do12"
Unit_Diag_Bit(2) = "Fault on do13 ... do16"
Unit_Diag_Bit(3) = "Heating short circuit"
Unit_Diag_Bit(8) = "Input fail channel 1"
Unit_Diag_Bit(9) = "Input fail channel 2"
Unit_Diag_Bit(10)= "Input fail channel 3"
Unit_Diag_Bit(11)= "Input fail channel 4"
Unit_Diag_Bit(12)= "Input fail channel 5"
Unit_Diag_Bit(13)= "Input fail channel 6"
Unit_Diag_Bit(14)= "Input fail channel 7"
Unit_Diag_Bit(15)= "Input fail channel 8"
;
;valid for GSD-Version V1
Slave_Family=5@TdF@Regler
Max_Diag_Data_Len =9
;Implementation_Type = "SPC3"
;OrderNumber="9407-480-30001"
```

Subject to alterations without notice.
Bei Änderungen erfolgt keine Mitteilung.
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