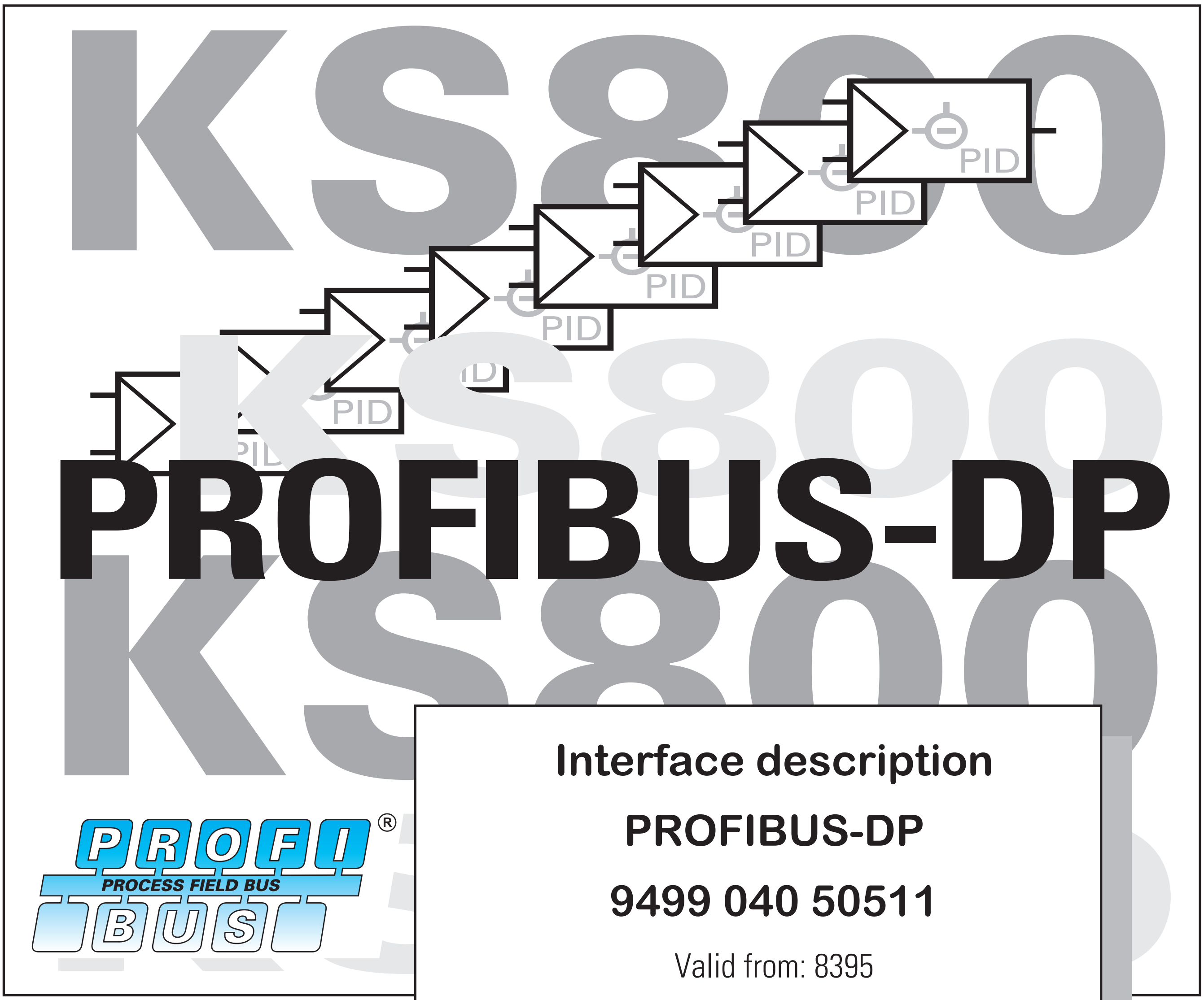
PMA Prozeß- und Maschinen-Automation GmbH

# Multi Temperaturecontroller KS800



# PROFIBUS-DP

## Interface description

## PROFIBUS-DP

## 9499 040 50511

Valid from: 8395

A publication of PMA Prozeß- und Maschinen Automation
Postfach 310229
D-34058 Kassel
Germany

## Contents

# 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.

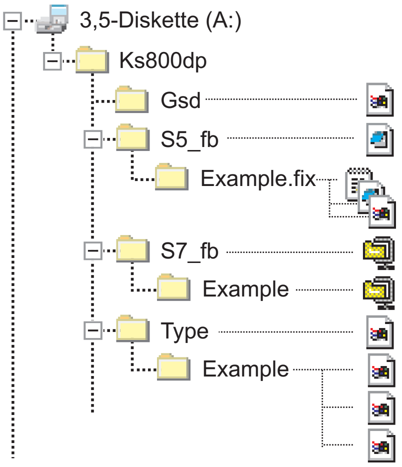
KS800 with PROFIBUS-DP interface offers many advantages with respect to handling and integration into a PROFIBUS network.

- 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 |

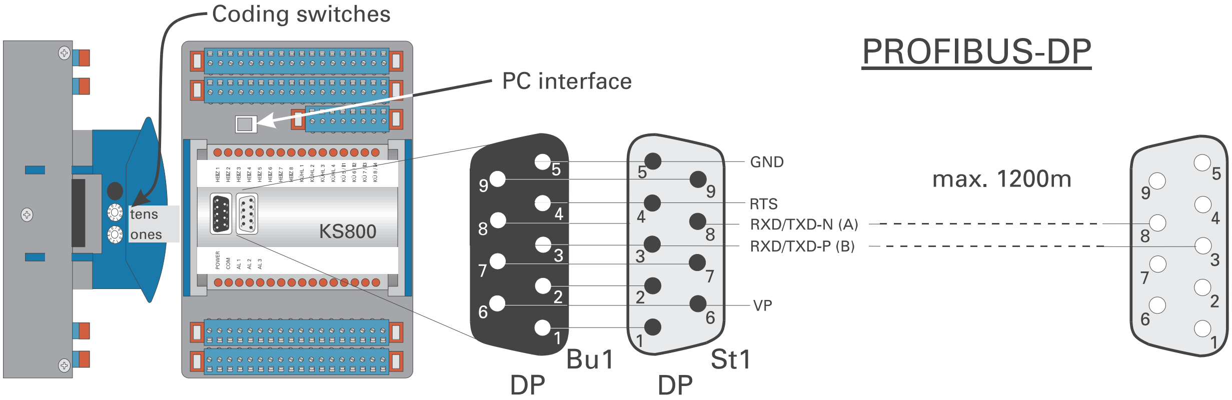
- Interface description for PROFIBUS-DP

# 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

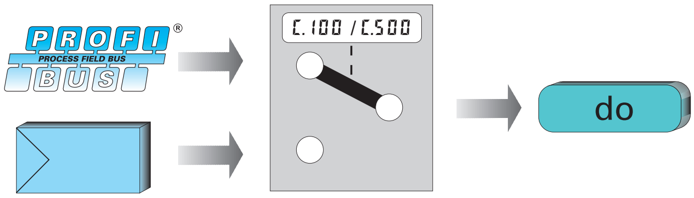
When laying the cables, the general hints for cable installation given by the supplier of the master module must be followed:

- 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

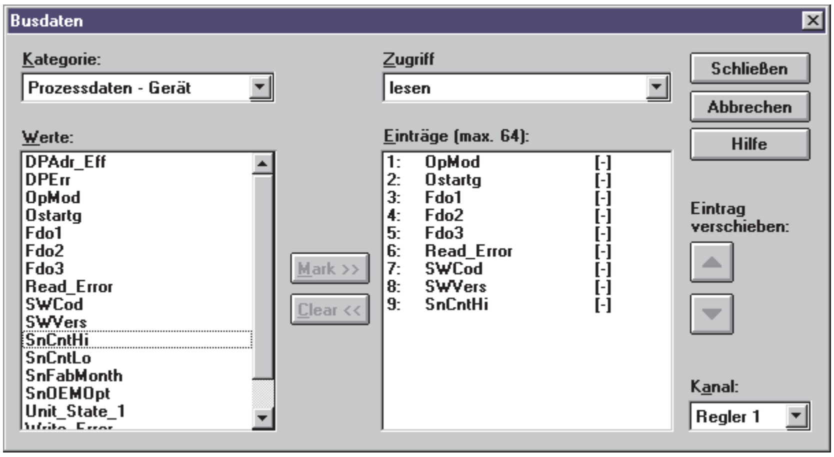
During data transmission, distinction of process data to be transmitted cyclically and parameter / configuration data to be transmitted acyclically is made. The I/O data field is structured modularly for matching it to the requirements of the control task.
Selection of the process data module is via 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]<br>Instrument status, (process value, output value, status, ..) | write [1] (52 bytes)<br>Instrument control, (set-point, output value, ...) | without parameter channel |
| Process data module B: | read (74 bytes)[1]<br>Instrument status, (process value, output value, status, ..) | write [1] (60 bytes)*<br>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]<br>Instrument status, (process value, output value, status, ..) | write (60 Byte) [1]<br>Instrument control, (set-point, output value, ...) | with parameter channel |
| Process data module E: | read (116 Byte) [1]<br>Instrument status, (52 variable process data) | write (116Byte) [1]<br>Instrument control, (52 variable process data) | with parameter channel |
| Process data module F: | read (92 Byte) [1]<br>Instrument status, (40 variable process data) | write (92 Byte) [1]<br>Instrument control, (40 variable process data) | with parameter channel |
| Process data module G: | read (28 Byte) [1]<br>Instrument status, (8 variable process data) | write (28 Byte) [1]<br>Instrument control, (8 variable process data) | with parameter channel |
| Process data module H: | read (16 Byte) [1]<br>Instrument status, (multiplexing 64 variable process data) | write (16 Byte) [1]<br>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.



Busdaten

Kategorie: Prozessdaten - Gerät

Zugriff: lesen

Werte:
DPAdr_Eff
DPErr
OpMod
Ostartg
Fdo1
Fdo2
Fdo3
Read_Error
SWCod
SWVers
SnCntHi
SnCntLo
SnFabMonth
SnOEMOpt
Unit_State_1

Einträge (max. 64):

```
1:  OpMod        [-]
2:  Ostartg      [-]
3:  Fdo1         [-]
4:  Fdo2         [-]
5:  Fdo3         [-]
6:  Read_Error   [-]
7:  SWCod        [-]
8:  SWVers       [-]
9:  SnCntHi      [-]
```

Kanal: Regler 1

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<br>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<br>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.

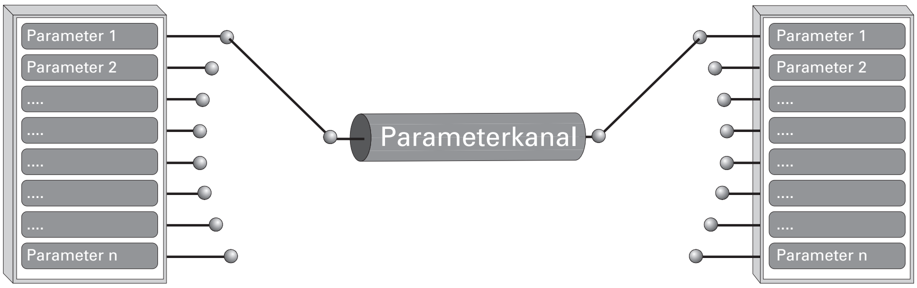
- When changing a reference, the controller module sets bit Dex = 1.
- The master must evaluate bit Dex.
- Acknowledgement and a statement that there are only valid write data also on the master side, are generated via a positive flank for bit Dval.
- When receiving a positive flank, the controller module 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 | /⍄ | individual access |
| Code < 100, multiple of 10 | /⍄ | tens block access |
| Code > 100 | /⍄ | overall block access |

### *3.5.3* Data write sequence

Start telegram:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|
| 0x10 | ID1 | Code | FB no. | Fct._no. | Type | Numb.real values | Numb.integer values |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|
| 0x10 | | | | | | | |

Data telegrams:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 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:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x16 | | | | |

Controller replies:

| Byte 0 | Byte 1 | Byte 2-3 | Byte 4 - 7 |
|---|---|---|---|
| 0x16 | | Result | |

### *3.5.4* Data read procedure

Start telegram:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|
| 0x10 | ID1 | Code | FB no. | Fct._no. | Type | 0 | 0 |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|
| 0x10 | | | | | | Numb. real values [1] | Numb. integer values [1] |

Data telegrams:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | count | | | |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 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:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x16 | | | | |

Controller replies:

| Byte 0 | Byte 1 | Byte 2-3 | Byte 4 - 7 |
|---|---|---|---|
| 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:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|
| 0x10 | 0 | 31 | 52 | 5 | 0 | 0 | 1 |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|
| 0x10 | | | | | | | |

Data telegrams:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 1 | | | 1 |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 1 | | | |

End telegram:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x16 | | | | |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 - 3 | Byte 4 - 7 |
|---|---|---|---|
| 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:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|
| 0x10 | 0 | 35 | 52 | 5 | 0 | 0 | 0 |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|
| 0x10 | | | | | | 0 | 1 |

Datentelegramme:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 1 | | | |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 1 | | | 2 (ok) |

End telegram:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x16 | | | | |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 - 3 | Byte 4 - 7 |
|---|---|---|---|
| 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:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|
| 0x10 | 0 | 30 | 53 | 1 | 0 | 0 | 0 |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|
| 0x10 | | | | | | 2 | 0 |

Data telegrams:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 1 | | | |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 1 | | | 150 |

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 2 | | | |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 2 | | | 140 |

End telegram:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x16 | | | | |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 - 3 | Byte 4 - 7 |
|---|---|---|---|
| 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:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|
| 0x10 | 0 | 0xB2 | 57 | 1 | 0 | 0 | 0 |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|
| 0x10 | | | | | | 6 | 0 |

Data telegrams:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 1 | | | |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 1 | | | 0 |

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 2 | | | |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 2 | | | 700 |

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 3 | | | |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 3 | | | 100 |

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 4 | | | |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 4 | | | -32000 |

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 5 | | | |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 5 | | | -32000 |

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 6 | | | |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 6 | | | -32000 |

End telegram:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x16 | | | | |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 - 3 | Byte 4 - 7 |
|---|---|---|---|
| 0x16 | | 0 | |

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

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|
| 0x10 | 0 | 0xB3 | 70 | 0 | 0 | 0 | 2 |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|
| 0x10 | | | | | | 0 | 0 |

Data telegram:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 1 | | | 0120 |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 1 | | | |

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 2 | | | 0110 |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x68 | 2 | | | |

End telegram:

Master sends:

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 - 7 |
|---|---|---|---|---|
| 0x16 | | | | |

Controller replies:

| Byte 0 | Byte 1 | Byte 2 - 3 | Byte 4 - 7 |
|---|---|---|---|
| 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

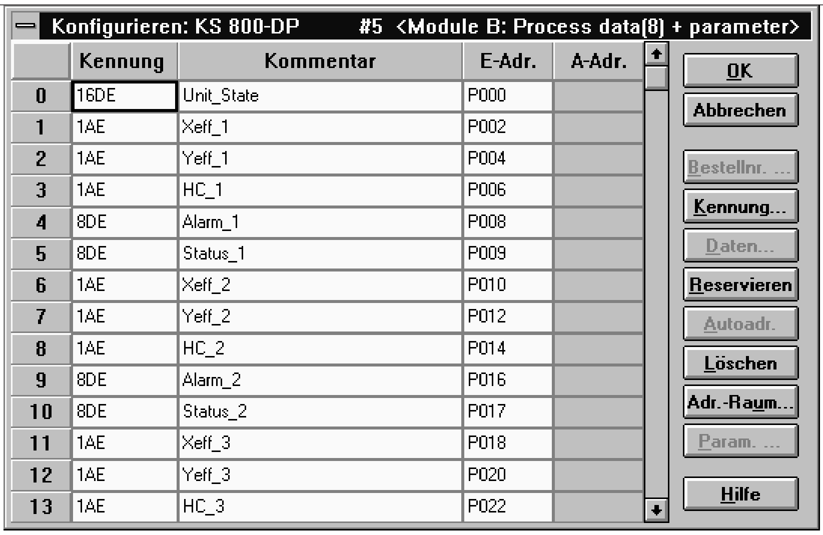
### *4.1.1* Example of a test environment:

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

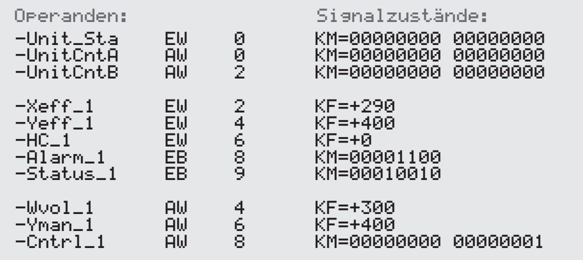


Konfigurieren: KS 800-DP #5 <Module B: Process data(8) + parameter>

| | 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 | |

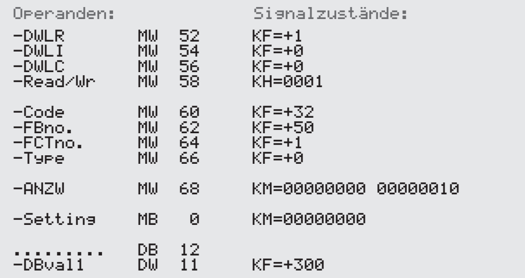
After taking the test set-up into operation, testing of the I/O area and parameter channel call-up are possible by means of the graphic modules enclosed in the project.

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
```

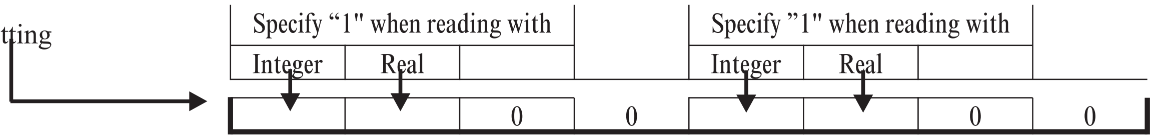
Graphic module 2:
Access to the function module parameters for parameter channel mapping is possible by means of this graphic module.



```
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
```

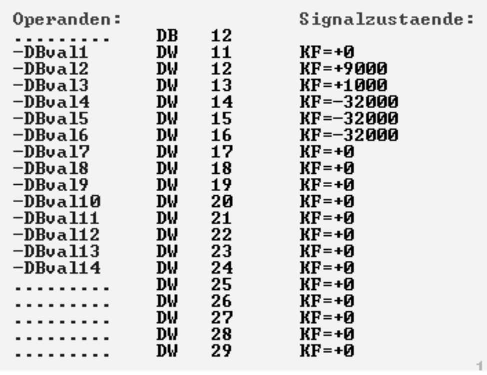
Specify e.g. when reading values:

- 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

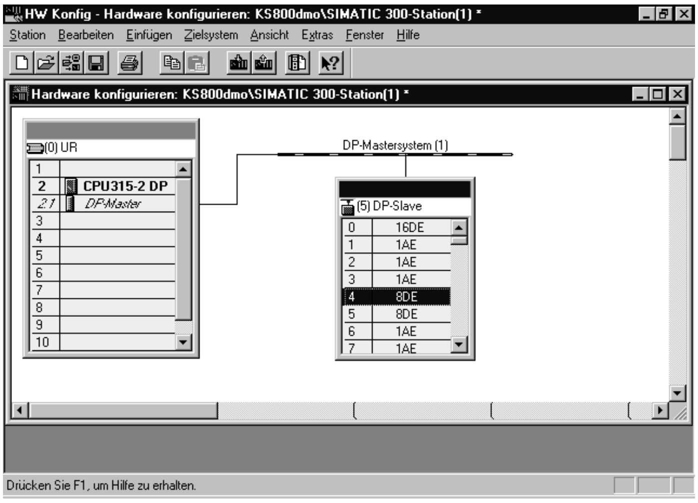
### *4.2.1* Example of a test environment:

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.


HW Konfig - Hardware konfigurieren: KS800dmo\SIMATIC 300-Station(1) *
Station
Bearbeiten
Einfügen
Zielsystem
Ansicht
Extras
Fenster
Hilfe
Hardware konfigurieren: KS800dmo\SIMATIC 300-Station(1) *
DP-Mastersystem (1)

(0) UR

| | |
|---|---|
| 1 | |
| 2 | CPU315-2 DP |
| 2.1 | DP-Master |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| 9 | |
| 10 | |

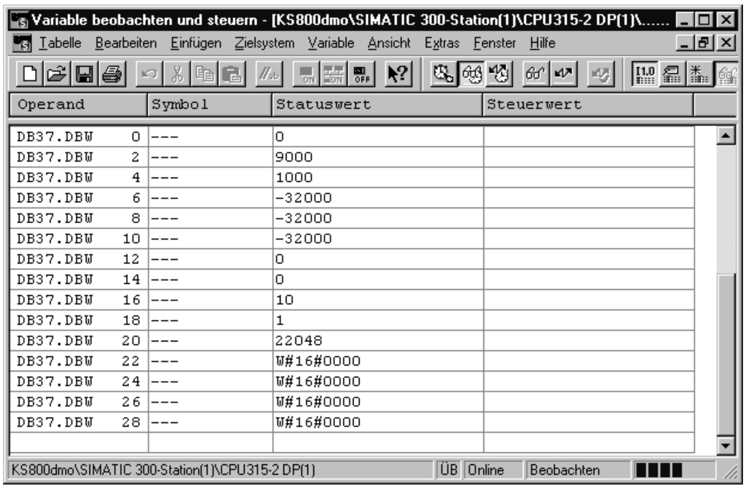
(5) DP-Slave

| | |
|---|---|
| 0 | 16DE |
| 1 | 1AE |
| 2 | 1AE |
| 3 | 1AE |
| 4 | 8DE |
| 5 | 8DE |
| 6 | 1AE |
| 7 | 1AE |

Drücken Sie F1, um Hilfe zu erhalten.

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)


Variable beobachten und steuern - [KS800dmo\SIMATIC 300-Station(1)\CPU315-2 DP(1)\.....
Tabelle Bearbeiten Einfügen Zielsystem Variable Ansicht Extras Fenster Hilfe

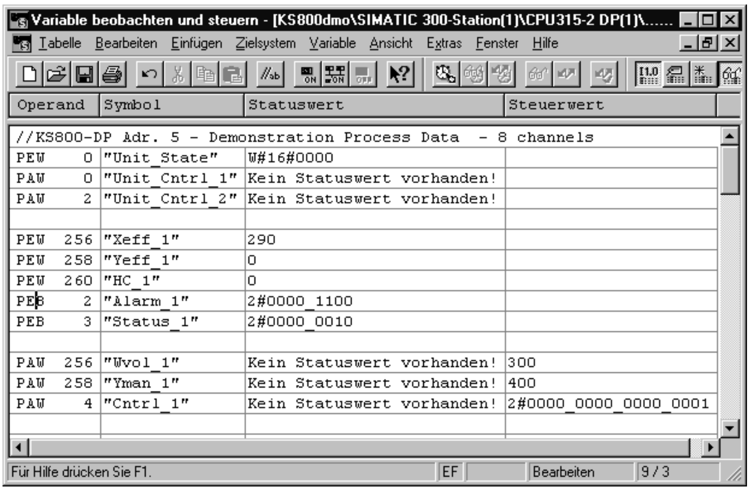
| Operand | Symbol | Statuswert | Steuerwert |
|---|---|---|---|
| DB37.DBW 0 | --- | 0 | |
| DB37.DBW 2 | --- | 9000 | |
| DB37.DBW 4 | --- | 1000 | |
| DB37.DBW 6 | --- | -32000 | |
| DB37.DBW 8 | --- | -32000 | |
| DB37.DBW 10 | --- | -32000 | |
| DB37.DBW 12 | --- | 0 | |
| DB37.DBW 14 | --- | 0 | |
| DB37.DBW 16 | --- | 10 | |
| DB37.DBW 18 | --- | 1 | |
| DB37.DBW 20 | --- | 22048 | |
| DB37.DBW 22 | --- | W#16#0000 | |
| DB37.DBW 24 | --- | W#16#0000 | |
| DB37.DBW 26 | --- | W#16#0000 | |
| DB37.DBW 28 | --- | W#16#0000 | |

KS800dmo\SIMATIC 300-Station(1)\CPU315-2 DP(1) | ÜB | Online | Beobachten

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:

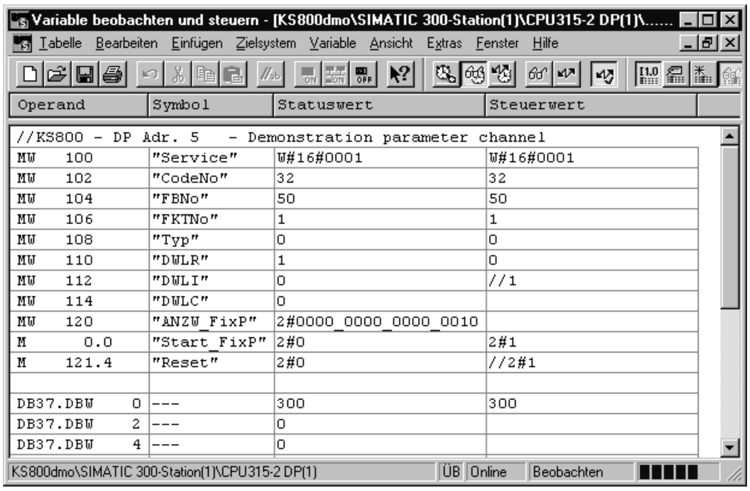
- CodeNo, FBNo, FKTNo, Type = 0 (⁄⌧ Chapter )
- Service = 0x 0001
- Start_FixP = 1
- ANZW_FixP indicates the status and the result after completing the FB handling.
- DWLR, DWLI, indicate the number of read values.


Variable beobachten und steuern - [KS800dmo\SIMATIC 300-Station(1)\CPU315-2 DP(1)\.....
Tabelle Bearbeiten Einfügen Zielsystem Variable Ansicht Extras Fenster Hilfe

| Operand | Symbol | Statuswert | Steuerwert |
|---|---|---|---|
| //KS800-DP Adr. 5 - Demonstration Process Data - 8 channels | | | |
| PEW 0 | "Unit_State" | W#16#0000 | |
| PAW 0 | "Unit_Cntrl_1" | Kein Statuswert vorhanden! | |
| PAW 2 | "Unit_Cntrl_2" | Kein Statuswert vorhanden! | |
| | | | |
| PEW 256 | "Xeff_1" | 290 | |
| PEW 258 | "Yeff_1" | 0 | |
| PEW 260 | "HC_1" | 0 | |
| PEB 2 | "Alarm_1" | 2#0000_1100 | |
| PEB 3 | "Status_1" | 2#0000_0010 | |
| | | | |
| PAW 256 | "Wvol_1" | Kein Statuswert vorhanden! | 300 |
| PAW 258 | "Yman_1" | Kein Statuswert vorhanden! | 400 |
| PAW 4 | "Cntrl_1" | Kein Statuswert vorhanden! | 2#0000_0000_0000_0001 |

Für Hilfe drücken Sie F1. | EF | Bearbeiten | 9 / 3

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.


Variable beobachten und steuern - [KS800dmo\SIMATIC 300-Station(1)\CPU315-2 DP(1)\.....
Tabelle Bearbeiten Einfügen Zielsystem Variable Ansicht Extras Fenster Hilfe

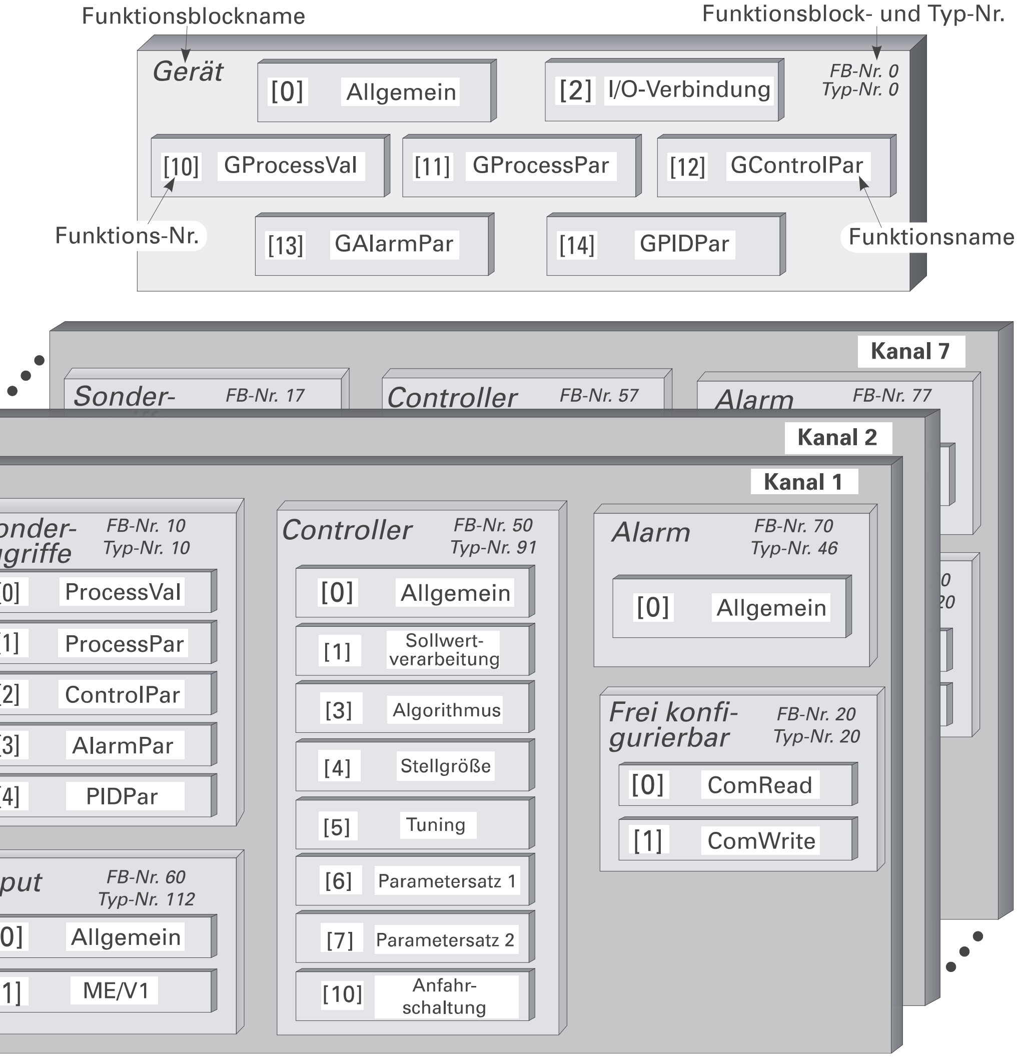
| Operand | Symbol | Statuswert | Steuerwert |
|---|---|---|---|
| //KS800 - DP Adr. 5 - Demonstration parameter channel | | | |
| MW 100 | "Service" | W#16#0001 | W#16#0001 |
| MW 102 | "CodeNo" | 32 | 32 |
| MW 104 | "FBNo" | 50 | 50 |
| MW 106 | "FKTNo" | 1 | 1 |
| MW 108 | "Typ" | 0 | 0 |
| MW 110 | "DWLR" | 1 | 0 |
| MW 112 | "DWLI" | 0 | //1 |
| MW 114 | "DWLC" | 0 | |
| MW 120 | "ANZW_FixP" | 2#0000_0000_0000_0010 | |
| M 0.0 | "Start_FixP" | 2#0 | 2#1 |
| M 121.4 | "Reset" | 2#0 | //2#1 |
| | | | |
| DB37.DBW 0 | --- | 300 | 300 |
| DB37.DBW 2 | --- | 0 | |
| DB37.DBW 4 | --- | 0 | |

KS800dmo\SIMATIC 300-Station(1)\CPU315-2 DP(1) | ÜB | Online | Beobachten

# 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.



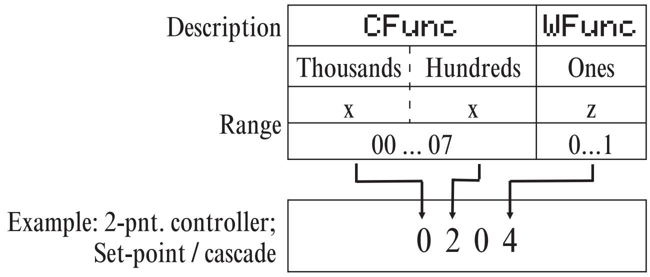
## 5.2 *CODE tables*

### *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)<br>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;<br>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]<br>COM1 | R/W | INT | Prot: Protocol type<br>Baud: Baudrate | (T)<br>(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<br>Alm-Ver: Alarm version<br>Mode-out:Configuration-version of the analog outputs (old/new)<br>Mode-out current zero 0/4 mA | (T)<br>(H)<br>(Z)<br>(E) | 0..x000 | |
| | 74 | C902 [1]<br>COM2 | R/W | INT | Prot: Protocol type<br>Baud: Baudrate (omitted with PROFIBUS) | (T)<br>(H,Z) | 0..wxyz | |
| | 75 | Adr2 [1] | R/W | INT | COM2: Instrument address: ISO1745 (def. 0)<br>CAN-BUS<br>PROFIBUS (def. 126) | | 0..99<br>0..255<br>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<br>Fkt_dio1: IN1 / OUT13<br>Fkt_dio2: IN2 / OUT14<br>Fkt_dio3: IN3 / OUT15<br>Fkt_dio4: IN4 / OUT16 | (T)<br>(H)<br>(Z)<br>(E) | 0..wxyz | |
| | 73 | C530 | R/W | INT | Main configuration OUT17 ... OUT19<br>mode_do17<br>mode_do18<br>mode_do19 | (T)<br>(H)<br>(Z) | 0...xyz0 | |
| | 74 | C151 | R/W | INT | Allocation HC/leakage current Alarm<br>DestHC<br>DestLeck<br>DestOutError | (T)<br>(H)<br>(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)<br>Unit: unit (Z) | 0..xxy0 | |
| | 77 | C205 | R/W | INT | Fail: sensor break behaviour (T)<br>STk: Source Tk (H)<br>XKorr: enable process value corr. (Z) | 1..wxy0 | |
| | 78 | C190 | R/W | INT | Signal allocation of digital signals:<br>Controller off (Z)<br>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<br>CType: Controller type<br>WFunc:set-point function | (T,H)<br>(Z)<br>(E) | 0..xxyz | |
| | 72 | C101 | R/W | INT | CMode:Controller output action<br>CDiff: x/x-w Differentiat.<br>CFail: Behaviour with sensor fail<br>CAnf: Start-up circuit | (T)<br>(H)<br>(Z)<br>(E) | 0..wxyz | |
| | 73 | C700 | R/W | INT | OMode:Optimization mode<br>OCond: Process at rest.<br>OGrp: Allocation group opt.<br>OCntr: Controlled adaptation mode | (T)<br>(H)<br>(Z)<br>(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<br>Src: Signal source (T,H)<br>Fnc: Function (Z)<br>DestFail: Fail Destination (E) | 0..xxyz | |
| | 72 | C601 | R/W | INT | DestLL : (T)<br>DestL : (H)<br>DestH : (Z)<br>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<br>Src: Signal source (T,H)<br>Fnc: Function (Z)<br>DestFail: Fail Destination (E) | 0..xxyz | |
| | 72 | C601 | R/W | INT | DestLL : (T)<br>DestL : (H)<br>DestH : (Z)<br>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<br>Src: Signal source (T,H)<br>Fnc: Function (Z)<br>DestFail: Fail Destination (E) | 0..xxyz | |
| | 72 | C601 | R/W | INT | DestLL : (T)<br>DestL : (H)<br>DestH : (Z)<br>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).

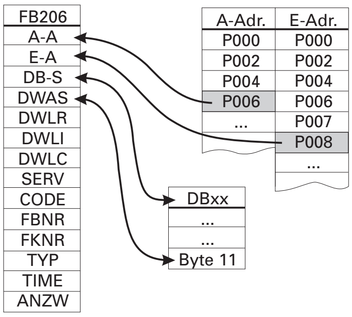
### *6.1.1* Structure

The parameters of the function module are:

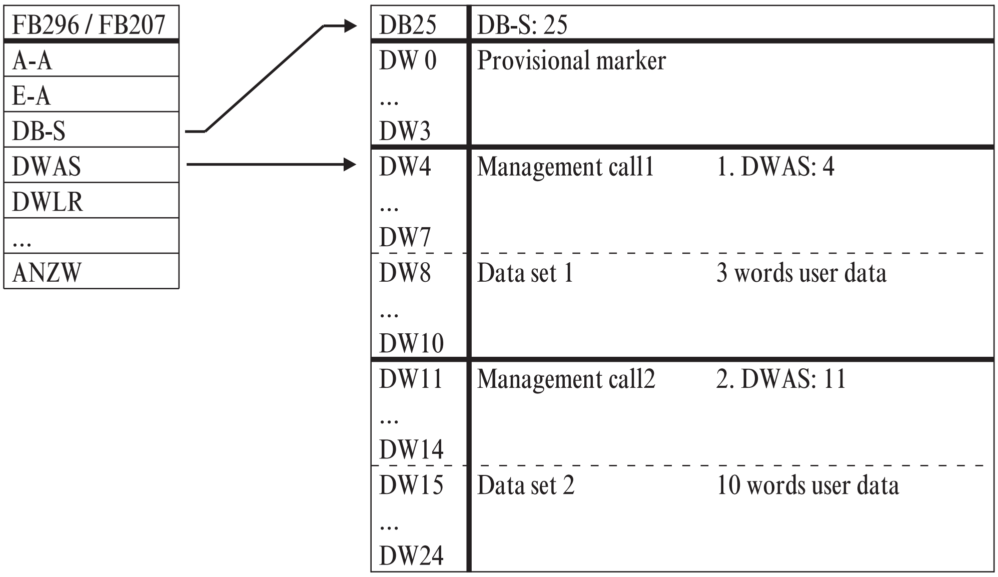
| Name | Type | Description / function |
|---|---|---|
| A-A | KF | Start of output bytes for send window |
| E-A | KF | Start of input bytes for receive window |
| DB-S | B | Data module for parameter data |
| DWAS | W | Data word start for order in DB |
| DWLR | W | Number of real values |
| DWLI | 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 | O<%-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.



| FB296 / FB207 |
|---|
| A-A |
| E-A |
| DB-S |
| DWAS |
| DWLR |
| ... |
| ANZW |

| DB25 | DB-S: 25 | |
|---|---|---|
| DW 0<br>...<br>DW3 | Provisional marker | |
| DW4<br>...<br>DW7 | Management call1 | 1. DWAS: 4 |
| DW8<br>...<br>DW10 | Data set 1 | 3 words user data |
| DW11<br>...<br>DW14 | Management call2 | 2. DWAS: 11 |
| DW15<br>...<br>DW24 | Data set 2 | 10 words user data |

- 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);<br>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"
```

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