

DB 5	Use
DW 0	Reserved
DW 1	Parameter-Index for read job
DL 2	Parameter-Subindex for read job
DR 2	Activation of read job (FFh = activate read job)
DW 3	Received data length in bytes of the response to read job
DW 4	Received data word 1
DW 5	Received data word 2
DL 6	Error class with read job (0 = no error)
DR 6	Error code with read job
DW 7	Additional error code with read job
DW 8	Parameter-Index for write job
DL 9	Parameter-Subindex for write job
DR 9	(Data length - 1) in bytes for write job (0 = 1 byte.....3 = 4 bytes)
DW 10	Data to be written word 1
DW 11	Data to be written word 2
DL 12	Automatic incrementing of PA-data word 2 (set point speed)
DR 12	Activation of write job (FFh = activate write job)
DL 13	Error class with write job (0 = no error)
DR 13	Error code with write job
DW 14	Additional error code with write job
DW 15	Process output data word 1
DW 16	Process output data word 2
DW 17	Process input data word 1
DW 18	Process input data word 2
DW 19	Internal use
:	:
DW 26	Internal use

DB 9	Use
DW 0	Internal use
DW 1	:
DW 4	Internal use
DW 5	First user address with diagnosis

COMBICOM



**S5 with IM308-B as PROFIBUS-DP-Master
Programming Example**



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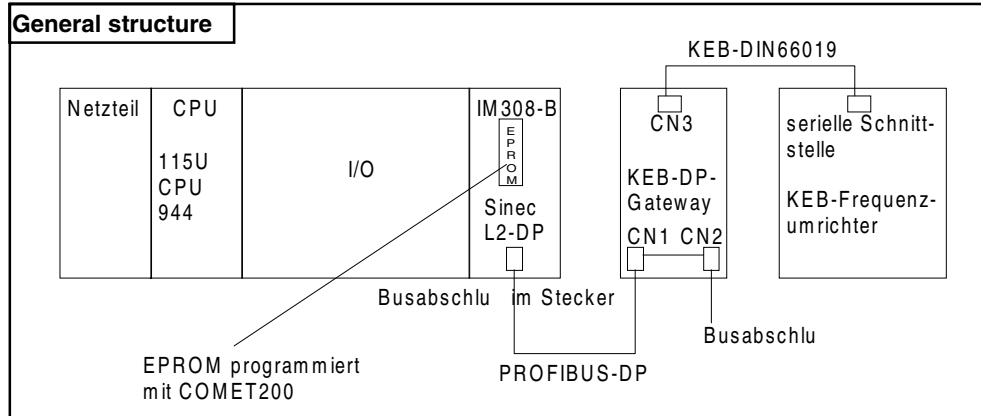
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Siemens S5 with IM308-B as PROFIBUS-DP-Master

This publication describes one possibility of communication between a PROFIBUS-DP-Master and the KEB-PROFIBUS-DP-Master. Because of the widespread usage this is shown on the example of a Siemens S5-PLC.

The explanations stated here do in no manner replace the intense study of the Siemens documents!



The S5-CPU communicates with the IM308-B (the actual PROFIBUS-DP-Master) by peripheral words or bytes. A specific peripheral area is assigned to every PROFIBUS-DP-Slave by the configuration of the system. That means, the contents of the peripheral words n to n+x is transferred cyclically to and from a prior defined PROFIBUS-DP-user. The available address range of the periphery depends on the addressing mode the S5-programmer has defined. P-page frame addressing has been selected in this example. In this case one must address the respective PROFIBUS-DP-user by setting the page frame selection address plus transferring into or loading from a specific peripheral area. Each page frame has 63 peripheral bytes (PY 192... PY254).

Programming of the PROFIBUS-DP-Master Module IM308-B

Preparatory steps for the communication between Siemens-S5 and KEB frequency inverters by PROFIBUS-DP are shown in an example:

1. Determining the PROFIBUS-DP-bus structure to be configured
 - 1.1. Desired transfer rate:
In the example: 1500 kBit/s.
 - 1.2. Number of connected DP-Masters and their PROFIBUS-station addresses.
In the example: 1 Master with station address (TS) = 1
 - 1.3. Number of connected DP-Slaves and assignment to the DP-Masters.

Example for a faultless read job:

- Set Index (DW1) and Subindex (DL2) to desired value
Example: DW1 = 6046h, DL2 = 2
- Transfer the data into the AG
- Activate the job : DR2 = FFh
- Transfer the data into the AG
- Wait until DR2 = 0.
- Read off the result:
DL6, DR6, DW7 = 0 (no error occurred).
DW3 = 4 (data length = 4 Byte)
DW4, DW5 = value for maximal speed amount in min-1

Example for a faulty write job:

- Set Index (DW8) and Subindex (DL9) to desired value
Example: DW8 = 6040h, DL9 = 1
- Enter (Dlen - 1) in DR9; Example: DR9 = 1 (means 2 bytes)
- Enter data in DW10(,DW11) ; Example: DW10 = 0006h
- Transfer the data into the AG
- Activate the job: DR12 = FFh
- Transfer the data into the AG
- Wait until DR12 = 0.
- Read off the result: Error "Object does not exist".
DL13 = 6
DR13 = 7
DW14 = 0

Example for a faultless write job:

- Set Index (DW8) and Subindex (DL9) to desired value
Example: DW8 = 6040h, DL9 = 0
- Enter (Dlen - 1) in DR9; Example: DR9 = 1 (means 2 bytes)
- Enter data in DW10(,DW11); Example: DW10 = 0006h
- Transfer the data into the AG
- Activate the job: DR12 = FFh
- Transfer the data into the AG
- Wait until DR12 = 0.
- Read off the result:
DL13, DR13, DW14 = 0 (no error occurred)

Process Data

The process output data (DW15, DW16) can be changed word by word and can be transferred to the AG. The process input data (DW17, DW18) are updated with every call of FB105.

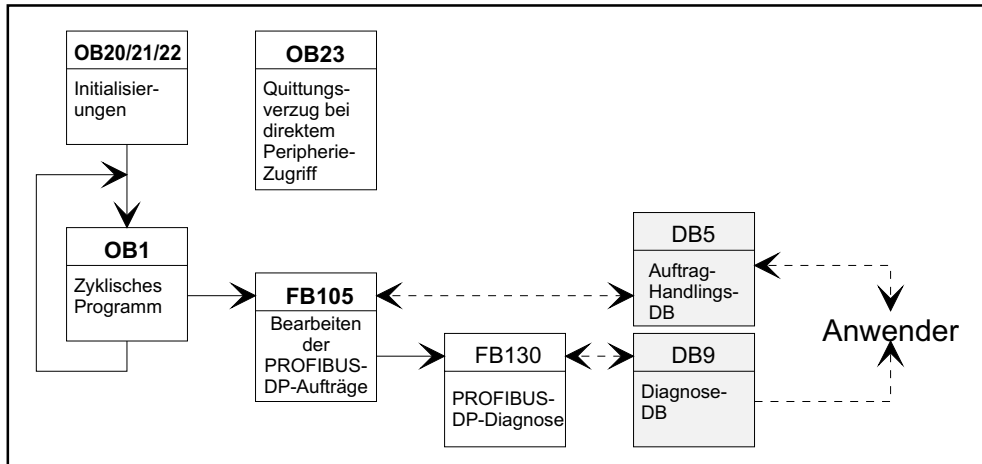
process data, i.e. 2 words are transmitted as process output data to the KEB-PROFIBUS-DP-Gateway and 2 process input data words are read by it.

The Content of the Disk

The enclosed disk contains following files:

- DP_S5.S5D: Contains the test control program.
- DP_S5.ST: Contains the configuration for variable control.
- KB1234TD.200: Contains the type file of the KEB-PROFIBUS-DP-Gateway for COMET200.
- KEBTSTET.200: Contains the complete configuration of the system prepared with COMET200 V4.1 for the transfer into the EPROM of IM308-B.

The Interface to the User



As already mentioned above, the interface to the user consists mainly of one data block (DB5). A second data block (DB9) is used for the diagnosis. The demo disk also contains a file that provides a configuration for variable control (DB_S5.ST). One can read this into the STEP5 of the menu „Variable control“ and can then issue commands by changing certain data words. For every parameter job it is important, that first all data is changed with deactivated service (DR2 bzw. DR12 = 0). Then the data must be transferred to the AG. Only after that is completed the service can be reactivated (DR2 or DR12 = FFh). In the following the individual functional possibilities are explained with the aid of examples:

In the example: 1 Slave with TS = 4 which is assigned to the single master.

- 1.4. Configuration of all slaves:
In the example: Slave with TS = 4 ==> 3 configuration bytes: B7h,A3h,93h
2. Programming the EPROMs in the IM308-B with the configuration and the system parameters by means of Siemens SW-package COMET200:
 - 2.1. The **type file for the KEB-PROFIBUS-DP-user (KB1234TD.200)** must be copied into the directory, which contains all type files (*TD.200) for COMET200. The file can be obtained from KEB.
 - 2.2. **Enter the ET200-system parameters** in the COMET200-main menu.

Example:

Plant designation:	: Name
Station number master module IM308-B	: 1
Bus Parameter: PG in the Bus	: N
Second IM308-B	: N
Further active stations	: N
Baud rate	: 1500 kBaud
Bus profile	: DP - Norm
CPU-Type	: C (for AG115,CPU 944)
AG-Parameter: Response monitoring	: J 000.1 s
QVZ in case of station failure	: J
Diagnosis	: J
Diagnosis address	: 252
Page framing	: J
Basic page frame number	: P 0
Ready-Signal	: J
Runup time delay	: 20 s

Select in the main menu of COMET200 **“Configuring”** and enter the configuration for every slave:

Example:

Station number	: 4
Range	: P0
Station type	: KEB Gateway DP
Station designation	: KEB1
Next free address	: automatically updated by COMET200

Configuration:

Area address	E:	A:					
0.	1.	2.	3.	4.	5.	6.	7.
183	163	147				

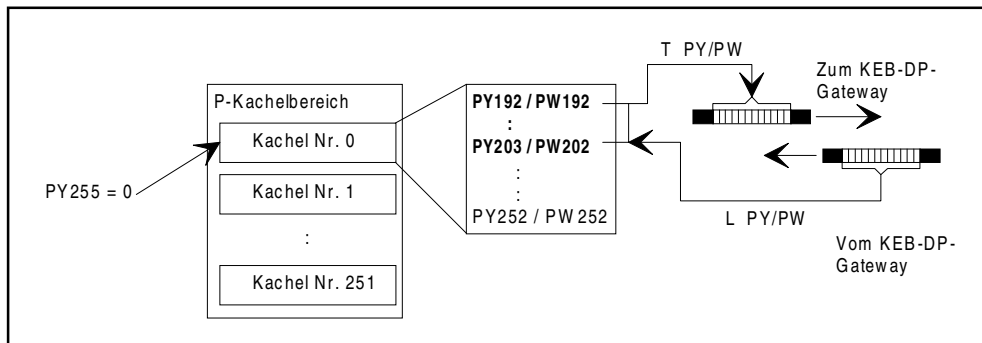
Explanation to the configuration

Only the first three modules must be written with a configuration byte, as the KEB-PROFIBUS-DP-Gateway contains these three modules:

- Parameterizing channel with 8 bytes input-output data and consistency over the entire range
==> Configuration : B7h = 183d
 - 4 bytes (process-)output data with consistency over the entire range
==> Configuration : A3h = 163d
 - 4 bytes (process-)input data with consistency over the entire range
==> Configuration : 93h = 147d
- Transfer of the settings into the EEPROM module (transfer function).

Basis of the S5-Control Programm

Through the programming of the IM308-B it is determined that, after parameterizing and configuration of the KEB-PROFIBUS-DP-Gateway, a cyclically data exchange of 12 usable data bytes each is carried out to (8 bytes parameterizing acknowledgement + 4 bytes (process-)output data) and from (8 bytes parameterizing acknowledgement + 4 bytes (process-)input data) the KEB-DP-Gateway. This exchange takes place at the most every 2.0 ms, it is defined by the entry Min-Slave-interval in the type file of the KEB-DP-Gateway. Furthermore, through the programming of the IM308-B it is specified, that the access to the usable data must be effected via the P-page frame addressing. The data for the KEB-DP-Gateway are on **page frame 0** and the peripheral bytes **PY192 to PY203** or peripheral words **PW192 to PW202**:



! The usable data of the KEB-DP-Gateway is to be handled as consistent data. The sequence in the control program must be configured in such a manner that the data blocks which belong together are also processed consistently. Which measurements are necessary to achieve this with the Siemens PLC depends on different factors. Please, absolutely consider the comments and statements in the Siemens Handbook on Decentral Periphery ET200.

Diagnostic Possibilities in the S5-Control Program

The KEB-PROFIBUS-DP-Gateway signals the PROFIBUS-DP-Master that a diagnosis is available, when the currently addressed frequency inverter has repeatedly failed to respond. In this case the diagnostic bit **Station_Not_Ready** is set. As a result the PROFIBUS-DP-Master module IM308-B no longer exchanges usable data with the DC-slave. The DP-Master tests the diagnostic data with this DP-Slave so often until the bit Station_Not_Ready is reset. This immediately happens with the KEB-PROFIBUS-DP-Gateway when the communication between the gateway and the currently addressed frequency inverter is functioning again.



This diagnostic possibility is NOT possible with Multicast/Broadcast-addressing of several connected KEB frequency inverters, as in this case the communication to the inverters is not confirmed, thus the PROFIBUS-DP-Gateway is unable to recognize the failure of frequency inverters.

With the S5-control program one has the possibility to find out whether a PROFIBUS-DP-station has signalled a diagnosis or not. This is done by queries of the **diagnostic monitoring**. On doing so one receives over a range of 16-Slave stations a bit-coded diagnosis word, from which one can learn whether and which user address has signalled a diagnosis.

Please also refer to the Siemens Handbook on Decentral Periphery ET200.

STEP5-Demo Programm

On request KEB supplies a S5-demo program. It allows the exchange of data between a Siemens S5-PLC and a KEB-COMBIVERT frequency inverter by way of PROFIBUS-DP. The example program has been tested on a **S5 115U with CPU944 plus IM308-B (edition 6)**. When using other CPUs it may become necessary to observe another sequence for reading/writing of the peripheral bytes (words). Please refer to the Siemens Handbook on Decentral Periphery ET200.

The test program is set up in such a manner that the user can give commands by way of the menu „Variable control“ of the Siemens programming software by changing specific data words in the handling module (in this case DB5). Furthermore, the user can send process output data to the KEB-DP-Gateway and read data from it.

The test program also supports the diagnosis. For that purpose a functional module (FB130) is cyclically called which determines whether one of the connected PROFIBUS-DP-Slave has signalled a diagnosis. In this case the data module DB9 is used as handling module. The DW 5 always contains a 128 (decimal), if none of the connected users has signalled a diagnosis. Otherwise, the first user address that signalled a diagnosis is recorded.

The demo-programm only supports the standard setting of the