BETRIEBSANLEITUNG
INSTRUCTION MANUAL

KEB COMBICOM **PROFIBUS-DP-Operator**

CP.F5.010-K000

KEB

10/2001

D

Seite D - 3 ..... D - 34

Das in dieser Betriebsanleitung verwendete Pictogramm entspricht folgender Bedeutung:

**Achtung,
Unbedingt
beachten**

In dieser Betriebsanleitung befindet sich im Anhang ein Literaturverzeichnis, in dem Nachschlagewerke aufgeführt sind, die bestimmte Normen und Aussagen in dieser Anleitung erläutern. An den entsprechenden Textstellen, befinden sich mit eckigen Klammern [ ] gekennzeichnete Ziffern.

GB

Seite GB - 3 ..... GB - 34

The pictographs used in this manual mean:

**Attention,
observe at
all costs**

On Page GB - 45 in this Manual you can find a literature list which contains referance books. Standards and statements are described in this reference books. At the corresponding text you can find digits in square brackets [ ].

1. General

This manual as well as the hardware and software are developments of the Karl E. Brinkmann GmbH. Errors and omissions excepted! Karl E. Brinkmann GmbH prepared the documents, software and hardware to the best of their knowledge, however, no guarantee is given that the specifications will bring the user the efficiency aimed at. The Karl E. Brinkmann GmbH reserves the right to change the specifications without obligation. All rights reserved!

2. Ordering Information

This Instruction Manual: CP.F5.010-K000
KEB F5-PROFIBUS-DP-Operator: 00.F5.060-3000
Accessory for diagnostic interface:
HSP5-cable between PC and adapter: 00.F5.0C0-0001
Adapter DSUB9 / Western: 00.F5.0C0-0002

3. F5-PROFIBUS-DP-interface

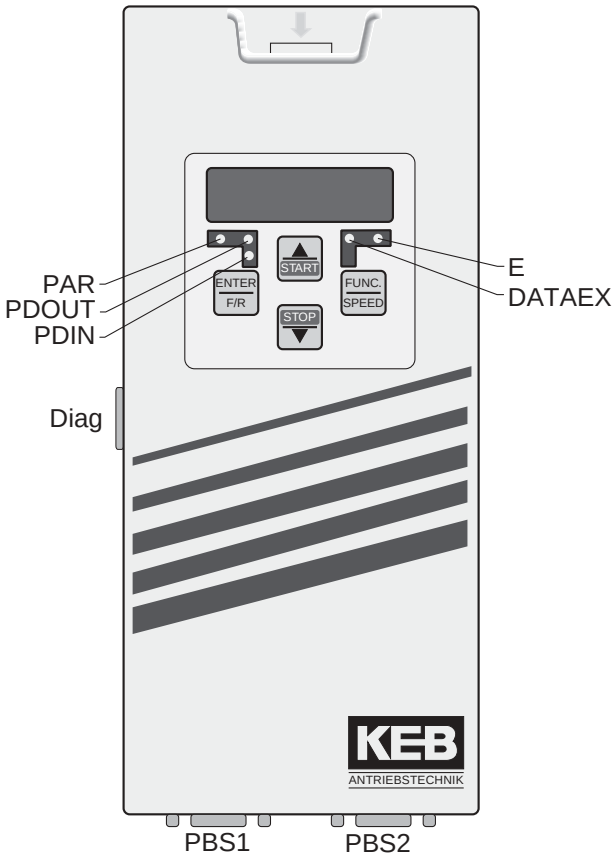
KEB-Antriebstechnik develops, produces and sells worldwide static frequency inverters in the industrial power range. Inverter type **F5** can be optionally equipped with a **PROFIBUS-DP**-interface. This is an intelligent interface which controls the access via PROFIBUS-DP to the parameters in the inverter.

The KEB F5-PROFIBUS-DP-Operator is integrated into the housing by simple plug-in and fits into all KEB F5 frequency inverters. Parallel to the field bus operation the operation via the integrated display/keyboard as well as a further serial interface for diagnosis/parameterizing (KEB COMBIVIS) is possible.

To program the KEB F5 inverter with PROFIBUS-DP you also need the respective manual for the inverter control in addition to this manual.

4. Hardware Description

PAR (green):	Parameter channel active
PDOUT (green):	PDOUT-data are written to the FI control.
PDIN (green):	PDIN-data are read from the FI control.
E (red): on ==>	Inverter ready for operation
blinking ==>	Inverter in error
off ==>	No supply voltage
DATAEX:	User data transfer active
Diag:	Diagnostic interface to the PC (see chapter 4.1)
PBS1, PBS2:	PROFIBUS-DP interface (socket-connector)



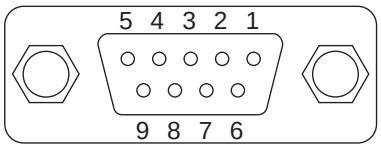
4.1 Diagnostic Interface

To prevent a destruction of the PC-interface, the diagnostic interface may only be connected to the PC over a special HSP5 cable with voltage adaptation.

Over an adapter a HSP5 cable is connected to the diagnostic interface (see page 4 ‘Ordering Information’). By way of the PC-software KEB COMBIVIS 5 one has now normal access to all inverter parameters. The operator-internal parameters PROFIBUS can also be read and adjusted or prameterized by means of download.

4.2 PROFIBUS-DP-Interface

For the connection of the PROFIBUS the operator offers two D-Sup-9-pole socket connectors (according to DIN41652 Part 1). The assignment is as follows:



PIN	Signal	Significance
1-2	-	reserved
3	RxD/TxD-P	transmission and receiving signal P
4	-	reserved
5	DGND	data ground
6	VP	voltage supply for matching resistor
7	-	reserved
8	RxD/TxD-N	transmission and receiving signal N
9	-	reserved

4.2.1 PROFIBUS-DP-Specifications

Transmission medium: Transmission and physical medium:
RS485; shielded, twisted two-wire

Cable parameter for:

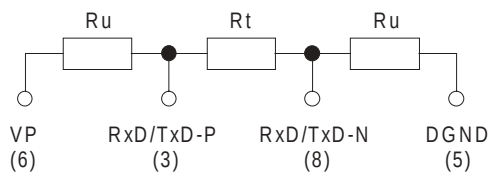
	Surge impedance	Capacitance per unit length	Loop resistance	Wire diameter	Wire cross section
- Cable A to [1]	135-165 Ohm (f = 3 - 20 kHz)	< 30 pF/m	< 110 Ohm/km	> 0.64 mm	> 0.34 mm2
- Cable B to [1]	100-120 Ohm (f > 100 kHz)	< 60 pF/m	< 160 Ohm/km	> 0.53 mm	> 0.22 mm2

Cable length dependent on the baudrate: Spur lines at cable A ≤ 0,3 m / B ≤ 6,6 m.
The spur lines are counted to the overall length!

Baudrate in kbit/s	9,6	19,2	93,75	187,5	500	1500
with line A in m	1200	1200	1200	1000	400	200
with line B in m	1200	1200	1200	600	200	-

Number of Bus subscribers: 32 (active, passive subscriber and line amplifier).

Bus termination: Must occur on every cable on the first and last BUS-subscriber.



Ru: 390 Ohm	Rt: 220 Ohm (with cable A)	Rt: 150 Ohm (with cables B)

5. Change from F4-PROFIBUS-DP to F5-PROFIBUS-DP-Anschaltung

Here the important changes of KEB-F5-PROFIBUS-DP-interfacing based on KEB-F5-PROFIBUS-DP-interface module are summarized in a list to provide the user with a survey.

Added features of F5-PROFIBUS-DP-interfacing

- Second PROFIBUS-DP-connector for the continuation of the PROFIBUS-DP-BUS or to plug-on a terminating resistor.
- Adaptability to the configuration preset by the master.
- Direct set addressing at inverter parameters via the Parameter-channel-Subindex: (see chapter 9).
- Programming and diagnosis via keyboard and display of the PROFIBUS-DP-operator.
- Additional diagnosis and programming interface for KEB COMBIVIS (see chapter 10).

Changes

- Changed identity numer (see unit master data).
- Modified standard process data assignment (see chapter 9.1.1).
- Uniform data length specification possible (see chapter 7.4.3).

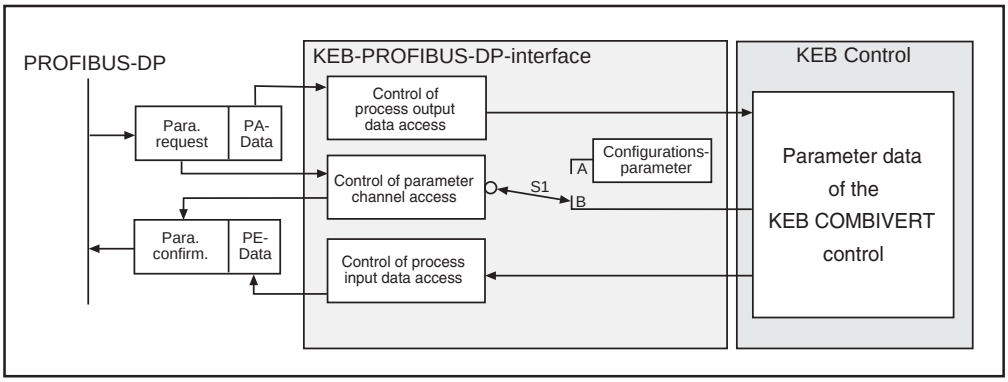
6. Functions

The KEB PROFIBUS-DP-interfacing has the following services/functions:

6.1 PROFIBUS-DP-Services

Data_Exchange	Transfers input-/output data
RD_Inp	Reads the inputs of a slave
RD_Outp	Reads the outputs of a slave
Slave_Diag	Reads DP-Slave diagnosis information
Set_Prm	Sends parameter data
Chk_Cfg	Checks configuration data
Get_Cfg	Reads out configuration data
Global_Control	Control commands

6.2 The 3 Function Blocks



6.2.1 Processing of Process-Output Data

The (process) **output data** transmitted from the PROFIBUS-DP-Master are written to the frequency inverter control when changes occur. The processing of the output data can be switched on/off by parameter „process output data released“.
Which parameters are hidden behind the process output data is determined by the complex parameter **process-output data-description** (Index = 6001h). The coding of this parameter is in accordance with DRIVECOM-Profile (see bibliography in the annex).

6.2.2 Processing of Process-Input Data

The operator reads cyclically the values of the (process-) **input data** from the inverter control within the adjustable cycle time (PE-Cycle) and transfer it over the PROFIBUS-DP to the master. The processing of the input data can be enabled/disabled by parameter „PE-enabled“. Which parameters are hidden behind the process input data is determined by the complex parameter **process-input data-description** (Index 6000h). The coding of this parameter is in accordance with DRIVECOM-Profile (see bibliography in the annex).

6.2.3 Parameter Channel

Over the parameter channel any parameters of the frequency inverter control and the PROFIBUS-DP-operator can be read or changed. If available, the parameter channel determines the first 8 bytes of the cyclical telegrams between DP-master and PROFIBUS-DP-interfacing. The parameter is more flexible since the parameter is addressed directly here. However, the implementation of the parameter-channel for the cyclic data comunication is somewhat more complex than the transfer of new process data.

6.3 Process Data and it’s Mapping

This chapter describes the difference between process data and parameterizing data. Process data are only user data, without any addressing. The PROFIBUS-DP-Master presets new values for the KEB COMBIVERT via process-output data. The actual values of certain parameters are announced to the PROFIBUS-DP-Master via process-input data. Since the process data do not contain any addresses these have to be determined first via an additional configuration between DP-Master and DP-Slave. This agreement is also called process data mapping.

7. PROFIBUS-DP-Key Data

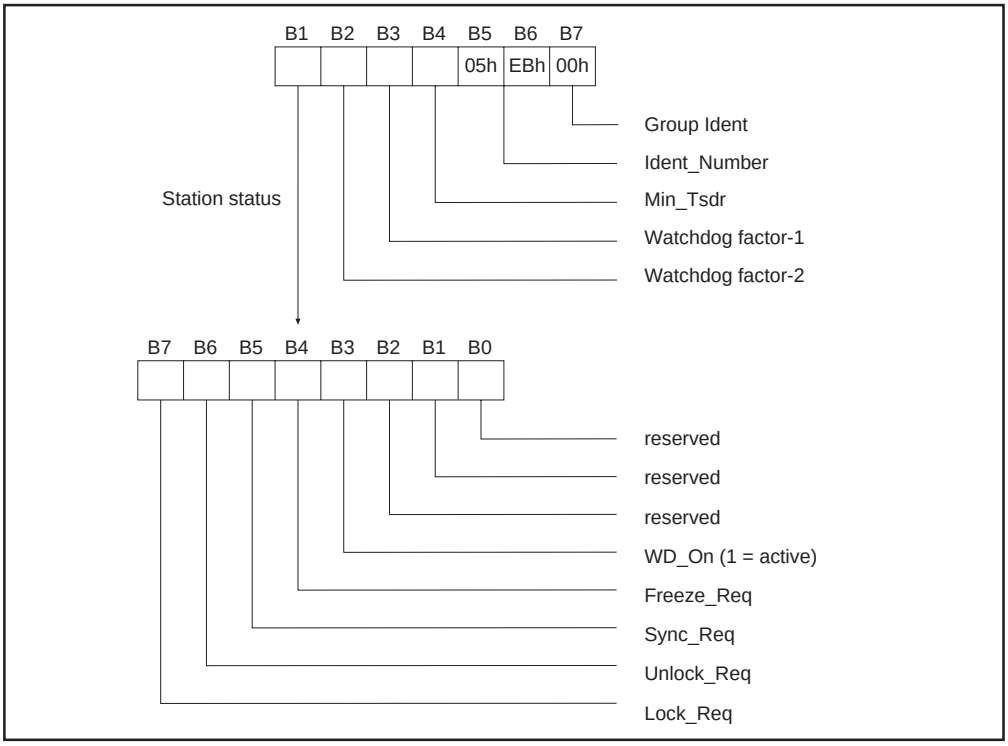
The PROFIBUS-DP-interface module realizes a passive user (Slave). This means that the PROFIBUS-DP-interfacing only transmits, if it is requested to do so by the master.

The PROFIBUS-DP-protocol defines different operating conditions, that must be executed first, before the actual user data PROFIBUS be exchanged. The responsible DP-master must first parameterize and then configure his slaves. If these two functions are successfully completed, the cyclic exchange of user data begins.

Both parameter channel and process data are only active, if the cyclic user data transfer runs.

7.1 Parameterizing

To successfully parameterize KEB-PROFIBUS-interfacing, the DP-Master must send **7 byte parameter data** to it, which have following set up according to standard:



As shown above, the response monitoing is activated or deactivated by Bit 3 of the station status. The watchdog-time is determined from watchdog-factor 1, 2 as follows:

TWD = Watchdog factor-1 * Watchdog factor-2 * 10 ms.

With an activated response monitoring the process-output data are set to zero in the case of an error (no receipt of a telefram within TWD).

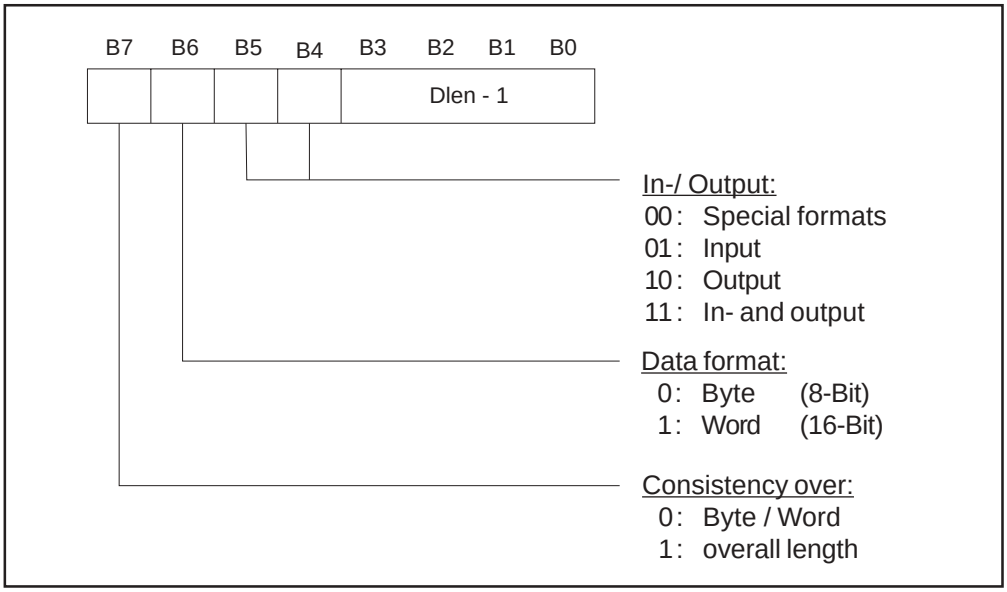
7.2 Configuration

Finally the PROFIBUS-DP-Master sends the configuration to the slave. When the slave accepts this configuration, the cyclic user data communication is started. The configuration consists of one or several configuration or identifier bytes. Such a byte is assigned to every available module. The DC-interfacing consists of three modules (functions):

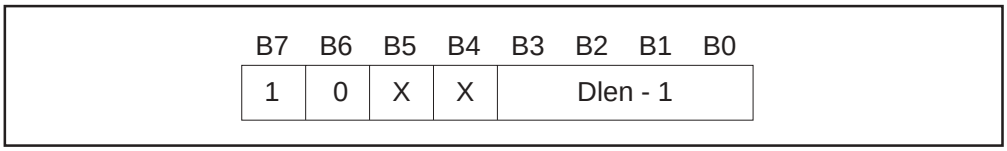
--> the Parameter channel,
--> the Process-data output
--> the Process-data input.

Therefore a maximum of three configuration bytes can be specified to the KEB-DP-Slave.

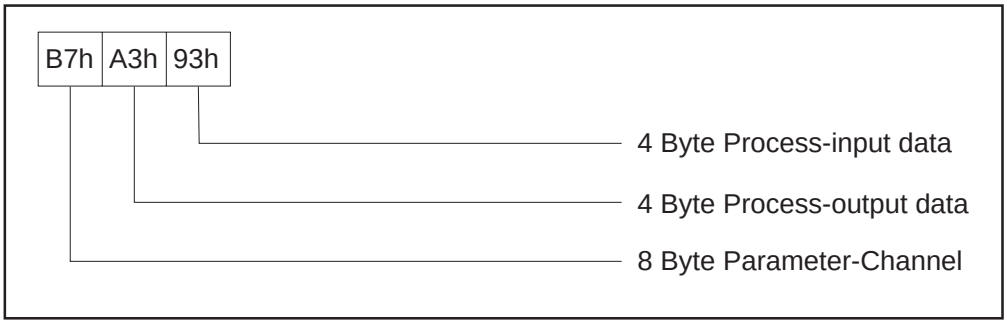
The general coding of the configuration bytes or identifier bytes according to PROFIBUS-DP is as follows:



At the KEB-PROFIBUS-DP-interfacing the configurations bytes have following setup:



The standard configuration of a PROFIBUS-DP-Slave contains 3 configuration bytes:



7.2.1 Adaptatiopn to preset configuration

The KEB F5-PROFIBUS-DP-interfacing adapts itself within certain limits to the configuration given by the master. That means, if a master presets another configuration as the one available in the operator, is does not always have to mean, that no user data communication takes place between master and slave. With that it is possible to adapt the function of the PROFIBUS-DC-interfacing with the PROFIBUS-DP-interfacing. For example, one can exclusively activate the parameter channel by presetting only 1 configuration byte with the value = B7H.

Following rules must be kept to so that the PROFIBUS-DP-OPERATOR accepts the configuration of the master:

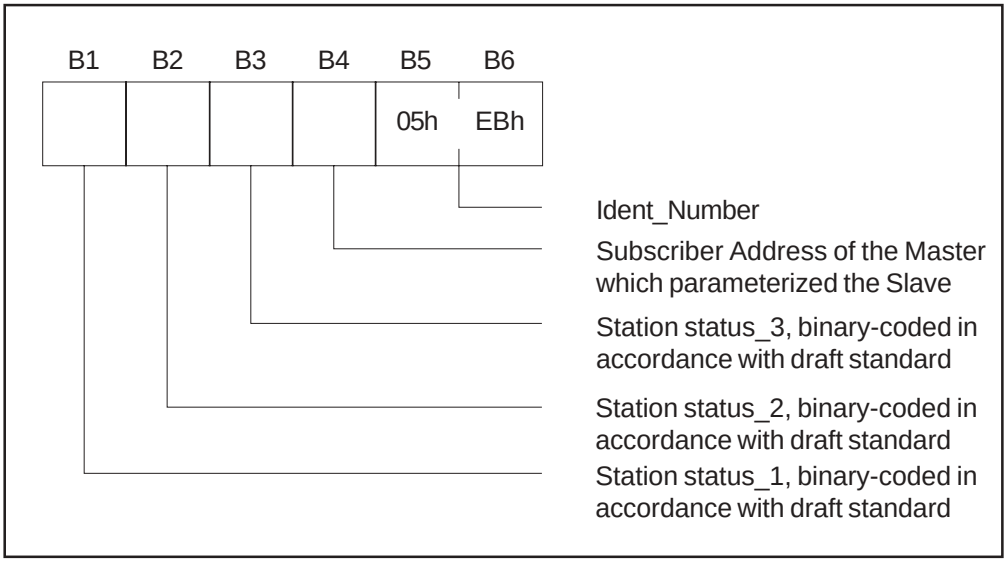
- Maximally 3 configuration bytes are possible.
- The values of the configuration bytes must adhere to the format described in the previous paragraph.
- Only one parameter channel, one ouput module and one input module can be activated.
- If the parameter channel is to be activated, the first configuration byte must contain the value B7H.
- One output module (AXh) can activate maximally 8 byte output data (X < = 7). If the length of the process-output data preset by the configuration does not agree with the value of the parameter process-output data length (Index = 6001, Subindex = 1), the operator starts but the processing of the process-output data is disabled. These must be reactivated again by the parameter process-data output-release.
- One input module (9Xh) can activate maximally 8 byte input data (X < = 7). If the length of the process-input data preset by the configuration does not agree with the value of the parameter process-input data length (Index 0 6000h, Subindex = 1), the operator starts but the processing of the process-input data is disabled. These must be reactivated again by parameter PE_Enabled.
- Following configuration possibilities are conceivable:
  … 3 configuration bytes:
    - B7h, AXh, 9Xh: Parameter channel + PDOUT + PDIN
    - B7h, 9Xh, AXh: Parameter channel + PDIN + PDOUT

  … 2 configuration bytes:
    - B7h, AXh: Parameter channel + PDOUT
    - B7h, 9Xh: Parameter channel + PDIN
    - AXh, 9Xh: PDOUT + PDIN
    - 9Xh, AXh: PDIN + PDOUT

  … 1 configuration bytes:
    - B7h: Parameter channel
    - AXh: PDOUT
    - 9Xh: PDIN

7.3 PROFIBUS-DP-Diagnostic Data

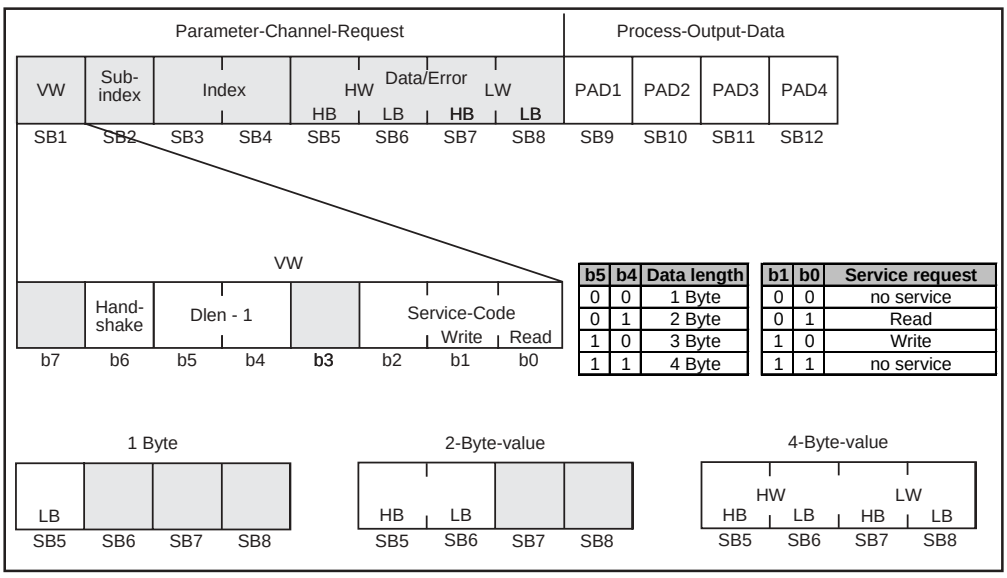
When the diagnostic data is requested by a PROFIBUS-DP-Master the KEB-PROFIBUS-DP-interface answers with **6 byte diagnostic data (no user diagnosis),** they correspond to the draft standard DIN19245 Part 3 and are set up as follows:



7.4 User Data for KEB PROFIBUS-DP-Interface

Every user-data telegram from the DP-Master to the KEB-DP-Slave has a **user-data length** of **12 bytes** in the standard setting**.** All user-data telegrams have the same user-data length from KEB-DP- Slave to DP-Master.

7.4.1 Coding of User-Data from DP-Master to KEB DP-Interface



b5	b4	Data length
0	0	1 Byte
0	1	2 Byte
1	0	3 Byte
1	1	4 Byte

b1	b0	Service request
0	0	no service
0	1	Read
1	0	Write
1	1	no service

The abbreviations have the following meaning:

LB: Low-Byte
HB: High-Byte
HW: High-Word
LW: Low-Word

The first **8 bytes** contain the **parameter-channel request.** Request means, that the DP-Master PROFIBUS informs the DP-Slave during this part of the telegram, that either the value of the parameter should be changed **(write)** or the value of a parameter should be inquired **(read)**. This part of the telegram PROFIBUS cannot be changed by changing the configuration.

The addressing of the parameter occurs via the 16-bit-**Index** and the 8-bit-**subindex**. The **data-length of the parameter**, which PROFIBUS can address by this parameter channel is limited to **4 bytes**.

Restrictions Some complex parameters PROFIBUS cannot be read/written via KEB-PROFIBUS-DP-interface by one parameter request. When accessing these parameters the user must register every part of the parameter/object separately (via the subindex).

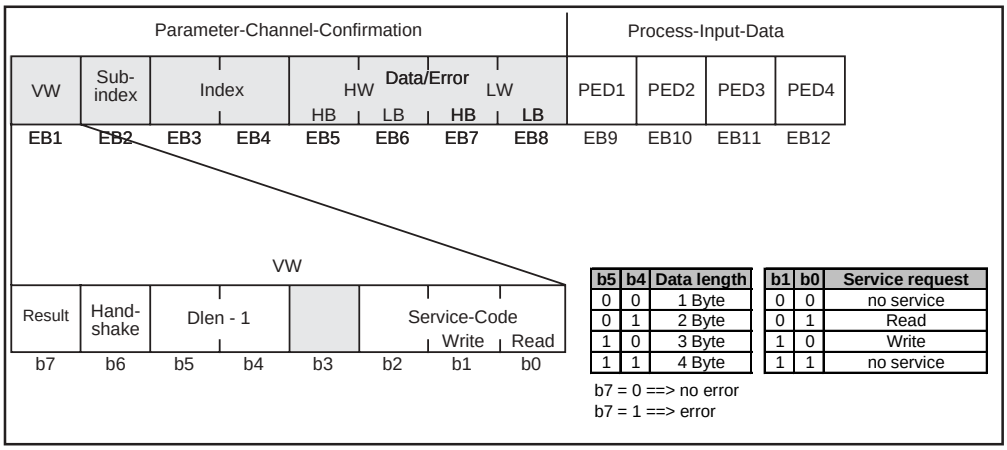
The first byte of the parameter-channel request has a special Significance (see chapter 7.4.1). The parameter requests are handled by this control byte. This additional service is necessary so that the parameter requests can be treated separately from the exchange of the PROFIBUS-DP-user data. The control byte has one **Handshake-Bit for this**. This bit must be inverted by the DP-Master every time it wants to send a new parameter-channel-request.
Bit 4 and 5 of the control byte specify the data length. The bits b0 and b1 contain the service-coding. If the DP-Master wants to inquire the value of a parameter from the KEB-DP-Slave **(read)**, then the bit **b0 = 1** and the bit **b1 = 0**.
Otherwise, the bit **b0 = 0** and the bit **b1 = 1** must be set, when the value of a parameter should be changed **(write)**.

To address the parameter, the index and subindex must be set. In case of a write request, additional data lengths must be entered as well as the data described above.

The second part of the user-data telegram contains the (process-) **Output data**. This data is not addressed, i.e. it only contains the data not parameter addresses. Where these data are mapped to is described in the chapter about the function KEB-PROFIBUS-DP-Interface.

Important! Process-ouput data are only actualized to the KEB COMBIVERT when they have changed!

7.4.2 Coding of the User-data from the KEB DP-Interface to the Master



b5	b4	Data length
0	0	1 Byte
0	1	2 Byte
1	0	3 Byte
1	1	4 Byte

b1	b0	Service request
0	0	no service
0	1	Read
1	0	Write
1	1	no service

The first **8 bytes** contain the **parameter-channel-confirmation**. This means the DP-Master is informed whether the requested service could be completed without any errors.

Even here the first byte, the control byte, has a special Significance. The bit6 (hand-shake) shows, whether the requested service was completed. When b6 has the same value as the request, then the service is completed and the confirmation can be evaluated. Bit b7 shows whether the requested service could be completed without an error (b7=0) or if an error occured (b7=1). In case of an error the data/error field (bytes EB5 to EB8) is to be read as an error description. The error is divided into the error class (EB5), error code (EB6) and additional code (EB7, EB8). The meaning of each error code is found in the annex. If no error occurs and the DP-Master requested the reading of a parameter value, the data/error field contains the data read-out.

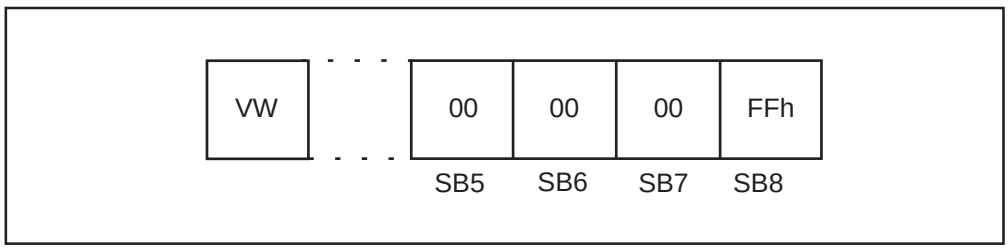
Note: With a write-request the written data is taken from the request into the confirmation, when no error occurs. In this case the DP-Master PROFIBUS read back the data to check it. The data length PROFIBUSnot be taken from the confirmation, while this is permanently set at 0 in a write-confirmation.

The 2nd part of the telegram contains the values of the (process) **input data**. These are previously specified and then entered in the PROFIBUS-DP-telegram. The input data are read cyclical with an adjustable cycle time. How the mapping of the process-input data occurs is described in the chapter 6.2.2 about the function of KEB-PROFIBUS-DP-Interface.

7.4.3 Note on the Use of the Data Length of the Parameters

The parameters of the KEB F5-frequency inverter and the parameters of the PROFIBUS-DP-interfacing possess effective data lengths of 1 to 4 bytes. In order to facilitate the access on the parameters it is possible to write each parameter with 4-byte data length. This means, the user does not need to worry about the data length of the parameter and treats every paramerer as a 4-byte parameter. The data filed of the parameter channels is then always to be completed like a 4-byte parameter.

The example shows the selection of a 1-byte parameter with value = 255d as 4-byte parameter:

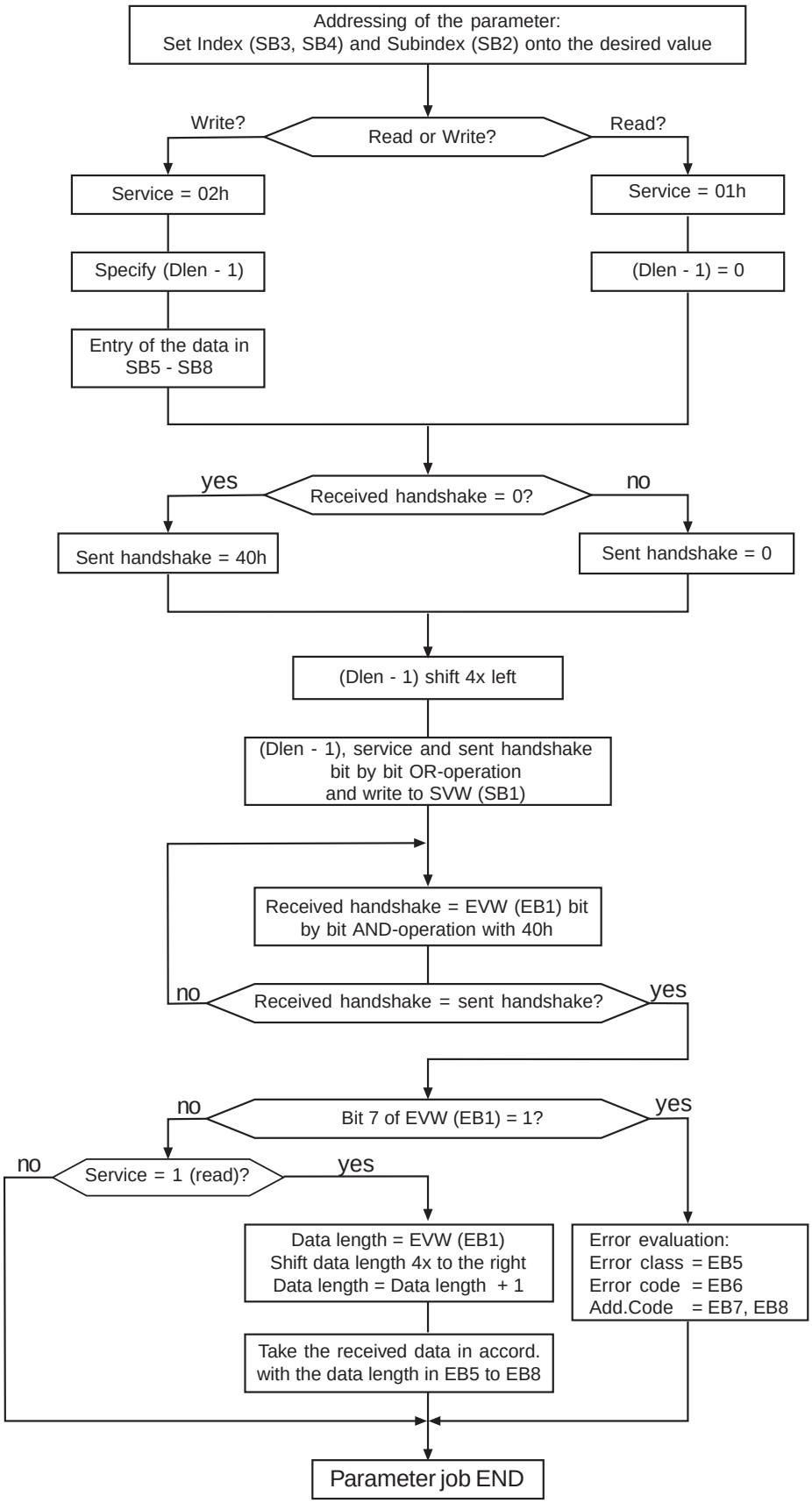


In analog mode for the reason of standardization every parameter with the data length = 4 is returned during the reading over the parameter-channel.

IMPORTANT During writing the parameters can still be accessed with the effective data length. For example the parameter PE_Enabled can still be written with data length = 1. Thererfore existing applications do not have to make modifications during writing. However, when reading the parameters it must be considered, that now all parameters are returned with a data length = 4.

7.5 Realization of the Parameter-Channel Protocols with the Master

The following flow chart shows the necessary procedures that a PROFIBUS-DP-Master must support to use the parameter channel of KEB-PROFIBUS-DP-Operator.



7.5.1 Examples for a Telegram Sequence of the Parameter Channel

For a better understanding of the sequence of parameter channel orders, the following examples describe possible telegram contents. Three successive parameter orders are listed. The complete PROFIBUS-telegrams are not displayed here. Only the user data of the parameter channel in the telegrams are displayed. The first column contains a telegram identifier. A 'S' with trailing digit displays 'transmission message from the master'. An 'E' displays 'receive message of the master'. The examples show that one parameter order can require different telegrams. The cause is the PROFIBUS-DP-protocol and also different times for the excecution of a parameter channel service in the KEB-PROFIBUS-DP-interface. The following examples describe the parameter orders:

Example 1:

– Request from the master: writing (index=2300h, subindex=0, Dlen=2, value =000Bhex/0011dez)
– Confirmation from the slave: error (error-class=8, error-code=0, Add-Code=0030h)

E0:	**00h**	00h	00h	00h	00h	00h	00h	00h
	B1	B2	B3	B4	B5	B6	B7	B8
S1:	**52h**	00h	23h	00h	00h	0Bh	00h	00h
E1:	**00h**	00h	00h	00h	00h	00h	00h	00h
S2:	**52h**	00h	23h	00h	00h	0Bh	00h	00h
E2:	**00h**	00h	00h	00h	00h	00h	00h	00h
S3:	**52h**	00h	23h	00h	00h	0Bh	00h	00h
E3:	**C2h**	00h	23h	00h	08h	00h	00h	30h

S1 contains the first request from the master. In this telegram the handshake-bit must be set, because the actual handshake of the slave (see E0) is = 0.
The confirmation of this request is displayed in E3. The handshake-bit and the request have the same value. Besides Bit7 is set in the first Byte - an error message is displayed. In this case the Bytes B5 to B8 must be interpreted as error message (see above). The error (8, 0, 0030h) means, that the value is invalid and therefore the value is not accepted.

Example 2:

– Request from the master: writing (index=2300h, subindex=0, Dlen=2, value=0003 hex / 0003 dez)
– confirmation from the KEB-slave: OK.

S4:	**12h**	00h	23h	00h	00h	03h	00h	00h
E4:	**C2h**	00h	23h	00h	08h	00h	00h	30h
S5:	**12h**	00h	23h	00h	00h	03h	00h	00h
E5:	**02h**	00h	23h	00h	00h	03h	00h	30h

S4 contains the request of the master (first time) with handshake-Bit=0. The confirmation of the slave is comming first in parameter E5. Bit7 is not set here --> no error.

Example 3:

– Request from the master: reading (index=2200h, subindex=0)
– Confirmation from the KEB-slave: OK (index=2200h, subindex=0, Dlen=4, Data=0046 hex / 0070dez)

S6:	**41h**	00h	22h	00h	00h	03h	00h	00h
E6:	**02h**	00h	23h	00h	00h	03h	00h	30h
S7:	**41h**	00h	22h	00h	00h	03h	00h	00h
E7:	**71h**	00h	22h	00h	00h	00h	00h	46h

S6 contains the request of the master (first time) with handshake-Bit=1.
The confirmation of the slave is first included in parameter E7.
Because of this is a reading service, the bytes B5 to B8 in accordance with the data length in B1 must be interpreted as value. Here Dlen = 4, value = 0046h/70d.

Note that at KEB-F5-PROFIBUS-DC interfacing each parameter is returned during the reading as 4-byte parameter!

8. PROFIBUS-DP-Operating-Parameter

8.1 Station Address

The PRFIBUS-DP user address corresponds to the value of the parameter inverter-address (SY.06). The standard address for all frequency inverter is 1. In case it must be changed, SY.06 can be modified over the operator keyboard.

8.2 Transfer Rate

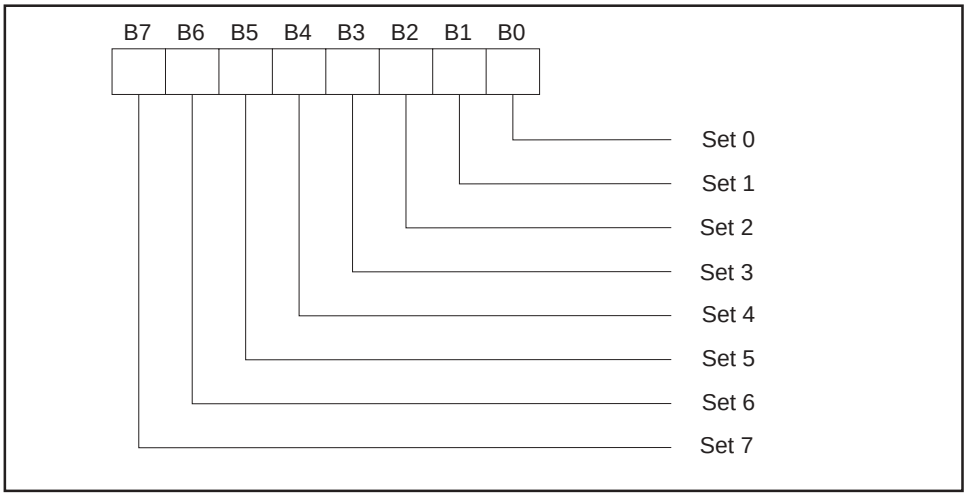
The PROFIBUS-DP transfer rate is recognized automatically. The possible bit rates and the appropriate maximum response delay time are listed in the following table:

Bit rate in KBit/s	max. TSDR in Bit time
9,6	60
19,2	60
93,75	60
187,5	60
500	100
1500	150
3000	250
6000	450
12000	800

9. Application Parameters

The KEB frequency inverter with PROFIBUS-DC interfacing is characterized on the application by its parameters. These are devided into three groups. The grouping is preset by the DRIVECOM profile. This dictates that manufacturer-specific parameters must lie in the index range 2000h...5FFFh liegen müssen. At KEB this range is subdevided again into:

- Parameters of the frequency inverter control (Index range 2000h...5EFFh).
  For the parameter addressing applies:
  Index = Parameter-address + 2000h
  (Parameter address of application manual of the frequency inverter control). Here the subindex can be used as direct presetting of the set, if a value uneven zero is specified as subindex. In this case the value determines bit-coded the addressed set/sets:



  For the addressing of several sets simultaneously the following is to be considered:

  - During the writing the value of the parameter is changed in all addressed sets.
  - During reading the value of the parameter is only returned, if it is identical in all sets. If the values are different an error message is returned.

  With subindex „0“, the parameter adjusted with Fr.09 (set pointer) is accessed.

- Configuration parameters of the PROFIBUS-DP interfacing (index range 5F00h...5FFFh).

- The parameters whose coding is defined by the DRIVECOM profile lie in the index range starting from 6000h.

9.1 Configuration Parameters

These parameters determine the configuration of the KEB PROFIBUS-DP interfacing and therefore are implemented there. That means a parameterizing job to such a parameter is processed directly in the PROFIBUS interface and not transfered to the FI-control. These parameters are not mappable on the process data.

Name **WD_Inhibit**
Index **5FF9h**
Object-Typee **Simple Variable**

Subindex **0**
Data length 1 Byte
Significance Determines onto which events the Fieldbus-Watchdog is triggered. The Fieldbus-Watchdog is used to bring the frequency inverter into the error condition if no activities take place on PROFIBUS-DP. The actual activation and programming of the Watchdog is adjusted in the FI-control. The parameters to be adjusted for that are found in the instruction manual of the FI-control.

Coding Bit-coded:
Bit 0 = 1
When starting a PDOUT-telegram to the FI-control the Watchdog is reset.
Bit 1 = 1
When starting the processing of a parameter-channel job, the Watchdog is reset.
Bit 2 = 1
If the slave is in the user data transfer, the Watchdog is reset.

Standard-Setting **07h**
The Watchdog is reset if:
- process output data is written to the FI-control,
- a **parameter-channel job** is started and
- the slave is in the user data transfer.

Note A changed value is immediately active and non-volatile stored.

Name	**PD_Stored**
Index	**5FE2h**
Object-Type	**Simple Variable**
Subindex	**0**
Data length	1 Byte
Significance	Determines whether the actual process data assignment is read from the EEPROM or whether it is operated with the standard PD-assignment.
Coding	FFh ==> operates with the stored PD-assignment otherwise ==> operates with the standard PD-assignment.
Standard-Setting	**FFh**
Note	A changed value is immediately active and non-volatile stored.

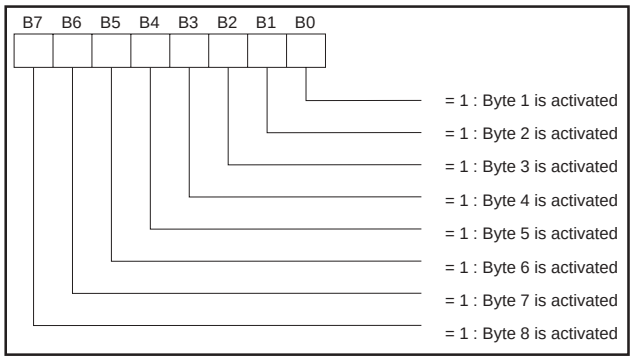
Name	**SW_Version**
Index	**5FF0h**
Subindex	**0**
Data length	2 Byte
Significance	Specifies the software version of the PROFIBUS-DP interfacing.
Coding	0,1
Standard-Setting	Depending on the version
Note	The parameter is Read_Only.

Name	**SW_Date**
Index	**5FF1h**
Subindex	**0**
Data length	2 Byte
Significance	Specifies the software date of the PROFIBUS-DP interfacing.
Coding	The last decimal place indicates the year, the next two high-order decimal places the month and the highest-order decimal place(s) the day. Example: 31011 ==> 31.01.2001
Standard-Setting	Depending on the date
Note	The parameter is Read_Only.

Name **PE_Enabled**
Index **5FF8h**

Subindex 0
Data length 1 Byte
Significance Specifies bit-coded, which process input data bytes are activated.

Coding



Standard-Setting 0Fh (Bytes 1 to 4 activated)
Note When activating process input data the current process input data description is transferred to the FI-control. If the FI-control rejects the assignment, an error code is returned to the PROFIBUS-DP and the processing remains switched off.

Name **PE_Cycle**
Index **5FFAh**

Subindex **0**
Data length 2 Byte
Significance Specifies the cycle time in ms, in which the process input data are read by the FI-control.

Coding 1 ms

Standard-Setting **25 ms**

Note A modified value is stored immediately and not-volatile.

9.1.1 DRIVECOM Profile Parameter in Index Range starting from 6000h

In this index-range are the parameters, whose coding adheres to the DRIVECOM profile. The parameters for the assignment of the process data are very complex and may not be immediately understandable after the first reading. Therefore a brief introduction to these parameters is given here.

Two of these parameter exist in the KEB PROFIBUS-DP interfacing, one for each process data direction. The entire object process-data-description is splitted into several partial objects, which are addressed over the subindex.

On subindex = 1 is the process data length in bytes. Followed by the process data mapping. These mappings describe the assignment for a certain process data byte and consist always of one 16-bit-parameter-index and one 8-bit-subindex. The value zero states that this process data byte still belongs to the preceding assignment.

Name **Process-Input Data Description**

Index **6000h**

Note For write accesses to index 6000h the processing of the process input data is switched off automatically (PE-Enabled = 0).

	Subindex in Hex	Data length in Byte	Description
Index 6000h	1	1	Indicates how many bytes the process input data occupy.
	2	2	Index of the parameter that is mapped in the first word of the process data.
	3	1	Indicates in which set (sets) the parameter (subindex 2) in changed in the FI.
	4	2	0 (unchangeable)
	5	1	0 (unchangeable)
	6	2	Index of the paramter that is mapped in the second word of the process data.
	7	1	Indicates in which set (sets) the parameter (subindex 6) is changed in the FI.
	8	2	0 (unchangeable)
	9	1	0 (unchangeable)
	A	2	Index of the parameter that is mapped in the third word of the process data.
	B	1	Indicates in which set (sets) the parameter (subindex A) in changed in the FI.
	C	2	0 (unchangeable)
	D	1	0 (unchangeable)
	E	2	Index of the parameter that is mapped in the fourth word of the process data.
	F	1	Indicates in which set (sets) the parameter (subindex E) is changed in the FI.
	10	2	0 (unchangeable)
	11	1	0 (unchangeable)

Example 1 **Default assignment of the process input data**

Index	Subindex	Value	Note	
6000h	1	4	4 Byte process input data	
6000h	2	**2033hex**	**Status Word**	
6000h	3	1	Read value from set 0	
6000h	4	0		1. Word
6000h	5	0		
6000h	6	**2035hex**	**Curent speed**	
6000h	7	1	Read value from set 0	
6000h	8	0		
6000h	9	0		2. Word

Example 2 **8. Byte Assignment of process input data with 32-bit values**

Index	Subindex	Value	Note	
6000h	1	8	8 Byte process input data	
6000h	2	**233B**	**OP.59 Motorpoti ramp time**	
6000h	3	1	Value from set 0	
6000h	4	0		High Word
6000h	5	0		
6000h	6	0		
6000h	7	0		
6000h	8	0		Low Word
6000h	9	0		
6000h	A	**2D00**	**LE.00 Switching level**	
6000h	B	1	Value from set 0	
6000h	C	0		High Word
6000h	D	0		
6000h	E	0		
6000h	F	0		
6000h	10	0		Low Word
6000h	11	0		

Name **Process-Output Data Description**

Index **6001h**

Note For write accesses to index 6001h the processing of the process output data is switched off automatically (procee output data enabled = 0).

	Subindex in Hex	Data length in Byte	Description
Index 6001h	1	1	Indicates how many bytes the process output data occupy.
	2	2	Index of the parameter that is mapped in the first word of the process data.
	3	1	Indicates in which set (sets) the parameter (subindex 2) is changed in the FI.
	4	2	0 (unchangeable)
	5	1	0 (unchangeable)
	6	2	Index of the parameter that is mapped in the second word of the process data.
	7	1	Indicates in which set (sets) the parameter (subindex 6) is changed in the FI.
	8	2	0 (unchangeable)
	9	1	0 (unchangeable)
	A	2	Index of the parameter that is mapped in the third word of the process data.
	B	1	Indicated in which set (sets) the parameter (subindex A) is changed in the FI.
	C	2	0 (unchangeable)
	D	1	0 (unchangeable)
	E	2	Index of the parameter that is mapped in the fourth word of the process data.
	F	1	Indicates in which set (sets) the parameter (subindex E) is changed in the FI.
	10	2	0 (unchangeable)
	11	1	0 (unchangeable)

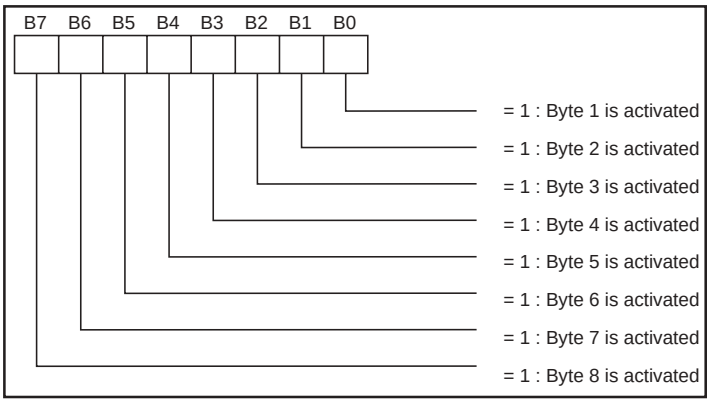
Example 1 **Default assignment of the process output data**

Index	Subindex	Value	Note	
6001h	1	4	4 Byte process output data	
6001h	2	**2032hex**	**Control Word**	
6001h	3	1	Written value in set 0	
6001h	4	0		1. Word
6001h	5	0		
6001h	6	**2034hex**	**Setpoint Speed**	
6001h	7	1	Written value in set 0	
6001h	8	0		2. Word
6001h	9	0		

Name **Process-Output Data Enabled**
Index **6002h**

Subindex 0
Data length 1 Byte
Significance Indicates bit-coded, which process output data bytes are activated.

Coding



Standard-Setting 0Fh (Bytes 1 to 4 activated)

Note When activating process output data the current process output data description is transferred to the FI-control. If the FI-control rejects the assignment, an error code is returned to the PROFIBUS-DP and the processing remains switched off.

10. Access to Operator-Parameters via Diagnostic Interface

The parameters which the operator organizes are also called Operator-parameters. Some of these parameters are pure diagnostic parameters and partly of no interest to the user.

Other parameters are mirrored fieldbus parameters, which in normal operation are programmed over the fieldbus, but for the initial commissioning and for test purposes they can also be modified over the diagnostic interface.

In the following the Operator-parameters are listed. Note, that for the addressing of the parameters a 16-Bit-address is indicated and not as for the fieldbus a 16-Bit-index plus 8-Bit-subindex. All parameters visible in the KEB COMBIVIS but not specified in the following are only for KEB internal use and may not be changed by the user.

Name **Date Mmm DD YYYY** Type: (with Mmm = month, DD = day, YYYY = year of the software date)
Parameter address **0080h**

Significance Specifies the operator type and version. It concerns a 32-Bit-value, which consists of two 16-Bit-values. The high-word indicates the operator type, the low-word indicates the version.

Data length 4 Byte
Coding Operator type:
- 0001h: Standard-Operator
- 0002h: INTERBUS-Operator
- 0003h: PROFIBUS-Operator
- 0004h: CANopen-Operator

Example:
00030001h means, it concerns a PROFIBUS-Operator of the version 1.

Note This parameter is Read_Only and not available via PROFIBUS.

Name **Parameter Count**
Parameter address **0081h**

Significance Number of available Operator-parameters.

Data length 1 Byte
Coding 1

Note This parameter is Read_Only and not available via PROFIBUS.

Name **Response Delay Time**
Parameter address **0082h**

Significance Minimum response delay for inquiries over the diagnostic interface.
Data length 1 Byte
Coding 1 ms
Note This parameter is not available via PROFIBUS.

Name **Current Password**
Parameter address **0083h**

Significance Currently adjusted password level
Data length 2 Byte
Coding See coding of the parameter password in the FI-control.
Note This parameter is Read_Only and not available via PROFIBUS.

Name **Display Parameter**
Parameter address **0084h**

Significance Specifies the parameter address of the parameter indicated in the display.
Data length 2 Byte
Coding 1
Note This parameter is Read_Only and not available via PROFIBUS.

Name **Display Set**
Parameter address **0085h**

Significance Specifies the parameter set of the parameter indicated in the display.
Data length 1 Byte
Coding 1
Note This parameter is Read_Only and not available via PROFIBUS.

Name **HSP5 Tout Count**
Parameter address **0087h**

Significance Counts the time overrun at the internal communication between the operator and the FI-control.
Data length 2 Byte
Coding 1
Note This parameter is not available via PROFIBUS.

Name **Watchdog inhibit**
Parameter address **008Eh**

Data length 1 Byte
Note This parameter is identical to the PROFIBUS-parameter WD_Inhibit (see above).

Name **PD_In_Length**
Parameter address **0090h**

Data length 1 Byte
Note This parameter corresponds to the PROFIBUS-DP-parameter process-input data length (Index = 6000h, Subindex = 1).

Name **PD_Inx Index (with x = 1 . . . 4)**
Parameter address **0090h + x**

Data length 2 Byte
Note This parameter corresponds to the PROFIBUS-DP-parameter with Index = 6000h, Subindex (2*x)).

Name **PD_Inx Set (with x = 1 . . . 4)**
Parameter address **0094h + x**

Data length 1 Byte
Note This parameter corresponds to the PROFIBUS-DP-parameter with Index = 6000h, Subindex = ((2*x)+1)).

Name **PD_In Enable**
Parameter address **0099h**

Data length 1 Byte
Note This parameter corresponds to the PROFIBUS-DP-parameter PE_Enabled (Index = 5FF8h, Subindex = 0).

Name **PD_Out_Length**
Parameter address **009Ah**

Data length 1 Byte
Note This parameter corresponds to the PROFIBUS-DP-parameter process-output data length (Index = 6001h, Subindex = 1).

Name **PD_Outx Index (with x = 1 . . . 4)**
Parameter address **009Ah + x**

Data length 2 Byte
Note This parameter corresponds to the PROFIBUS-DP-parameter with Index = 6001h, Subindex = (2*x).

Name **PD_Outx Set (with x = 1 . . . 4)**
Parameter address **009Eh + x**

Data length 1 Byte
Note This parameter corresponds to the PROFIBUS-DP-parameter with Index = 6001h, Subindex = ((2*x)+1)).

Name **PD_Out Enable**
Parameter address **00A3h**

Data length 1 Byte
Note This parameter corresponds to the PROFIBUS-DP-parameter process-output data enable (Index = 6002h, Subindex = 0).

Name **Take Stored PD-Map**
Parameter address **00A4h**

Data length 1 Byte
Note This parameter corresponds to the PROFIBUS-DP-parameter PD_Stored (Index = 5FE2h, Subindex = 0).

Name **ProcessData Inx (with x = 1 . . . 4)**
Parameter address **00A4h + x**

Data length 2 Byte
Note The value of this parameter corresponds to the x. process-input data word (16-Bit). The parameter is Read_Only.

Name **ProcessData Outx (with x = 1 . . . 4)**
Parameter address **00A8h + x**

Significance x. process output data word
Data length 2 Byte
Coding Depending on mapped parameter
Note The value of this parameter corresponds to the x. process-output data word (16-Bit).
The parameter is Read_Only.

Name **PD_In_Cycle**
Parameter address **00AFh**

Data length 2 Byte
Note This parameter corresponds to the PROFIBUS-DP-parameter PE_Cycle.

Name **Check PD Setting**
Parameter address **00B6h**

Significance Indicates whether the last reassignment of the process data was carried out without error.
Data length 1 Byte
Coding 0: Error occurred during the last PD-reassignment.
255d: Last PD-reassignment was carried out without error.
Note This parameter is not available on PROFIBUS-DP.

Name **CFG_Len**
Parameter address **00B0h**

Significance Indicates the number of configuration bytes, which are currently adjusted in the PROFIBUS-DP-operator.
Data length 1 Byte
Coding 1
Note The parameter is Read_Only and not available on PROFIBUS-DP.

Name **CFG_Datax (with x = 1 . . . 3)**
Parameter address **00B0h + x**

Significance Indicates the respective PROFIBUS-DP configuration byte.
Data length 1 Byte
Coding see chapter 7.2.
Note The parameter is Read_Only and not available on PROFIBUS-DP.

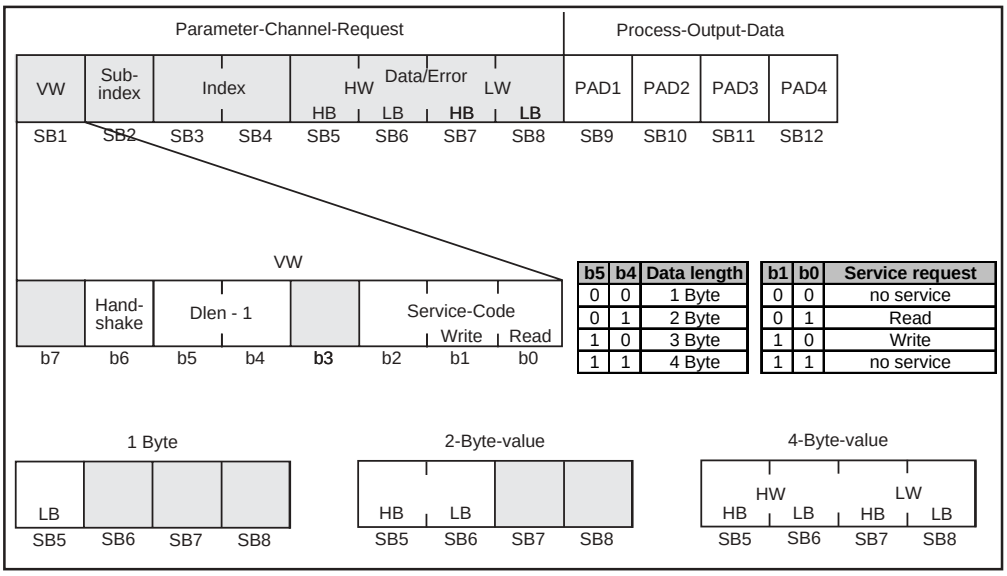
11. KEB PROFIBUS-DP Compact

PROFIBUS-DP-user address = SY.06

The standard configuration of the KEB slave:

B7h	A3h	93h

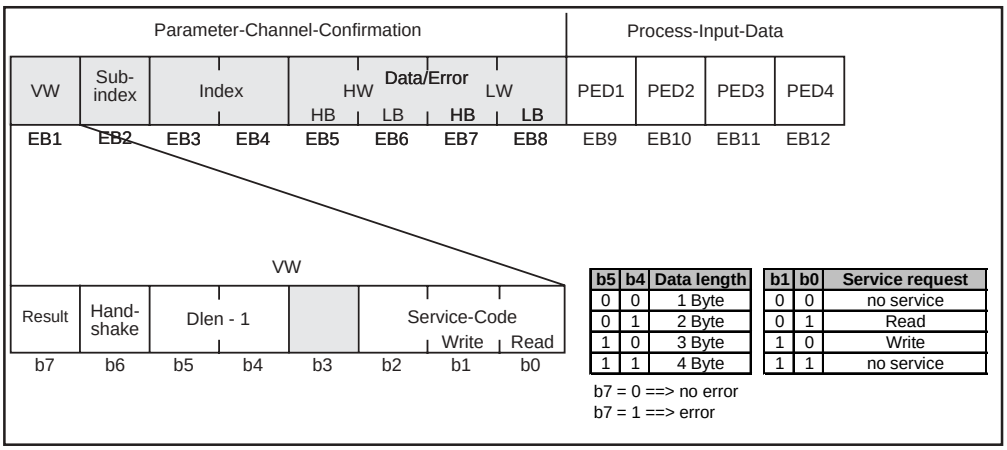
Structure of the cyclic user data telegrams of the KEB master to the KEB slave.



b5	b4	Data length
0	0	1 Byte
0	1	2 Byte
1	0	3 Byte
1	1	4 Byte

b1	b0	Service request
0	0	no service
0	1	Read
1	0	Write
1	1	no service

Structure of the cyclic user data telegrams of the KEB slave to the KEB master.



b5	b4	Data length
0	0	1 Byte
0	1	2 Byte
1	0	3 Byte
1	1	4 Byte

b1	b0	Service request
0	0	no service
0	1	Read
1	0	Write
1	1	no service

b7 = 0 ==> no error
b7 = 1 ==> error

MEMO

Bibliography

[1] PROFIBUS Norm EN 50170 Vol. 2, Version 1.0.
[2] PROFIL Antriebstechnik (21) of the DRIVECOM user group e.V. of 16.12.1991.

Table of Error Messages of the Parameter Channels

Error-Class (EB5)	Error-Code (EB6)	Add.-Code (EB7, EB8)	Significance
5	4	0000h	The bits for writing and reading are set at the same time.
6	2	0000h	No connection to FI.
6	3	0000h	Parameter write-protected.
6	3	0030h	No access to the parameter with the currently adjusted password.
6	4	0000h	Invalid parameter address (Index).
6	5	0000h	Invalid process-data description.
6	5	0011h	Invalid subindex.
8	0	0022h	Inverter busy.
8	0	0030h	The written value lies outside the valid value range.
8	0	0033h	The addressed parameter set is invalid.
8	0	0034h	Operation not possible.

Unit Master Data File for KEB F5 PROFIBUS-DP-Operator (Stand: 17.05.2001)

```
#Profibus_DP
Vendor_Name                 = "KEB Antriebstechnik"
Model_Name                  = "KEB DP_F5_OP"
Revision                    = "V1.0"
Ident_Number                = 1515          ;       0x05EB
Protocol_Ident              = 0
Station_Type                = 0         ;       DP-Slave
FMS_supp                    = 0
Hardware_Release            = "03.F5.060-0009"
Software_Release            = "0S.F5.A30-1000"
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
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
Repeater_Ctrl_Sig           = 0
24V_Pins                    = 0
Freeze_Mode_supp            = 1
Sync_Mode_supp              = 1
Auto_Baud_supp              = 1
Set_Slave_Add_supp          = 0
User_Prm_Data_Len           = 0
Min_Slave_Intervall         = 1         ;       0.1 ms
Modular_Station             = 1
Max_Module                  = 3
Max_Input_Len               = 16
Max_Output_Len              = 16
Max_Data_Len                = 32
Module                      = "Parameter channel" 0xB7
EndModule
Module                      = "Process-output data" 0xA3
EndModule
Module                      = "Process-input data" 0x93
EndModule
```

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 CP.F5.010-K000 10/2001