COMBICOM **F5**

INSTRUCTIONS FOR USE | **PROFIBUS OPERATOR**

Translation of the original manual
Document 20114545 EN 01

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1. General Information

The presented documentation as well as the herein mentioned hard- and software are developments of KEB Automation KG. Errors excepted. The KEB Automation KG have prepared the documentation, hardware and software to the best of their knowledge, however, no guarantee is given that the specifications will provide the efficiency aimed at by the user. The KEB Automation KG reserves the right to change the specifications without prior notification or further obligation. All rights reserved.

2. Order Informations

This Instruction Manual:	20114545
KEB F5-PROFIBUS-DP-Operator:	00F5060-3000
Utilities for the diagnostic interface:	
HSP5-cable between PC and adapter:	00F50C0-0010
Adapter DSUB9 / Western:	00F50C0-0020

3. F5-PROFIBUS-DP interface

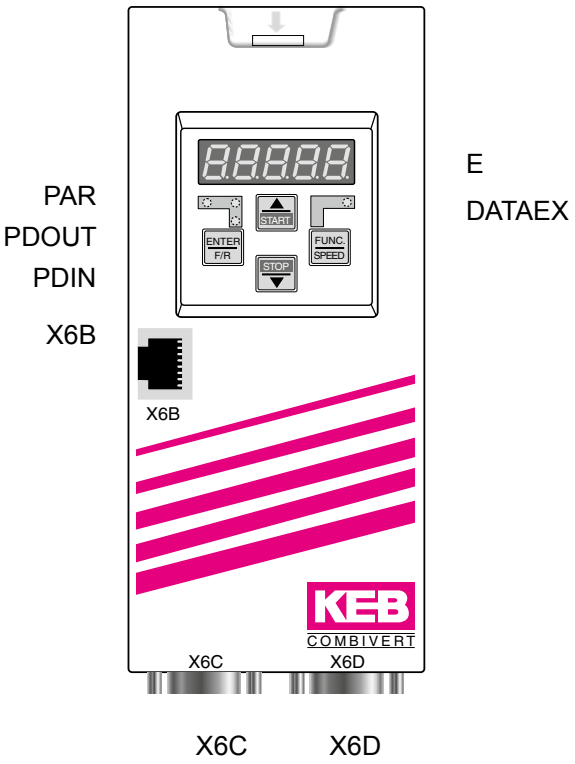
KEB power transmission develop, produce and sell static frequency inverters worldwide in the industrial power range. The inverters of the type F5 can be equipped optionally with a KEB F5-PROFIBUS-DP interface. It concerns an intelligent interface, that controls the access over PROFIBUS-DP to the parameters of the frequency inverter.

The KEB F5-PROFIBUS-DP operator is integrated into the FI housing by plug-in and fits into all KEB F5 frequency inverters. Parallel to the fieldbus operation the operation over the integrated display/keyboard as well as another interface for diagnosis/parameterization (KEB COMBIVIS) is possible.

For programming the KEB F5 frequency inverter by PROFIBUS-DP the user requires in addition to this manual the instruction manual of the respective frequency inverter control.

4 Hardware Description

PAR (green)	:	Parameterizing channel active
PDOUT (green)	:	PDOUT data are written to the FI control
PDIN (green)	:	PDIN data are read by the FI control
E (red)	:	on → Inverter ready for operation Blinking → Error in inverter off → no power supply
DATAEX	:	Net data transfer active
X6B	:	Diagnostic interface to the PC (see chapter 4.1)
X6C	:	PRROFIBUS-DP interface 1, Sub D9 socket
X6D	:	PROFIBUS-DP interface 2, Sub D9 socket



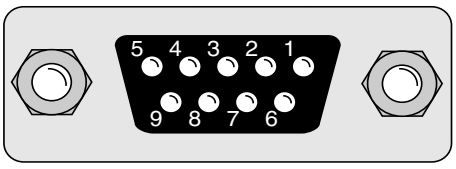
4.1 Diagnostic Interface

A HSP5-cable is connected to the diagnostic interface via an adapter (see chapter 2. order designation). Over the PC software KEB COMBIVIS 5 normal access to all inverter parameters is available now. Also the operator internal parameters can be read out and partly adjusted or parameterized with download.

To prevent the desctruction of the PC-interface, the diagnostic interface must be connected to the PC with a special HSP5-cable with voltage adaption only !

4.2 PROFIBUS-DP interface

The operator offers two D-SUB-9pole sockets for the PROFIBUS connection (according to DIN41652 part 1). The assignment is as follows:



Pin	Signal	Meaning
1-2	-	reserved
3	RxD/TxD-P	Transmit-/receive signal P
4	-	reserved
5	DGND	Data reference potential
6	VP	Supply voltage for terminating resistor
7	-	reserved
8	RxD/TxD-N	Transmit-/ receive signal N
9	-	reserved

4.2.1 PROFIBUS-DP specifications

Transmitting medium

Transmitting and physical medium:
RS485; screened, twisted two-wire line

Cable parameter

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

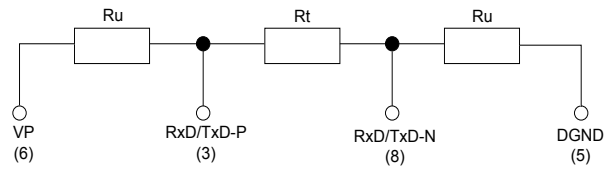
Line length dependent on baud rate:

Radial lines at line A < 0,3 m / B < 6,6 m.
The radial lines are counted to the total length!

Baud rate in kbit/s	at line A in m	at line B in m
9.6	1200	1200
19,2	1200	1200
93,75	1200	1200
187,5	1000	600
500	400	200
1500	200	-
3000		
6000		
12000		

Number of bus nodes: 32 (active, passive nodes and line amplifier).

Bus termination: Must be made at each line at the first and last bus node.



Ru: 390 Ohm	Rt: 220 Ohm (at line A)	Rt: 150 Ohm (at line B)

5. Changeover from F4-PROFIBUS-DP to F5-PROFIBUS-DP interface connection

The important changes for the user of the KEB F5-PROFIBUS-DP interface connection (based on the KEB F4-PROFIBUS-DP interface connection) are summarized here in an overview list.

Added properties of the F5-PROFIBUS-DP interface connection

- Second PROFIBUS-DP connector to forwarding the PROFIBUS-DP bus or plug-on of a terminating resistor.
- Adaptability to the preset configuration of the master.
- Direct set-addressing at inverter parameters via parameterizing channel subindex (see chapter 9).
- Programming and diagnostics via keyboard and display of the PROFIBUS-DP operator.
- Additional diagnostics and programming interface for KEB COMBIVIS (see chapter 10).

Changes

- Changed ident number (see unit main data).
- Changed default process data assignment (see chapter 9.1.1).
- Uniform data length setting possible (see chapter 7.4.3).

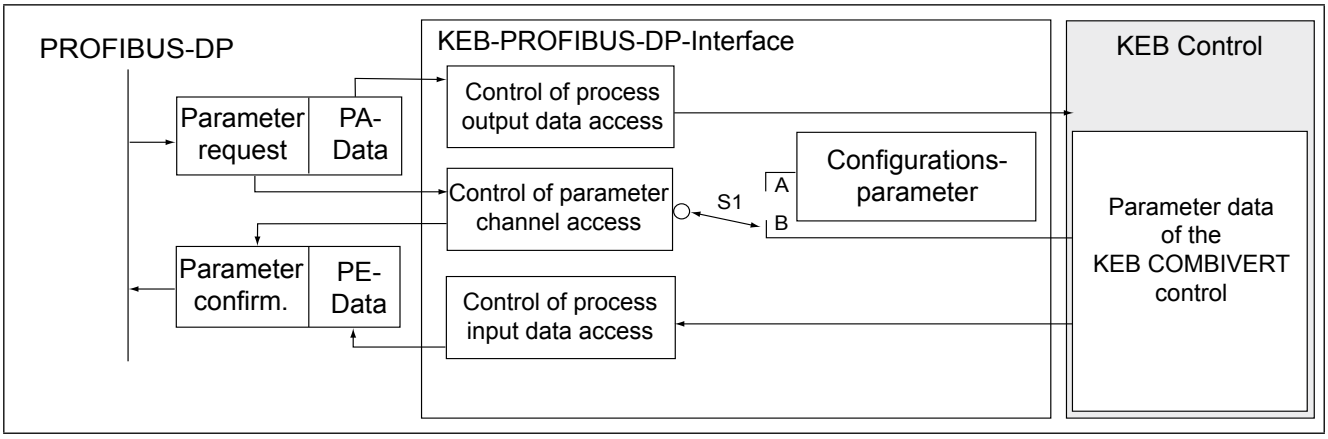
6 Functions

6.1 PROFIBUS-DP services

The PROFIBUS-DP interface connection provides the following services or functions:

Data_Exchange	Transfer of input and output data
RD_Inp	Read inputs of a slave
RD_Outp	Read outputs of a slave
Slave_Diag	Read DP slave diagnostics information
Set_Prm	Transmit parameter data
Chk_Cfg	Check configuration information
Get_Cfg	Read out configuration information
Global_Control	Control command

6.2 Three funktion blocks



6.2.1 Process output data processing

The transmitted (process) output data from the PROFIBUS DP master are written to the FI control at a change. Processing of the output data can be switched on/off via parameter "Enable process output data". Which parameters determines to the process output data is defined by the complex parameter process output data description (Index = 6001h). Coding of this parameter in accordance with DRIVECOM profile (see literature reference in the annex).

6.2.2 Process input data processing

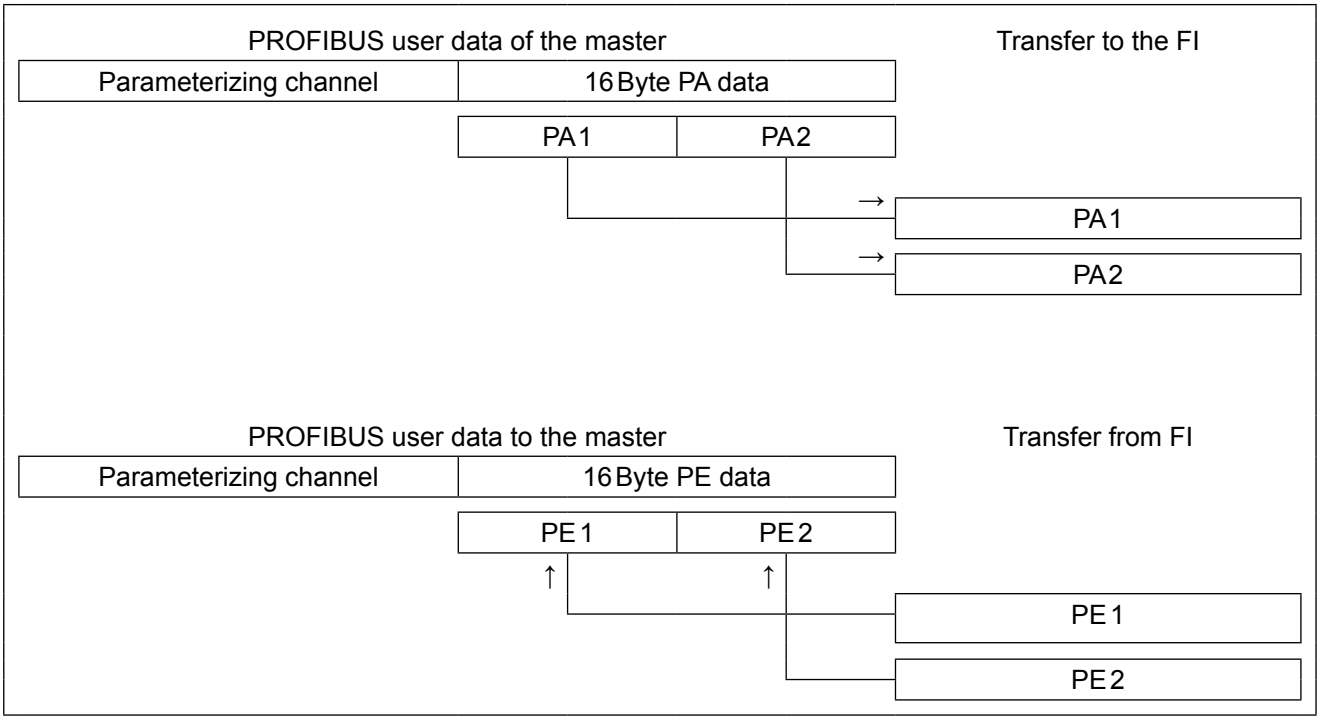
The operator reads cyclically inside the adjustable cycle time (PE_Cycle) the values of the (process) input data from the inverter control and transfers them on PROFIBUS DP to the master. Processing of the input data can be switched on/off via parameter „PE-Enabled“. Which parameters determines to the process input data is defined by the complex parameter process input data description (Index = 6000h). Coding of this parameter in accordance with DRIVECOM profile (see literature reference in the annex).

6.2.3 Parameterizing channel

Any parameters of the FI control and the PROFIBUS DP operator can be read out or changed via the parameterizing channel. If available, the parameterizing channel determines the first 8 bytes of the cyclic telegrams between DP master and PROFIBUS-DP interface connection. The parameterizing channel is more flexible, since the parameter is directly addressed here. However the realization of the parameterizing channel on the cyclic data traffic is also somewhat more complex than the delivery of new process data.

6.3 Process data and their mapping

This chapter describes the difference between process data and parameterizing channel. The process data are only user data. That means they do not contain any addressing. The master preset new setpoints to the KEB COMBIVERT via process output data. In the other data direction the KEB COMBIVERT informs the master about certain actual values by means of process input data. For this the PROFIBUS operator reads cyclically the process input data from the inverter control adjusted by parameter PE_Cycle/PD_In_Cycle. Which parameters concern to the process data is determined by the process data assignment.
The current software of the KEB-F5-PROFIBUS operator allows the mapping of maximum16 byte both for process input data and process output data. Internal communication between operator and FI control supports only the transfer of maximum 8 byte process data into both directions. A second process data channel to the FI control is necessary for mappings with more than 8 byte process data.



- That means in this case the process data are transferred not in one telegram to the FI control, but in two separated telegrams. This causes a division in halves of the maximum transfer rate of the process data.

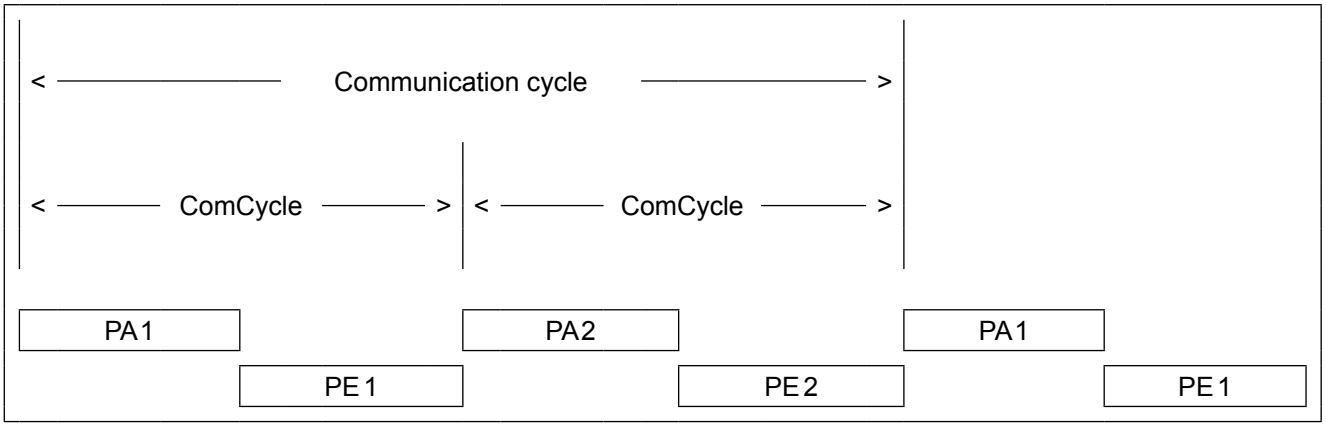
6.4 Configuration of the FI for the default process data assignment

The default process data assignment of the PROFIBUS-DP operator links the parameters control word (Sy.50) and setpoint speed (SY.52) to the process output data and parameters status word (Sy.51) and actual speed (Sy.53) to the process input data. Some parameters in the FI must be configured in order that the FI accept the preset values by the process output data as active setpoints. The following parameters are very important:

Parameter code	Parameter-Name	Default value	Notice
OP.00	reference source	5	
OP.01	rotation source	8	other values are possible
DI.01	select signal source	Bit0 = 1	only the value of bit0 is applicable
DI.02	digital input setting	Bit0 = 1	only the value of bit0 is applicable

6.5 Cyclic communication mode

From software version V1.7 the F5-PBS operator supports the cyclic communication mode. Thereby all communication between operator and FI control is handled via four exact cyclic transmitted telegrams. Thus it is reached that process data are exchanged in a deterministic grid. Each telegram transfers process data of 8 byte maximum, in such a way process data of 16-byte are also supported in the cyclic mode. The smallest achievable communication cycle time thereby is 2ms (SelComCycle = 1000). The following picture shows the sequence as overview:



The cyclic communication mode causes no limitations in the functionality of the F5-PROFIBUS operator. All control elements and functions operate unchanged. Only the processing of all non-process data telegrams is dependent on the adjusted cycle time (ComCycle). That may lead (e.g.) to a deceleration of the processing speed to the diagnostic interface at high values of ComCycle.
The value of SelComCycle should be adjusted to 1000 or 2000 if no special circumstances are against it.
The cyclic communication mode can only be activated, if the connected FI control supports the HSP5 services 54 and 55 for writing (see parameter description ‚FU_HSP5Supp7').

7 PROFIBUS-DP Basic Data

The PROFIBUS-DP interface connection realizes a passive participant (slave). This means the PROFIBUS-DP interface connection only transmits if it has been requested by the master.

The PROFIBUS-DP protocol defines different operating conditions, which must be pass through at first, before the actual user data can be exchanged. First the appropriate DP master must parameterize the slaves and afterwards it must configure them. The cyclic exchange of user data starts if these two functions are successfully executed.

Both parameterizing channel and process data only become active if the cyclic user data transfer is running.

7.1 Parameterizing

The DP master must transmit 7 byte parameter data to the PROFIBUS-DP interface connection for a successful parameterizing of it. According to the standard they have the following structure:

B7	: 00h (KEB)	=	Group Ident
B6 B5	: EBh : 05h	=	Ident_Number
B4		=	Min_Tsdr
B3		=	Watchdog_Factor_1
B2		=	Watchdog_Factor_2
B 1		=	Station-Status

Station-Status		
B7	=	Lock_Req
B6	=	Unlock_Req
B5	=	Sync_Req
B4	=	Freeze_Req
B3	=	WD_On (1 = activated)
B2	=	reserved
B 1	=	reserved
B0	=	reserved

The response monitoring is activated or deactivated via Bit 3 of the station status (see above). The watchdog time is defined as follows:

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

An activated response monitoring causes in error case (no receipt of a telegram within TWD) that the process output data are set to zero.

7.2 Configuration

Finally the PROFIBUS DP master sends the configuration to the slave. The cyclic user data transfer is started if the slave accepts this configuration. The configuration consists of one or more configuration or identification bytes. Such a byte is assigned at least for each available module. Referring to this the DP interface connection consists of three modules (functions):

→ the parameterizing channel

→ the process output data

→ the process input data

General coding of the configuration bytes or identification bytes according to PROFIBUS DP standard is as follows:

		Integrity over:	
B7	=	0	: Byte/word
		1	: total length
		Data format:	
B6	=	0	: Byte (8 bit)
		1	: Word (16 bit)
		Input/output:	
B5 B4	=	00	: Special format
		01	: Input
		10	: Output
		11	: Input and output
B3 B2 B1 B0	=	**Dlen-1**	

The standard configuration of a PROFIBUS DP slave contains 3 configuration bytes:

B7h	=	8 Byte parameterizing channel
A3h	=	4 Byte process output data
93h	=	4 Byte process input data

7.2.1 Flexible PROFIBUS configuration

The preset PROFIBUS DP configuration by the master is handled very flexible in the current software. Thus it is possible to divide the process data to several modules. One module can be defined maximally for each process data word (16-bit), so 17 modules (parameterizing channel (1)+process output data (8)+process input data (8)) can be configured maximally by the PROFIBUS master.
This is helpful e.g., if the process data for a slave on a master SPS are not in a consecutive memory range, but allocated in such way that the limited memory can be used optimally. This is described in the following with an example of default configuration (parameterizing channel + 4-byte PA data + 4-byte PE data):

a) Default configuration with 3 modules in byte structure:

8-byte parameterizing channel	4-byte process output data	4-byte process input data
Cfg1	Cfg2	Cfg3
B7h	A3h	93h

b) Default configuration with division of the process output data to 2 modules in byte structure:

8-byte parameterizing channel	4-byte process output data		4-byte process input data
Cfg1	Cfg2	Cfg3	Cfg4
B7h	A1h	A1h	93h

c) Default configuration with division of the process output and input data to 2 modules in byte structure:

8-byte parameterizing channel	4-byte process output data		4-byte process input data	
Cfg1	Cfg2	Cfg3	Cfg4	Cfg5
B7h	A1h	A1h	91h	91h

d) Default configuration with division of the process output and input data to 2 modules in word structure:

8-byte parameterizing channel	2-words process output data		2-words process input data	
Cfg1	Cfg2	Cfg3	Cfg4	Cfg5
B7h	E0h	E0h	D0h	D0h

In spite of all flexibility the following regulations for the PROFIBUS DP configuration must be considered:

- If available, the parameterizing channel module must be activated with the first configuration byte and value "B7h".
- One configuration byte decsribes minimum one 16-bit word.

7.3 PROFIBUS-DP diagnostic data

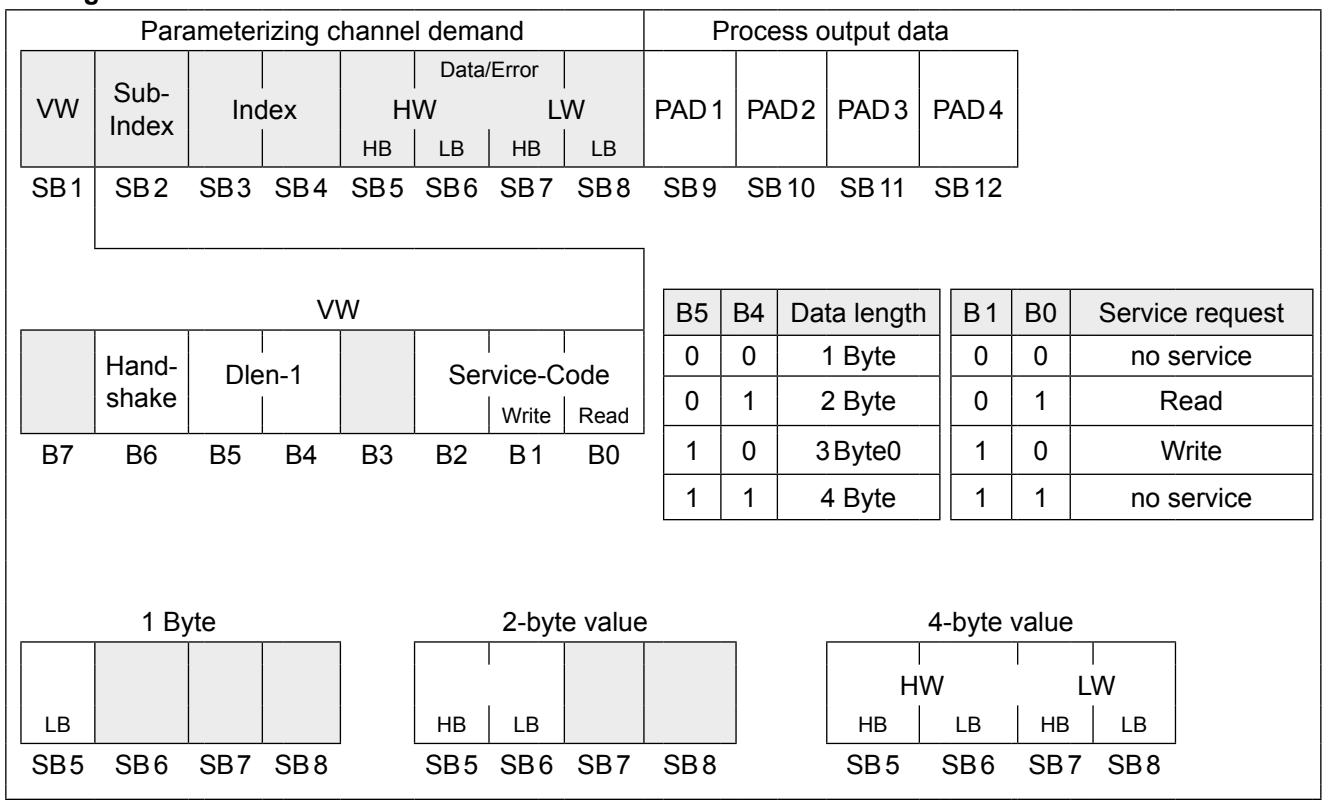
On request of the diagnostics data by a PROFIBUS-DP master the KEB PROFIBUS-DP responds with 6 byte diagnostics data (no user diagnostics), which are designed according to the draft standard DIN19245 part 3 as follows:

B6 B5	: EBh : 05h	=	Ident number
B4		=	Node address of the master, which has parameterized the slave
B3		=	Station status_3, bit-coded according to draft standard
B2		=	Station status_2, bit-coded according to draft standard
B1		=	Station status_1, bit-coded according to draft standard

7.4 User data of the KEB PROFIBUS-DP interface connection

Each user data telegram from DP master to KEB DP node has a user data length **of** 12 byte at default setting. All user data telegrams from KEB DP node to DP master have the same user data length.

7.4.1 Coding of the user data from DP master to KEB DP interface connection



B5	B4	Data length
0	0	1 Byte
0	1	2 Byte
1	0	3 Byte0
1	1	4 Byte

B1	B0	Service request
0	0	no service
0	1	Read
1	0	Write
1	1	no service

This means

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

The first 8 byte **contain the** parameterizing channel request**. Request means, the DP master can inform the DP slave in this part of the telegram whether it wants to change** (write) or scan (read) the value of a parameter.

The addressing of the parameter is done via 16-bit **index** and 8-bit **subindex**. The **data length of the parameters**, which can be responded via this parameter channel, **is limited to 4** byte.

Limitations
Some complex parameters cannot be read/written only with one parameterizing order via the KEB PROFIBUS-DP interface connection. The user must access each part of this parameter/object separately (via subindex).

The first byte of the parameterizing channel request is a matter of special importance (see chapter 7.4.1). The parameterizing orders are carry out with this administration byte. This additional work is necessary, that the parameterizing orders can be treated detached from the cyclic exchange of the PROFIBUS-DP user data. The administration byte contains one handshake-bit. This bit must be inverted by the DP master each time if it wants to send a new parameterizing channel request.
Bit 4 and 5 of the administration byte indicates the data length. Bits b 0 and b 1 contain the service coding. If the DP master wants to inquire (read) the parameter value of a KEB DP node, bit b 0 must be 1 and bit b 1 = 0 .
Otherwise set 0 = 0 and bit b 1 = 1, if the value of a parameter shall be changed (write).

Index and subindex must be set for addressing of the parameter. In case of a write request the data length and the data must be entered additionally as described above.

The second part of the user data telegram includes the (process) **output data**. These data are non-addressed, i.e. they do not contain a parameter address, but only data. Where these data are mapped was already described in the chapter of the function of the KEB PROFIBUS-DP interface connection.

Observe!
Process output data are only transferred to the KEB COMBIVERT if these values have changed!

7.4.2 Coding of user data from the KEB DP interface connection to the master

Parameterizing channel confirmation								Process input data			
VW	Sub-Index	Index		HW (Data/Error)		LW		PED 1	PED 2	PED 3	PED 4
				HB	LB	HB	LB				
EB 1	EB 2	EB 3	EB 4	EB 5	EB 6	EB 7	EB 8	EB 9	EB 10	EB 11	EB 12

VW							
Re-sult	Hand-shake	Dlen-1		Service-Code			
						Write	Read
B7	B6	B5	B4	B3	B2	B 1	B0

B5	B4	Data length
0	0	1 Byte
0	1	2 Byte
1	0	3 Byte0
1	1	4 Byte

B 1	B0	Service request
0	0	no service
0	1	Read
1	0	Write
1	1	no service

B7 = 0 → No Error

B7 = 1 → Error

The first **8 byte** contain the parameterizing channel confirmation. That means, the DP master is informed whether his requested order could be executed error-free or not.

The first byte (administrative byte) has also a special meaning here. Bit b 6 (handshake) indicates whether the execution of the requested order is executed. The order is executed and the confirmation can be evaluated, if bit b 6 has the same value than the request. Bit b 7 indicates whether the requested order could be executed error free (b 7 = 0) or if an error occurs (b 7 = 1). The data/error field (byte EB 5 to EB 8) is to be interpreted as error description in error case. The error divides in error class (EB 5), error code (EB 6) and additional code (EB 7,EB 8). The meaning of the individual error codes are specified in the annex. The data/error field contains the read out data, if no error occurs and the DP master has requested the reading of a parameter value.

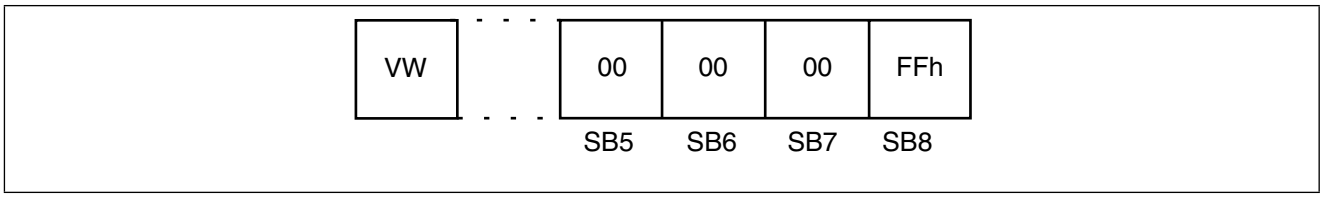
Notice
In case of a write request the written data from the request are also transferred to the confirmation if no error occurs. In this case the DP master can read back the written data for compare.

The second part of the telegram contains the (process) input data. These data are first determined and then the data are entered in the PROFIBUS DP telegram. The input data are read cyclically with an adjustable cycle time. The mapping of the process input data can be taken from chapter 6.2.2 via the function of the KEB PROFIBUS-DP interface connection.

7.4.3 Note for the use of the data length of the parameters

Parameters in the KEB F5 frequency inverter as well as the parameters in the PROFIBUS-DP interface connection offer an effective data lengths of 1 to 4 byte. It is possible to write each parameter with a data length of 4-byte in order to allow the user an easy access to the parameters. That means the user must not pay attention to the data length of the parameter and uses each parameter as 4-byte parameter. The data field of the parameterizing channel must be filled always as a 4-byte parameter.

In the example the setting of a 1-byte parameter with value = 255d is presented as 4-byte parameter:

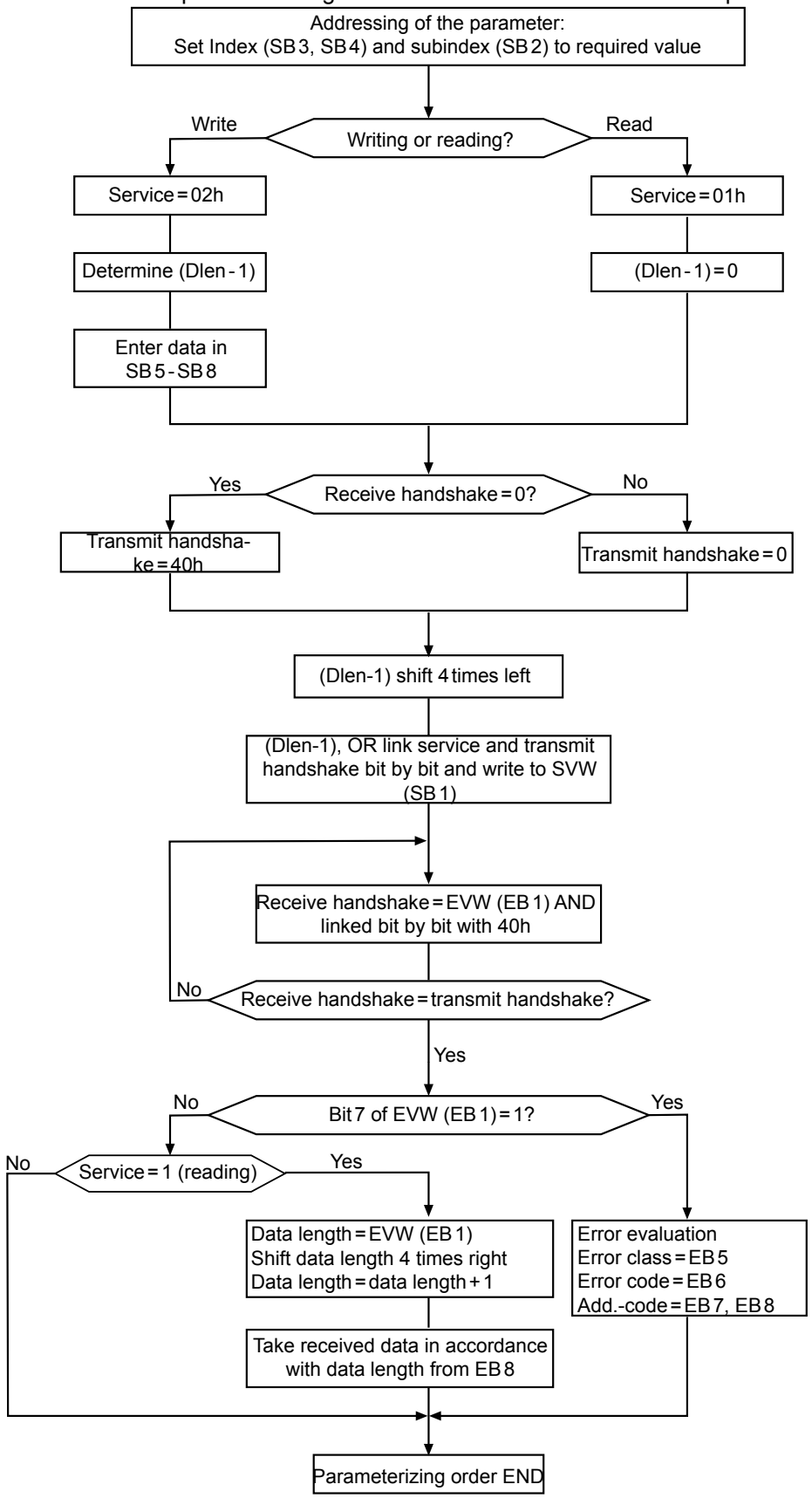


All parameters are returned with data length = 4 for the reason of standardization during the reading via parameterizing channel.

IMPORTANT
During writing access to the parameters can still be done with the effective data length. Parameter PE_Enabled (e.g.) can be written furthermore with a data length = 1. Therefore existing applications do not have to make changes during writing. However it must be considered during reading of the parameters that all parameters returned with the data length = 4.

7.5 Realization of the parameterizing channel protocol at the master

The following flow chart shall describe the necessary procedure, which must be supported by a PROFIBUS-DP master in order to use the parameterizing channel of the KEB PROFIBUS-DP operator.



7.5.1 Examples for a telegram sequence of the parameterizing channel

Possible telegram contents are exemplary illustrated in the following for further clarification of parameterizing channel orders. Three successive parameterizing orders are listed. Only the user data of the parameterizing channel in the telegrams are presented here, not the complete PROFIBUS DP telegrams. The first column contains a telegram identification. 'S' with following digit means 'transmit telegram from the master' 'E' means 'receive telegram from the master'. The examples show that one parameterizing order can require different various telegrams. This is caused by the PROFIBUS-DP protocol and the different duration for the execution of a parameterizing channel service in the KEB PROFIBUS-DP connection. The following parameterizing orders are described in the examples:

Example 1:

- Request from the master: write (Index=2300h, subindex=0, Dlen=2, value=000Bhex/0011dec)
- Confirmation from the slave: error (error-class=8, error-code=0, add-code=0030h)

E0	:	**00h (KEB)**	00h (KEB)	00h (KEB)	00h (KEB)	00h (KEB)	00h (KEB)	00h (KEB)	00h (KEB)
		B 1	B2	B3	B4	B5	B6	B7	B8
S 1	:	**52h**	00h (KEB)	23h	00h (KEB)	00h (KEB)	0Bh	00h (KEB)	00h (KEB)
E 1	:	**00h (KEB)**	00h (KEB)	00h (KEB)	00h (KEB)	00h (KEB)	00h (KEB)	00h (KEB)	00h (KEB)
s2	:	**52h**	00h (KEB)	23h	00h (KEB)	00h (KEB)	0Bh	00h (KEB)	00h (KEB)
E 2	:	**00h (KEB)**	00h (KEB)	00h (KEB)	00h (KEB)	00h (KEB)	00h (KEB)	00h (KEB)	00h (KEB)
s3	:	**52h**	00h (KEB)	23h	00h (KEB)	00h (KEB)	0Bh	00h (KEB)	00h (KEB)
E 3	:	**C2h**	00h (KEB)	23h	00h (KEB)	08h	00h (KEB)	00h (KEB)	30h

S1 contains the first request from the master. The handshake-bit must be set in this telegram, since the current handshake of the slaves (see E0) = 0.
The confirmation to this request comes with E 3. This is to recognize at the handshake bit because it has the same value as the request. Furthermore bit 7 is set in the first byte. This characterizes an error response. Bytes B 5 to B 8 can be considered as errors in this case (see above). The error at this place (8, 0, 0030h) means that the value is invalid and therefore it is not transferred.

Example 2:

- Request from the master: write (Index=2300h, subindex=0, Dlen=2, value=0003 hex/0003 dec)
- Confirmation from the slave: OK.

s4	:	**12h**	00h (KEB)	23h	00h (KEB)	00h (KEB)	03h	00h (KEB)	00h (KEB)
E 4	:	**C2h**	00h (KEB)	23h	00h (KEB)	08h	00h (KEB)	00h (KEB)	00h (KEB)
s5	:	**12h**	00h (KEB)	23h	00h (KEB)	00h (KEB)	03h	00h (KEB)	00h (KEB)
E 5	:	**02h**	00h (KEB)	23h	00h (KEB)	00h (KEB)	03h	00h (KEB)	00h (KEB)

The request from the master with handshake-bit = 0 comes first in S4.
The confirmation from the slave comes first in E 5. Bit 7 is not set here → no error.

Example 3:

- Request from the master: read (Index=2200h, subindex=0)
- Confirmation from the KEB slave: OK (Index=2200h, subindex=0, Dlen=4, data=0046 hex / 0070dec)

s6	:	**41h**	00h (KEB)	22h	00h (KEB)	00h (KEB)	03h	00h (KEB)	00h (KEB)
E6	:	**02h**	00h (KEB)	23h	00h (KEB)	00h (KEB)	00h (KEB)	00h (KEB)	00h (KEB)
s7	:	**41h**	00h (KEB)	22h	00h (KEB)	00h (KEB)	03h	00h (KEB)	00h (KEB)
E7	:	**71h**	00h (KEB)	22h	00h (KEB)	00h (KEB)	00h (KEB)	00h (KEB)	46h

The request from the master (for the first time) with handshake-bit = 1 is being in S6.
The confirmation from the slave comes first in E7.
Bytes B5 to B8 must be interpreted as value in accordance with the data length in bit 1 because it concerns to a read service. Dlen = 4, value = 0046h/70d.

Observe at the KEB-F5 PROFIBUS-DP interface connection that all parameters during reading are returned as 4-byte parameter!

8. PROFIBUS-DP Operating Parameters

8.1 Node address

The PROFIBUS-DP node address corresponds to the value of the parameter inverter address (SY.06). The default address of all inverters is 1. SY.06 can be changed via operator keyboard if this address must be changed.

8.2 Transmission rate

The PROFIBUS-DP transmission speed is recognized automatically. The possible bit rates and the appropriate maximum response delay times can be taken from the following table:

Bit rate in KBit/s	max. TSDR in bit times
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-DP interface connection is characterized by the parameters on the application level. These parameters are divided in three groups. The classification is preset by the DRIVECOM profile. This prescribes, manufacturer-specific parameters must be inside the index range 2000h...5FFFh. KEB divides this range once more in:

- Parameter of the FI control (Index range 2000h...5EFFh).
  The following applies to the parameter addressing:
  Index = parameter address + 2000h (parameter address of the application manual of the FI control). The subindex can be used here as direct setting of the set, if a value not equal to zero is indicated as subindex. In this case the value determines bit-coded the addressed set/sets:

B7	=	set 7
B6	=	set 6
B5	=	set 5
B4	=	set 4
B3	=	set 3
B2	=	set 2
B 1	=	set 1
B0	=	set 0

The following must be considered for the simultaneous addressing of several sets :

- The value of the parameters is changed in all addressed sets during writing.
- The value of the parameter is only returned during reading if the value is equal in all addressed sets. An error message is returned, if the values are unequal.

If subindex = 0 is preset, then access to the parameter that is defined by the value of the set indicator (Fr.09) is done.

- Configuration parameters of the PROFIBUS-DP interface connection (Index range 5F00h...5FFFh).
- Parameters with preset coding by DRIVECOM profile are in index range upto 6000h.

9.1 Configuration Parameters

This parameters define the configuration of the KEB PROFIBUS-DP interface connection and therefore they are realized there. That means a parameterizing order to such a parameter is directly procecced in the PROFIBUS-DP interface connection and it is not transmitted to the frequency inverter control. This parameters can not be mapped to process data.

FBS Command

Index	**5FD9h**
Subindex	0
Object type	single variable
Data length	2 Byte
Meaning	Serves for execution of certain commands in the PROFIBUS operator.
Coding	0 : no command. 1 : Write default values of all non-volatile stored operator parameters into the non-volatile memory.
Default setting	0 : no command.
Notice	For confirmation that the operator has executed the command the operator sets bit 15 of the value finally to 1.

PD_In2_Enable

Index	**5FF6h**
Subindex	0
Object type	single variable
Data length	1 Byte
Meaning	activates/deactivates the second part of PE data, if configurated. This parameter is compatible to parameters PE_Enabled / PD_In_Enable.
Coding	Bit coded: Bit 0 = 1 Byte 9 of PE data is activated. ⋮ ⋮ ⋮ Bit 7 = 1 Byte 16 of PE data is activated.
Default setting	0 (not active)
Notice	A new parameter value will be immediately active and stored non-volatile.

PD_Out2_Enable

Index	**5FF5h**
Subindex	0
Object type	single variable
Data length	1 Byte
Meaning	activates/deactivates the second part of PA data, if configurated. This parameter is compatible to parameter enable process output data / PD_Out_Enable.
Coding	Bit coded: Bit0 = 1 Byte9 of PA data is activated. ⋮ ⋮ ⋮ Bit7 = 1 Byte16 of PA data is activated.
Default setting	0 (not active)
Notice	A new parameter value will be immediately active and stored non-volatile.

PDOUT TakeMode

Index	**5FD8h**
Subindex	0
Object type	single variable
Data length	1 Byte
Meaning	Determines the PDOUT data transfer of the operator. With this parameter it can be prevented e.g.that on responding of the PROFIBUS monitoring the preset PDOUT values (all values = 0) are transferred to the FI control.
Coding	0 : The PDOUT data are transferred independently on the condition of the PROFIBUS Asic. This adjustment corresponds to the previous behaviour of the operator without this new parameter. 240 : PDOUT data are not transferred if all bytes have the value = 0. The actual state of the PROFIBUS Asic remains unconsidered during this adjustment. 241 : PDOUT data are not transferred if all bytes have the value = 0 or the PROFIBUS-Asic is not in ‚DataExchange' state. other values : PDOUT data from PROFIBUS are only transferred in status ‚DataExchange' of PROFIBUS-Asic.
Default setting	0
Notice	A new parameter value will be immediately active and stored non-volatile.

PD_Stored

Index	**5FE2h**
Subindex	0
Object type	single variable
Data length	1 Byte
Meaning	Determines whether the actual process data assignment is read from the EEPROM or processed with the standard PD-assignment.
Coding	FFh → works with the saved PD-assignment other-wise → works with the Standard-PD-assignment.
Default setting	FFh
Notice	A changed value will be immediately active and stored non-volatile.

PE_Cycle/ PD_In_Cycle

Index	**5FFAh**
Subindex	0
Data length	2 Byte
Meaning	Indicates the cycle time in ms when the process input data are read from the FI control.
Coding	1 ms
Default setting	25 ms
Notice	A changed value takes effect immediately and is stored non-volatile.

PE_Enabled/
PD_In_Enabled

Index	**5FF8h**
Subindex	0
Data length	1 Byte
Meaning	Indicates bit-coded which process input data bytes are activated.
	B7 = 1 Byte 8 is activated
	B6 = 1 Byte 7 is activated
	B5 = 1 Byte 6 is activated
	B4 = 1 Byte 5 is activated
	B3 = 1 Byte 4 is activated
	B2 = 1 Byte 3 is activated
	B 1 = 1 Byte 2 is activated
	B0 = 1 Byte 1 is activated
Default setting	0Fh (Bytes 1 to 4 activated)
Notice	The actual process input data description is transferred to the FI control when activating the process input data. If the FI control refuses the assignment, an error code is returned to PROFIBUS-DP and the processing remains switched off.

SW_Date

Index	**5FF1h**
Subindex	0
Data length	2 Byte
Meaning	Indicates the software date of the PROFIBUS-DP interface connection.
Coding	The last decimal place indicates the year 2000, the next two upper decimal places indicate the month and the most significant(n) decimal place(n) indicates the day. Example: 31011 → 31.01.2001
Default setting	depending on date
Notice	This parameter is Read_Only.

SW_Version

Index	**5FF0h**
Subindex	0
Data length	2 Byte
Meaning	Indicates the software version of the PROFIBUS-DP interface connection.
Coding	0.1
Default setting	depending on version
Notice	This parameter is Read_Only.

ValueSwapping

Index	**5FF4h**
Subindex	0
Object type	single variable
Data length	1 Byte
Meaning	Serves for adaption of systems, store the data in intel format (low byte first). With this parameter the 16 bit and 32 bit data can be changed byte by byte in this sequence. The change can be programmed separately for process data and parameterizing channel.
Coding	Bit coded: Bit 0 = 1 Change all 16 bit and 32 bit values in process data Bit 1 = 1 Change index (16 bit), value (32 bit) in the parameterizing channel Bit 2-7 reserved
Default setting	0 (no data change)
Notice	A new parameter value is immediately stored non-volatile, but becomes active only after the next switch on.

Watchdog activation

Index	**5FDAh**
Subindex	0
Object type	single variable
Data length	1 Byte
Meaning	Defines the activation of the fieldbus watchdog. This parameter must be observed always together with parameter "watchdog inhibit`. Up to now the fieldbus watchdog was immediately active after switching on. Now this can be done specific after occurance of certain events. Several events can be used as watchdog-activation by the bit-coding of this parameter.
Coding	0 : Fieldbus watchdog immediately active after power on. Bit 0 = 1 Fieldbus watchdog active after first writing of PDOUT data to FI control. Bit 1 = 1 Fieldbus watchdog active after first parameterizing channel order.
Default setting	0 : Fieldbus watchdog immediately active after power on.
Notice	A new parameter value will be immediately active and stored non-volatile.

Watchdog inhibit

Index	**5FF9h**
Subindex	0
Object type	single variable
Data length	1 Byte
Meaning	Defines upon which events the Fieldbus-Watchdog is triggered. The fieldbus watchdog is used to set the frequency inverter into the error state, if no more activities take place on PROFIBUS. The real activation and programming of Watchdog is adjusted in the FI-control. Take the parameters to be adjusted from 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 The watchdog is reset at the beginning of the processing of a parameterizing channel order. Bit 2 = 1 The watchdog is reset if the slave is in user data transfer.
Default setting	07h The Watchdog is always reset, if: - the process output data are written to the FI control - a parameterizing channel order is started - the slave is in user data transfer
Notice	A changed value will be immediately active and stored non-volatile.

HSP5CommMode

Index	**2196h**
Subindex	0
Object type	single variable
COMBIVIS address	0196h
Data length	1 Byte
Meaning	Indicates the active communication mode between operator and FI control.
Coding	Bit-coded, only bit 2 interesting for this parameter Bit 2 = 0 Normal communication mode active (standard) Bit 2 = 1 Cyclic communication mode active
Notice	This parameter is Read_Only

FU_HSP5Supp7

Index	**2197h**
Subindex	0
Object type	single variable
COMBIVIS address	0197h
Data length	2 Byte
Meaning	Indicates, which of the HSP5 services 48-63 supports the connected FI control for writing. This parameter is only an information parameter, which can be important if the operator cannot be set in the cyclic communication mode. The operator can only change in the cyclic communication mode, if the connected FI control supports the services 54 and 55 for writing.
Coding	bit-coded
	Bit 0 = 1 Service 48 is supported for writing
	Bit 1 = 1 Service 49 is supported for writing
	: = 1
	Bit 6 = 1 Service 54 is supported for writing
	Bit 7 = 1 Service 55 is supported for writing
Default setting	dependent on connected FI control
Notice	This parameter is Read_Only

SelComCycle

Index	**2198h**
Subindex	0
Object type	single variable
COMBIVIS address	0198h
Data length	4 Byte
Meaning	Presets the requested telegram cycle time in the cyclic communication mode. Since in cyclic mode always two different telegrams are transferred per cycle, the real cycle time for process data exchange is 2 * SelComCycle. Observe that the adjusted cycle time has direct influence on the processing of all non--process data communication services.
Coding	0: no cyclic communication mode
	Otherwise: 1 µs (only multiple of 1000 = 1ms are valid)
Default setting	0
Notice	A new parameter value will be immediately active and stored non-volatile.

ComCycle

Index	**2199h**
Subindex	0
Object type	single variable
COMBIVIS address	0199h
Data length	4 Byte
Meaning	Displays the actual telegram cycle time in the cyclic communication mode. If SelComCycle > 0 , but ComCycle remains unchanged = 0, this may have the following reasons: • The connected FI control does not support this mode (see FI_HSP5Supp7). • The PROFIBUS operator is not in user data transfer.
Coding	0: no cyclic communication mode
	Otherwise: 1 µs
Default setting	0
Notice	This parameter is Read_Only.

9.1.1 DRIVECOM profile parameters in the index range upto 6000h

This index range contains parameters, whose coding adheres to the DRIVECOM profile. The parameters for the assignment of the process data are very complex and not easy-to-understand at first reading. Therefore a small introduction is given here to these parameters.

The KEB PROFIBUS-DP has two of these parameters, one for each process data direction. The whole object process data description is divided in several part objects, which can be addressed via subindex.

The process data length in byte is find on subindex = 1. Then the process data mappings are following. These mappings describe the assignment of a specific process data byte and they always consist of a 16-bit parameter index and a 8-bit subindex. Value zero indictes that this process data byte still belongs to the previous assignment:

Process input data description

Index	**6000h**		
Notice	Processing of the process input data is automatically switched off at write accesses to index 6000h (PE_Enabled = 0).		
Coding	Sub index in hex	Data length in byte	Description
	1	1	Indicates how many bytes are assigned by the process input data.
	2	2	Index of the parameter, which is mapped in the first word of the process data.
	3	1	Indicates the set (sets) where parameter (subindex 2) is changed in the FI .
	4	2	0 (unchangeable)
	5	1	0 (unchangeable)
	6	2	Index of the parameter, which is mapped in the second word of the process data.
	7	1	Indicates the set (sets) where parameter (subindex 6) is changed in the FI.
	8	2	0 (unchangeable)
	9	1	0 (unchangeable)
	A	2	Index of the parameter, which is mapped in the third word of the process data.
	B	1	Indicates the set (sets) where parameter (subindex A) is changed in the FI.
	C	2	0 (unchangeable)
	D	1	0 (unchangeable)
	E	2	Index of the parameter, which is mapped in the fourth word of the process data.
	F	1	Indicates the set (sets) where parameter (subindex E) is changed in the FI.
	10	2	0 (unchangeable)
	11	1	0 (unchangeable)

Example 1: Standard assignment of the process input data

Index	Subindex	Value	Notice	
6000h	1	4	4 Byte process input data	
6000h	2	**2033hex**	**Status Word**	1. Word
6000h	3	1	read values of set 0	
6000h	4	0		
6000h	5	0		
6000h	6	**2035hex**	**actual speed**	2. Word
6000h	7	1	read values of set 0	
6000h	8	0		
6000h	9	0		

Example 2: 8. Byte assignment of the process input data with 32 bit values

Index	Subindex	Value	Notice
6000h	1	8	8 Byte process input data
6000h	2	**233B**	**OP.59 Motorpoti ramp time**
6000h	3	1	Values of 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	Values of set 0
6000h	C	0	High Word
6000h	D	0	
6000h	E	0	
6000h	F	0	
6000h	10	0	Low Word
6000h	11	0	

Process output data description

Index	**6001h**			
Notice	Processing of the process output data is automatically switched off at write accesses to index 6001h (PE_Enabled = 0).			
Coding	Sub index in hex	Data length in byte	Description	
	1	1	Indicates how many bytes are assigned by the process input data.	
	2	2	Index of the parameter, which is mapped in the first word of the process data.	
	3	1	Indicates the set (sets) where parameter (subindex 2) is changed in the FI .	
	4	2	0 (unchangeable)	
	5	1	0 (unchangeable)	
	6	2	Index of the parameter, which is mapped in the second word of the process data.	
	7	1	Indicates the set (sets) where parameter (subindex 6) is changed in the FI.	
	8	2	0 (unchangeable)	
	9	1	0 (unchangeable)	
	A	2	Index of the parameter, which is mapped in the third word of the process data.	
	B	1	Indicates the set (sets) where parameter (subindex A) is changed in the FI.	
	C	2	0 (unchangeable)	
	D	1	0 (unchangeable)	
	E	2	Index of the parameter, which is mapped in the fourth word of the process data.	
	F	1	Indicates the set (sets) where parameter (subindex E) is changed in the FI.	
	10	2	0 (unchangeable)	
	11	1	0 (unchangeable)	

Example 1: Standard assignment of the process output data

Index	Subindex	Value	Notice	
6001h	1	4	4 Byte process output data	
6001h	2	**2032hex**	**Control Word**	1. Word
6001h	3	1	written values in set 0	
6001h	4	0		
6001h	5	0		
6001h	6	**2034hex**	**Setpoint speed**	2. Word
6001h	7	1	written values of set 0	
6001h	8	0		
6001h	9	0		

Enable process output data / PD_ Out_Enable

Index	**6002h**
Subindex	0
Data length	1 Byte
Meaning	Indicates bit-coded which process output data bytes are activated.
Coding	B7 = 1 Byte 8 is activated B6 = 1 Byte 7 is activated B5 = 1 Byte 6 is activated B4 = 1 Byte 5 is activated B3 = 1 Byte 4 is activated B2 = 1 Byte 3 is activated B 1 = 1 Byte 2 is activated B0 = 1 Byte 1 is activated
Default setting	0Fh (Bytes 1 to 4 activated)
Notice	The actual process output data description is transferred to the FI control when activating the process output data. If the FI control refuses the assignment, an error code is returned to PROFIBUS-DP and the processing remains switched off.

10. Access to Operator Parameters

10.1 Access via keyboard/display

Access to operator parameters is also possible via keyboard/display. The input of a special password in parameter ud.01 is necessary in order to change the keyboard/display to operator parameters. The value of this password is 666 (dez). However this password level is not stored. I.e. the last stored password level is valid again after the next switching off/on. The changeover from keyboard/ display to inverter parameters is done by input of the corresponding value in os.01:

Changeover from keyboard/display to operator parameters by ud.01 = 666 (dez)

Changeover from keyboard/display to inverter parameters by:

- switch off/-on
- input of os.01 = required password value (e.g. 440 (dez)) for „Application“

10.2 Access via diagnostic interface

Parameters, which are administrated by the operator, are called operator parameter. Some of these parameters are pure diagnostics parameters and for the user in normal case without interest.
Other parameters are mirrored fieldbus parameters, which are programmed via fieldbus in normal case. However they can be preset also via diagnostic interface for start-up or test purposes.
The appearance of the operator parameters in COMBIVIS has easily changed caused by the internal changeover of the operator parameters. The "operator parameters" are listed on the same level with the "inverter parameters" in the left part of the explorer window. Furthermore it is possible that both inverter parameters and operator parameters can be preconfigured with the same downloadlist. It is also possible to divide the operator parameters to more than only one parameter group. Each available inverter parameter group can enter max.127 operator parameters in the address range starting from XX80h. "XX` defines the parameter group number, which determines the HIGH byte of the parameter address at KEB.
Operator parameters in COMBIVIS are additionally achievable via the main menu "view" → „Operator parameters" for downward compatibility reasons. New applications should only use new addresses, because all new added operator parameters are only available at these new addresses.
The following list defines operator parameters which are interesting for the user. All visible parameters in COMBIVIS are only available for diagnostic purposes and may not not be changed.

Operator type (OS.00)

Parameter address	s. Table in the annex
Data length	2 Byte
Meaning	Specifies the data type according to internal KEB coding. The value is displayed as plaintext in the corresponding view through the COMBIVIS plaintext defintion. e.g. ‚PBS+Diag V1.6‘.
Coding	KEB internal
Notice	This parameter has the same function like the available parameter "DATE Mmm DD YYYY type" before, but it has a different coding.

Diag Response delay time (OS.04)

Parameter address	s. Table in the annex
Data length	1 Byte
Meaning	Specifies the minimum response delay time of the diagnostic interface.
Coding	1 ms
Default setting	0

Diag Baud rate (OS.05)

Parameter address	s. Table in the annex
Data length	1 Byte
Meaning	Specifies the actual transmission speed of the diagnostic interface.
Coding	0 : 1200 Bit/s 1 : 2400 Bit/s 2 : 4800 Bit/s 3 : 9600 Bit/s 4 : 19200 Bit/s 5 : 38400 Bit/s 6 : 55500 Bit/s (ATTENTION: no default PC bit rate!!!)
Default setting	s. SY.07
Notice	This parameter is only readable. Setting of the diagnostic baud rate can be done indirectly via inverter parameter SY.07.

HSP5 Max InvBusy retries (0S.06)

Parameter address	s. Table in the annex
Data length	1 Byte
Meaning	This is a parameter of the HSP5 state machine. Any communication between operator and inverter control runs via this machine. This parameter can induce the HSP5 state machine to repeat automatically a service if the inverter responds with the error message "InverterBusy". If this error is still present after several repetitions it is transmitted to the call-up software module.
Coding	1
Default setting	0

HSP5 Tout count (OS.07)

Parameter address	s. Table in the annex
Data length	2 Byte
Meaning	Counts the timeouts at communication to the inverter control.
Coding	1
Default setting	0

PD_In_Length (Fb.00)

Parameter address	s. Table in the annex
Data length	1 Byte
Meaning	This parameter corresponds to the PROFIBUS parameter process input data length (Index = 6000h, subindex = 1).

PD_Inx_Index (with x = 1...8)

Parameter address	s. Table in the annex
Data length	2 Byte
Meaning	This parameter corresponds to the PROFIBUS parameter with the index = 6000h, subindex = X*2.

PD_Inx_Set (with x = 1...8)

Parameter address	s. Table in the annex
Data length	1 Byte
Meaning	This parameter corresponds to the PROFIBUS parameter with the index = 6000h, subindex = (X*2)+1.

PD_In_Enable

Parameter address	s. Table in the annex
Data length	1 Byte
Meaning	This parameter corresponds to the PROFIBUS parameter with the index = 5FF8h, subindex = 0

PD_In2_Enable

Parameter address	s. Table in the annex
Data length	1 Byte
Meaning	This parameter corresponds to the PROFIBUS parameter with the index = 5FF6h, subindex = 0

PD_In_Cycle

Parameter address	s. Table in the annex
Data length	2 Byte
Meaning	Sets the cycle time to read the process input data from the FI.
Coding	1 ms
Notice	If more than 8-byte process input data are activated, the FI reads the second part of the process input data directly after the first part.

PD_Out_Length

Parameter address	s. Table in the annex
Data length	1 Byte
Meaning	This parameter corresponds to the PROFIBUS parameter process output data length (Index = 6001h, subindex = 1).

PD_Outx_Index (with x = 1...8)

Parameter address	s. Table in the annex
Data length	2 Byte
Meaning	This parameter corresponds to the PROFIBUS parameter with the index = 6001h, subindex = X*2.

PD_Outx_Set (with x = 1...8)

Parameter address	s. Table in the annex
Data length	1 Byte
Meaning	This parameter corresponds to the PROFIBUS parameter with the index = 6001h, subindex = (X*2)+1.

PD_Out_Enable

Parameter address	s. Table in the annex
Data length	1 Byte
Meaning	This parameter corresponds to the PROFIBUS parameter with the index = 6002h, subindex = 0.

PD_Out2_Enable

Parameter address	s. Table in the annex
Data length	1 Byte
Meaning	This parameter corresponds to the PROFIBUS parameter with the index = 5FF5h, subindex = 0.

Take Stored PD-Map (Fb.23)

Parameter address	s. Table in the annex
Data length	1 Byte
Meaning	This parameter corresponds to the PROFIBUS parameter with the index = 5FE2h, subindex = 0.

Watchdog activation (Fb.39)

Parameter address	s. Table in the annex
Data length	1 Byte
Meaning	This parameter corresponds to the PROFIBUS parameter with the index = 5FDAh, subindex = 0.

Watchdog inhibit (Fb.40)

Parameter address	s. Table in the annex
Data length	1 Byte
Meaning	This parameter corresponds to the PROFIBUS parameter with the index = 5FF9h, subindex = 0.

FBS Command (Fb.41)

Parameter address	s. Table in the annex
Data length	2 Byte
Meaning	This parameter corresponds to the PROFIBUS parameter with the index = 5FD9h, subindex = 0.

PDOUT TakeMode (Fb.42)

Parameter address	s. Table in the annex
Data length	1 Byte
Meaning	This parameter corresponds to the PROFIBUS parameter with the index = 5FD8h, subindex = 0.

ValueSwapping (Fb.43)

Parameter address	s. Table in the annex
Data length	1 Byte
Meaning	This parameter corresponds to the PROFIBUS parameter with the index = 5FF4h, subindex = 0.

11. KEB PROFIBUS-DP Compact

PROFIBUS-DP node address = SY.06

Standard configuration of the KEB slave:

B7h	A3h	93h

Structure of the cyclic user data telegram from KEB master to KEB slave:

Parameterizing channel demand								Process output data			
VW	Sub-Index	Index		Data/Error HW HB	LB	LW HB	LB	PAD 1	PAD 2	PAD 3	PAD 4
SB 1	SB 2	SB 3	SB 4	SB 5	SB 6	SB 7	SB 8	SB 9	SB 10	SB 11	SB 12

VW

	Hand-shake	Dlen-1		Service-Code			
						Write	Read
B7	B6	B5	B4	B3	B2	B 1	B0

B5	B4	Data length
0	0	1 Byte
0	1	2 Byte
1	0	3 Byte0
1	1	4 Byte

B 1	B0	Service request
0	0	no service
0	1	Read
1	0	Write
1	1	no service

1 Byte

LB			
SB 5	SB 6	SB 7	SB 8

2-byte value

HB	LB		
SB 5	SB 6	SB 7	SB 8

4-byte value

HW HB	LB	LW HB	LB
SB 5	SB 6	SB 7	SB 8

Structure of the cyclic user data telegram from KEB slave to KEB master:

Parameterizing channel confirmation								Process input data			
VW	Sub-Index	Index		Data/Error HW HB	LB	LW HB	LB	PED 1	PED 2	PED 3	PED 4
EB 1	EB 2	EB 3	EB 4	EB 5	EB 6	EB 7	EB 8	EB 9	EB 10	EB 11	EB 12

VW

Re-sult	Hand-shake	Dlen-1		Service-Code			
						Write	Read
B7	B6	B5	B4	B3	B2	B 1	B0

B5	B4	Data length
0	0	1 Byte
0	1	2 Byte
1	0	3 Byte0
1	1	4 Byte

B 1	B0	Service request
0	0	no service
0	1	Read
1	0	Write
1	1	no service

B7 = 0 → No Error

B7 = 1 → Error

12. Annex

12.1 Parameter overview

Index	Sub-Index	COMBIVIS address			Name	Data length	Access
		Old	New (*1)	ID			
2180h	0	-	0180h	OS00	Operator type	2	WA
2181h	0	-	0181h	OS01	Password	-	WA
2183h	0	-	0183h	OS03	Diag Error Count	-	RW
2184h	0	0082h	0184h	OS04	Diag Response delay time	1	RW
2185h	0	-	0185h	OS05	Diag Baudrate	1	RO
5FE1h	0	0084h	0186h	OS06	HSP5 Max InvBusy retries	1	RW
2187h	0	0087h	0187h	OS07	HSP5 Tout Count	2	RW
2188h	0	-	0188h	OS08	Software number	-	RO
2190h	0	-	0190h	OS16	Mem_Addr	-	RW
2191h	0	-	0191h	OS17	Mem_Val	-	RO
2192h	0	00ADh	0192h	OS18	EE_Address	-	RW
2193h	0	00AEh	0193h	OS19	EE_Data	-	RO
2194h	0	-	0194h	OS20	FatalErrorCnt_Index	-	RW
2195h	0	-	0195h	OS21	FatalErrorCnt_Value	-	RO
6000h	1	0090h	0280h	Fb00	PD_In_Length	1	RW
6000h	2	0091h	0281h	Fb01	PD_In1_Index	2	RW
6000h	6	0092h	0282h	Fb02	PD_In2_Index	2	RW
6000h	10	0093h	0283h	Fb03	PD_In3_Index	2	RW
6000h	14	0094h	0284h	Fb04	PD_In4_Index	2	RW
6000h	3	0095h	0285h	Fb05	PD_In1_Set	1	RW
6000h	7	0096h	0286h (KEB)	Fb06	PD_In2_Set	1	RW
6000h	11	0097h	0287h	Fb07	PD_In3_Set	1	RW
6000h	15	0098h	0288h	Fb08	PD_In4_Set	1	RW
5FFAh	0	00AFh	0289h	Fb09	PD_In_Cycle	2	RW
5FF8h	0	0099h	028Ah	Fb10	PD_In_Enable	1	RW
228Bh	-	00B7h	028Bh	Fb11	PDIN_HSP5Service	-	RO
6001h	1	009Ah	028Ch	Fb12	PD_Out_Length	1	RW
6001h	2	009Bh	028Dh	Fb13	PD_Out1_Index	2	RW
6001h	6	009Ch	028Eh	Fb14	PD_Out2_Index	2	RW
6001h	10	009Dh	028Fh	Fb15	PD_Out3_Index	2	RW
6001h	14	009Eh	0290h	Fb16	PD_Out4_Index	2	RW
6001h	3	009Fh	0291h	Fb17	PD_Out1_Set	1	RW
6001h	7	00A0h	0292h	Fb18	PD_Out2_Set	1	RW
6001h	11	00A1h	0293h	Fb19	PD_Out3_Set	1	RW
6001h	15	00A2h	0294h	Fb20	PD_Out4_Set	1	RW
6002h	0	00A3h	0295h	Fb21	PD_Out_Enable	1	RW

further on next side

Index	Sub-Index	COMBIVIS address			Name	Data length	Access
		Old	New (*1)	ID			
2296h	-	00B8h	0296h	Fb22	PDOUT_HSP5Service	1	RO
5FE2h	0	00A4h	0297h (KEB)	Fb23	Take Stored PD-Map	-	RW
2298h	-	00A5h	0298h (KEB)	Fb24	ProcessData In1	-	RO
2299h	-	00A6h	0299h (KEB)	Fb25	ProcessData In2	-	RO
229Ah	-	00A7h	029Ah	Fb26	ProcessData In3	-	RO
229Bh	-	00A8h	029Bh	Fb27	ProcessData In4	-	RO
229Ch	-	00A9h	029Ch	Fb28	ProcessData Out1	-	RO
229Dh	-	00AAh	029Dh	Fb29	ProcessData Out2	-	RO
229Eh	-	00ABh	029Eh	Fb30	ProcessData Out3	-	RO
229Fh	-	00ACh	029Fh	Fb31	ProcessData Out4	-	RO
22A0h	-	00B6h	02A0h	Fb32	Check PD Setting	-	RO
22A1h	-	00B0h	02A1h	Fb33	CFG_Len	-	RO
22A2h	-	00B1h	02A2h	Fb34	CFG_Data1	-	RO
22A3h	-	00B2h	02A3h	Fb35	CFG_Data2	-	RO
22A4h	-	00B3h	02A4h	Fb36	CFG_Data3	-	RO
22A5h	-	00B5h	02A5h	Fb37	Master_PDIN_Len	-	RO
22A6h	-	00B4h	02A6h	Fb38	Master_PDOUT_Len	-	RO
5FDAh	0	00FCh	02A7h	Fb39	Watchdog activation (*1)	1	RW
5FF9h	0	008Eh	02A8h	Fb40	Watchdog Inhibit	1	RW
5FD9h	0	-	02A9h	Fb41	FBS Command (*1)	2	RW
5FD8h	0	-	02AAh	Fb42	PDOUT TakeMode	1	RW
5FF4h	0	-	02ABh	Fb43	ValueSwapping (*1)	1	RW
6000h	18	-	02ACh	Fb44	PD_In5_Index (*2)	2	RW
6000h	22	-	02ADh	Fb45	PD_In6_Index (*2)	2	RW
6000h	26	-	02AEh	Fb46	PD_In7_Index (*2)	2	RW
6000h	30	-	02AFh	Fb47	PD_In8_Index (*2)	2	RW
6000h	19	-	02B0h	Fb48	PD_In5_Set (*2)	1	RW
6000h	23	-	02B1h	Fb49	PD_In6_Set (*2)	1	RW
6000h	27	-	02B2h	Fb50	PD_In7_Set (*2)	1	RW
6000h	31	-	02B3h	Fb51	PD_In8_Set (*2)	1	RW
5FF6h	0	-	02B4h	Fb52	PD_In2_Enable (*2)	1	RW
22B5h	-	-	02B5h	Fb53	PDIN2_HSP5Service	-	RO
6001h	18	-	02B6h	Fb54	PD_Out5_Index (*2)	2	RW
6001h	22	-	02B7h	Fb55	PD_Out6_Index (*2)	2	RW
6001h	26	-	02B8h	Fb56	PD_Out7_Index (*2)	2	RW
6001h	30	-	02B9h	Fb57	PD_Out8_Index (*2)	2	RW
6001h	19	-	02BAh	Fb58	PD_Out5_Set (*2)	1	RW
6001h	23	-	02BBh	Fb59	PD_Out6_Set (*2)	1	RW

further on next side

Index	Sub-Index	COMBIVIS address			Name	Data length	Access
		Old	New (*1)	ID			
6001h	27	-	02BCh	Fb60	PD_Out7_Set (*2)	1	RW
6001h	31	-	02BDh	Fb61	PD_Out8_Set (*2)	1	RW
5FF5h	0	-	02BEh	Fb62	PD_Out2_Enable (*2)	1	RW
22BFh	-	-	02BFh	Fb63	PDOUT2_HSP5Service	-	RO
22C0h	-	-	02C0h	Fb64	ProcessData In5	-	RO
22C1h	-	-	02C1h	Fb65	ProcessData In6	-	RO
22C2h	-	-	02C2h	Fb66	ProcessData In7	-	RO
22C3h	-	-	02C3h	Fb67	ProcessData In8	-	RO
22C4h	-	-	02C4h	Fb68	ProcessData Out5	-	RO
22C5h	-	-	02C5h	Fb69	ProcessData Out6	-	RO
22C6h	-	-	02C6h	Fb70	ProcessData Out7	-	RO
22C7h	-	-	02C7h	Fb71	ProcessData Out8	-	RO
5FF0h	0	-	-	-	SW_Version	2	RO
5FF1h	0	-	-	-	SW_Date	2	RO

(*1): Thise parameters are new starting from software version 1.5.
(*2): This parameters are new starting from sofware version 1.6.

12.2 Error messages on the F5-operator display

Error	Communication error during initialisation
o_Flo	Overflow in value calculation
t_out	Timeout, control board doesn't answer
IDAtA	Invalid Data
rOnly	Parameter Read_Only
E_Bcc	Communication error : wrong checksum
Busy	Inverter Busy
ISruc	Communication error : Invalid service
No PA	Parameter locked by password
I_FrA	Communication error : Invalid character
E_PAr	Communication error : wrong parity
I_SEt	Invalid set
I_Adr	Invalid parameter address
I_OPE	Invalid operation
E xx	xx=error code in hex : all other errors
EEEPX	with X = 1,2,3..: fatal error during test of serial eeprom
EEEPR	: fatal error during test of serial eeprom
Special error messages on PROFIBUS-operator:	
ESPC3	Fatal error during test of PRIFIBUS-chip SPC3
EESPE	Fatal error during test of external ram
EDPSI	Fatal error during function dpse_init()
EIOLE	Fatal error during function dpse_calculate_inp_outp_len()

ESPCS	Fatal error: No SPC3-memory available for operator-software
EDPSE	Fatal error called by DPSE driver(multiple reasons)
Special error messages on CAN-operator:	
ECAXX	with XX = 00,01,...:Fatal error during test of external can controller
Synch	Operator operates in Synchronous mode
SAuto	Operator operates in Auto-synchronous-mode. That means that no SYNC-telegrams are received on CAN and the operator generates an synchronous clock himself for keeping the communication between operator and FI running.
Special displays of the PowerLink-Operator:	
EEPL1	Is displayed until Config_Done of the FPGA is set
EEPL2	Is displayed, as long as FPGA_State = Init
EEPL4	Is displayed, as long as FPGA_State != Pre_operational

12.3 List of Literature

[1] PROFIBUS Norm EN 50170 Vol. 2, Version 1.0.
[2] PROFIL power transmission (21) of the DRIVECOM user group from 16.12.1991.

12.4 Table error messages of the parameterizing channel

Error class (EB5)	Error code (EB6)	Additional-Code (EB7, EB8)	Meaning
5	4	0000h	Bits for writing and reading are set simultaneously
6	2	0000h	No connection to the inverter
6	3	0000h	Parameter write protected.
6	3	0030h	Access to the parameter is not possible with the actual 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 of the valid value range
8	0	0033h	The addressed parameter set is unvalid
8	0	0034h	Operation not possible

12.5 Unit master file for KEB F5 PROFIBUS-DP operator

The unit master file (*.GSD) can be loaded via the KEB homepage.

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