

C O M B I C O M



GB SPS-Operator on PROFIBUS DP

Version 1.0

Mat. No.	Rev.
CPF5ZEA-K010	1A



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1. Product Description

1.1 General

KEB-Antriebstechnik develop, produce and sell static frequency inverters world-wide in the industrial power range. The presented documentation as well as the herein mentioned hard and software are developments of Karl E. Brinkmann GmbH. Errors and omissions excepted!The company Karl E. Brinkmann GmbH established this documentation to the best of her knowledge but without engagement, that the herein stated specifications may not provide the user with the expected advantages. The Karl E. Brinkmann GmbH reserves the right to change the specifications without prior notification or further obligation. All rights reserved.

1.2 Description of the operator

Frequency inverters of type F5 offer the possibility to plug-on an operator with SPS functionality. It concerns a special development on the base of the PROFIBUS-DP.

1.3 Intended use

The SPS operator offers the mechanical engineer the possibility to integrate own applications or functions in the inverter.

1.4. Validity

The present instruction manual is only valid in connection with the KEB Profibus instruction manual "CP.F5.010-K000" as well as the corresponding application manual of the frequency inverter.

1.5 Function scope

The SPS operator F5 supports the following functions in version 1.0:

- 16 outputs with adjustable inverter address
- 16 inputs with adjustable inverter address
- 8 inputs as operator parameter for constants
- 4 process data input words
- 4 process data output words
- AND, OR and negation possible
- Multiplexer
- Timer
- Comparator
- Word to Bit and Bit to Word
- Error and warning handler

2. Operation

2.1 Description of the connection sockets

X6B: Diagnostic interface to the PC

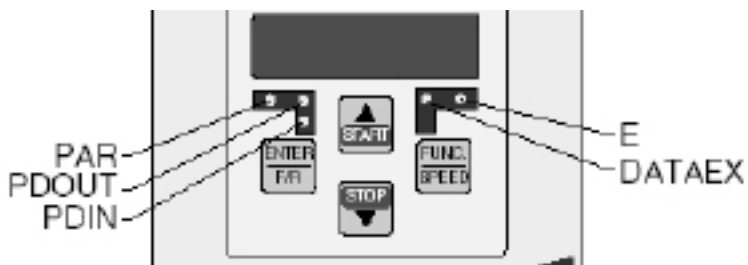
X6C*: PBS1 PROFUBUS DP-interface

X6D*: PBS2 PROFUBUS DP-interface

* Sockets X6C and X6D are internally bridged.
Connector assignments see PROFIBUS manual!

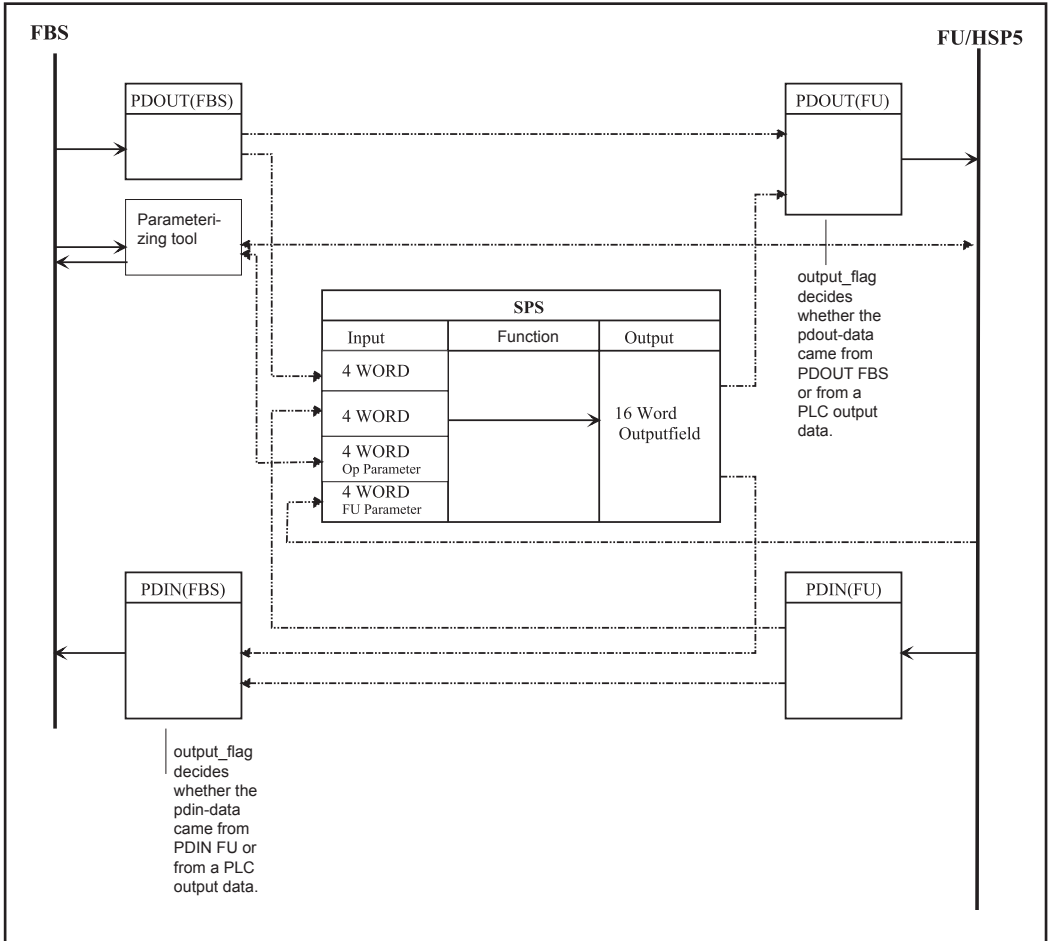


2.2 Description of the LED's



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): An → inverter ready for operation
 blinking → Inverter in error
 off → no supply voltage
DATAEX: Net data transfer active

2.3 Function principle



3. Parameter Description

P-no.	Name	E	Res.	Lower limit	Limit	Customer	Unit	Display	Notice
Runtime environment									
rt.00	runtime status	-	1	0	8	-	-	x	0 = O.K. EF 1 = error with the highest priority EF 2 = error 2 input 2 of function block ERROR is set EF 3 - EF 6 reset of the error message via input 7
rt.01	runtime version	-	1	0.00	655.35	1.0	-	-	
rt.02	Default	-	1	0	1	0	-	-	Default values in runtime and functional parameter
rt.03	runtime start stop	-	1	0	1	0	-	-	Starting and stopping the PLC function
rt.04	command index	-	1	0	127	0	-	-	Runtime of the function blocks to be processed rt.04 = index
rt.05	command	-	1	0	255	0	-	-	rt.05 = function block
rt.06	cycle time	-	1	0	255	50	ms	-	indicates the cycle time after the PLC functions are started again.
rt.07	cycle time info	-	1	0	255		ms	x	The necessary time can be determined with 0
16 outputs with adjustable FI address. The outputs must be programmed without gap. The data are transferred in a SPS-cycle to a registered address									
rt.10	out data index	-	1	0	3				Selection of the output
rt.11	out data exit address	-	1	0	65535	0			Parameter address of the target address
rt.12	out data exit set	-	1	0	255	0			Parameter set of the target address
Process data outputs + inputs									
A process output data word or -input data word can be assigned to each exit. Each process output data word and -input data word can only be assigned "once".									
rt.20	out data index PD		1	0	3				Selection of the output
rt.21	out data entry adr PD		1	0	65535	0			Parameter address of the target address
16 inputs with adjustable FI address. The data are read in a SPS-cycle from the registered address									
rt.30	in data index FUPara			0	3	0			Selection of the input
rt.31	in data entry address FUPara		1	0	65535	0			Parameter address pointer of the input block
rt.32	in data entry set FUPara		1	0	255	0			Parameter set of the parameter
8 inputs as operator parameter. They can be fixed adjusted as constants or they can be read and written via the parameter channel (e.g. changeable reference values)									
rt.40	in data op_para1			0	65535	0			OP Parameter 1
rt.41	in data op_para2			0	65535	0			OP Parameter 2
rt.42	in data op_para3			0	65535	0			OP Parameter 3
rt.43	in data op_para4			0	65535	0			OP Parameter 4
rt.44	in data op_para5			0	65535	0			OP Parameter 5
rt.45	in data op_para6			0	65535	0			OP Parameter 6
rt.46	in data op_para7			0	65535	0			OP Parameter 7
rt.47	in data op_para8			0	65535	0			OP Parameter 8
Function Blocks									
A process data field can be assigned to each exit via rt.20-21. Parameter addresses can be assigned to the outputs via rt.10-12. Data are transferred at the end of the SPS cycle to the appropriate parameter address									
Output 1 Input 1 Output									
Fu.10	output info		1	0	32	0		x	info
Fu.11	output index		1	0	32	0			
Fu.12	output entry address		1	0		0			

P.-no	Name	E	Res.	Lower limit	Limit	Customer	Unit	Display	Notice
Multiplexer		3 Input 1 Output							
Fu.15	multiplexer info	1	0	32	0			x	info
Fu.16	multiplexer index	1	0	8	0				
Fu.17	multip. change entry adr.	1	0	65535	0				Selection 0=Data inp.1 are given to the output 1=Data inp.2 are given to the output
Fu.18	multiplexer entry adr.1	1	0	65535	0				see Fb.12
Fu.19	multiplexer entry adr.2	1	0	65535	0				see Fb.12
Compare		3 Input 1 Output							
Fu.20	compare info	1	0	32	0			x	info
Fu.21	compare index	1	0	32	0				
Fu.22	compare entry address1	1	0	65535	0				Selection of the comparison 0 = == 1 = != 2 = <= 3 = >= 4 = < 5 = >
Fu.23	compare entry address2	1	0	65535	0				see Fb.12
Fu.24	compare entry address3	1	0	65535	0				see Fb.12
Timer		2 Input 2 Output Input 1 = on delay Output 1 = off delay							
Fu.25	timer info								info
Fu.26	timer index								
Fu.27	timer entry address								see Fb.12
Fu.28	delay time entry address								The delay time is preset via the input
Not		1 Input 1 Output							
Fu.30	not info	1	0	32	0			x	info
Fu.31	not index	1	0	32	0				
Fu.32	not entry address	1	0	65535	0				
And		2 Input 1 Output							
Fu.35	and info	1	0	32	0			x	info
Fu.36	and index	1	0	32	0				
Fu.37	and entry address1	1	0	65535	0				
Fu.38	and entry address2	1	0	65535	0				
Or		2 Input 1 Output							
Fu.40	or info	1	0	32	0			x	info
Fu.41	or index	1	0	32	0				
Fu.42	or entry address1	1	0	65535	0				
Fu.43	or entry address2	1	0	65535	0				
Word to Bit		1 Input 16 Output							
Fu.45	word to bit info	1	0	32	0			x	info
Fu.46	word to bit index	1	0	32	0				
Fu.47	word to bit entry address	1	0	65535	0				
Bit to Word		16 Input 1 Output							
Fu.50	bit to word info	1	0	32	0			x	info
Fu.51	bit to word index	1	0	3	0				
Fu.52	bit to word entry address1	1	0	65535	0				
Fu.53	bit to word entry address2	1	0	65535	0				
Fu.54	bit to word entry address3	1	0	65535	0				
Fu.55	bit to word entry address4	1	0	65535	0				
Fu.56	bit to word entry address5	1	0	65535	0				
Fu.57	bit to word entry address6	1	0	65535	0				
Fu.58	bit to word entry address7	1	0	65535	0				
Fu.59	bit to word entry address8	1	0	65535	0				
Fu.60	bit to word entry address9	1	0	65535	0				

P-no.Name	E	Res.	Lower limit	Limit	Customer	Unit	Display	Notice
Fu.61 bit to word entry address10	1	0	65535	0				
Fu.62 bit to word entry address11	1	0	65535	0				
Fu.63 bit to word entry address12	1	0	65535	0				
Fu.64 bit to word entry address13	1	0	65535	0				
Fu.65 bit to word entry address14	1	0	65535	0				
Fu.66 bit to word entry address15	1	0	65535	0				
Fu.67 bit to word entry address16	1	0	65535	0				

Error7 Inputs 1 Output

Input 1 has the highest priority rt.00 displays the error.

The error can be reset with input 7

Fu.70 error info	1	0	32	0			x	info
Fu.71 error index	1	0	3	0				
Fu.72 error entry address1	1	0	65535	0				
Fu.73 error entry address2	1	0	65535	0				
Fu.74 error entry address3	1	0	65535	0				
Fu.75 error entry address4	1	0	65535	0				
Fu.76 error entry address5	1	0	65535	0				
Fu.77 error entry address6	1	0	65535	0				
Fu.78 error reset entry address	1	0	65535	0				

Warning 6 Inputs 1 Output

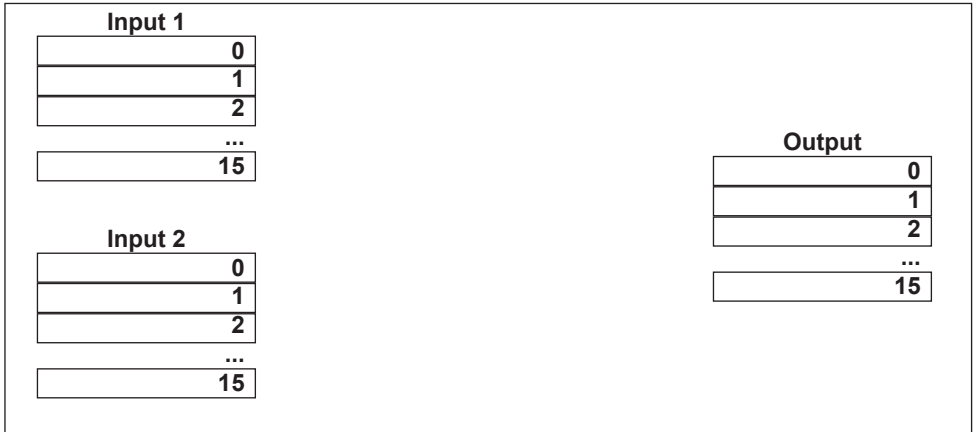
Fu.80 warning info	1	0	32	0			x	info
Fu.81 warning index	1	0	3	0				
Fu.82 warning entry address1	1	0	65535	0				
Fu.83 warning entry address2	1	0	65535	0				
Fu.84 warning entry address3	1	0	65535	0				
Fu.85 warning entry address4	1	0	65535	0				
Fu.86 warning entry address5	1	0	65535	0				
Fu.87 warning entry address6	1	0	65535	0				

4. Examples

4.1 Starting a new Project

For the programming it is absolutely necessary to create an operating diagram.

4.4.1 4.4.1 Empty function chart

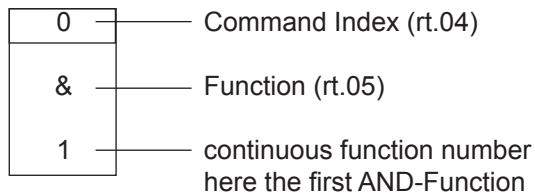


4.4.2 Loading default values

Before any definitions are met, the default values should be loaded, in order to guarantee that all inputs and outputs as well as function blocks are reset and/or deleted. This occurs by writing of value "1" to parameter rt.02.

4.4.3 Insert the function blocks

With parameters rt.04 and rt.05 the function blocks can be inserted. Each module with the function, command index and continuous function number is displayed in the function chart.



An „AND“, „OR“ and a Word-to-Bit-function is inserted in this example. Furthermore only one output function must be defined. The output is assigned to this output function.

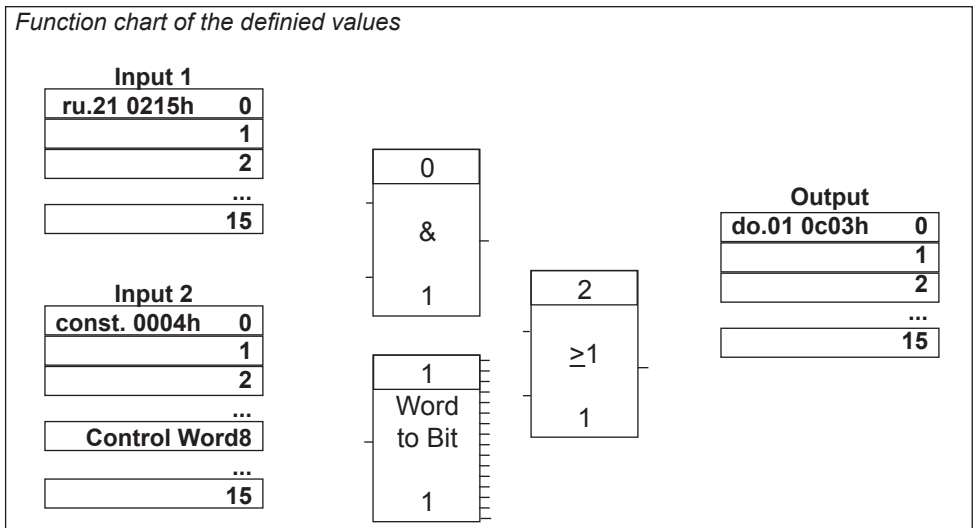
rt.04	command index	0	
rt.05	command		and
rt.04	command index	1	
rt.05	command		Word to Bit
rt.04	command index	2	
rt.05	command		OR
rt.04	command index	3	
rt.05	command		out data

4.4.4 Specifications of Inputs and Outputs

The variables and constants are specified in this section. The input variables can be directly connected by the inverter parameters with input 1 (index 0... 15). An input variable can occur via process input data words with input 2 (Profibus) (index 8... 11), and/or by means of process output data words with input 2 (index 12... 15). **Constants** are entered in Input 2 (Index 0...7). The output variables are assigned to the inverter parameters or process data in the output-block (Index 0...15).

Example: Input variable: Parameter ru.21 of set 0
 rt.30 in data index FUpara 0
 rt.31 in data address FUpara 0215h
 rt.32 in data entry set FUpara 01h
 Output variable: Parameter do.01 in set 0
 rt.10 out data index FUpara 0
 rt.11 out data address FUpara 0C03h
 rt.12 out data exit set FUpara 01h
 Constant: enter 16 Bit constant
 rt.40 in data op_para1 0004h

Function chart of the defined values



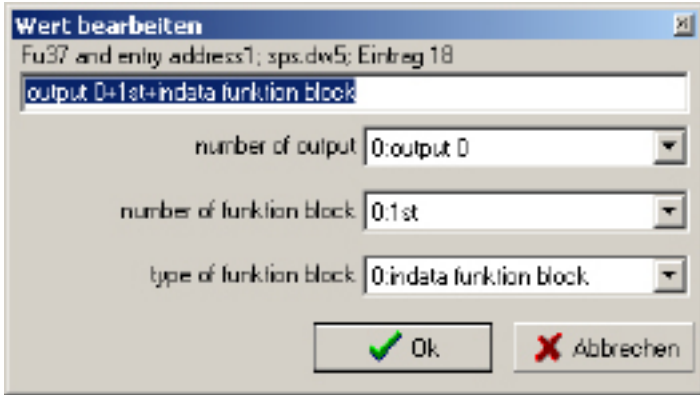
4.4.5 Arrange the assignments

After the required in- and outputs and function moduls are entered, the assignments between the moduls can be made.

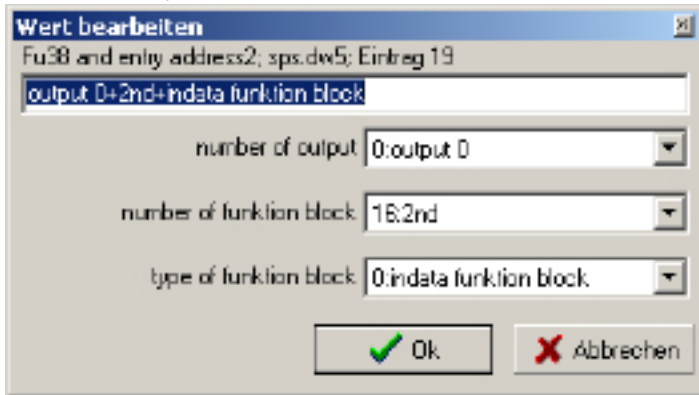
Following assignments are to be made:

ru.21 to first input and the constant to input 2 of the AND modul:

Fu.36	and index	0
Fu.37	and entry address1	output 0+1st+indata function block



Fu.38	and entry address2	output 0+2nd+indata function block
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Put the Control word from Input 2 Index 8 to the word to bit function:

Fu.46	word to bit index	0
Fu.47	word to bit entry address	output 8+2st+indata function block

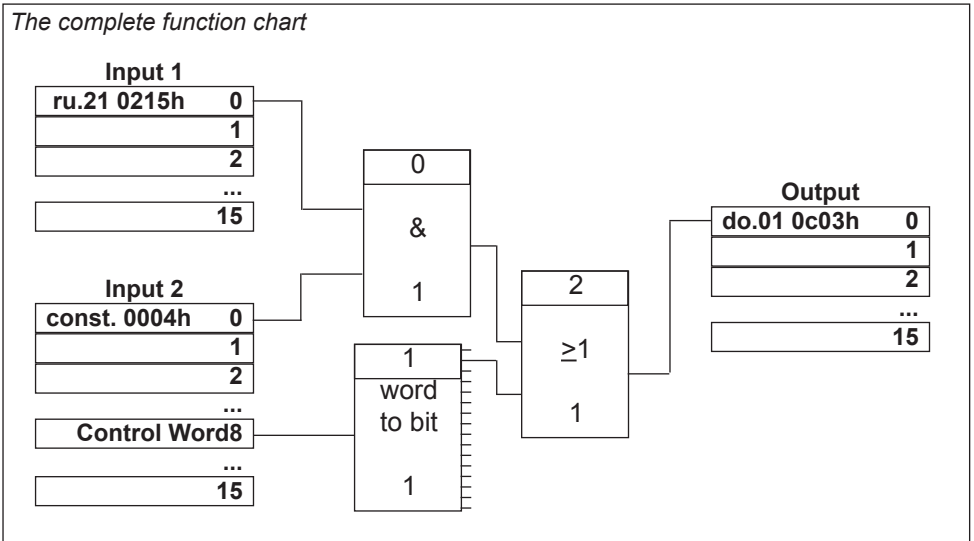
Put the output of the first AND modul to the first input of the first OR function and the first bit of the first word to bit function to input 2:

- Fu.41 or index 0
- Fu.42 or entry address1 output 0+1st+and function block
- Fu.43 or entry address2 output 1+1st+word to bit function

The output of the first OR modul issued to output index 1:

- Fu.11 output index 0
- Fu.12 output entry address output 0+1st+or function block

The complete function chart



4.4.6 Description of the function

If the 16 bit word of ru.21 and of the constant are equal, the AND function outputs a „1“ to the OR function. The word to bit function is evaluating bit 1 of the control word and outputs it to the OR function. If one of the inputs of the OR function is set, a „1“ is output to do.01.

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