Equipment for Machine Tools

WF 725/WF 726
Positioning Modules

Planning Instructions Part 5
Difference Description
WF 725/WF 726 in SINUMERIK

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1 Introduction

This difference description describes the software package ”Basic functions” for the positioning modules WF 725 A, B and WF 726 A, B with SINUMERIK. The offered functions are identical to the ”Standard I” with SIMATIC.

The software package ”Basic functions” considers the blocks and variables set in the SINUMERIK as well as the assignment of inputs, outputs, flags, times and counters in the PLC. Furthermore, the adapted functions are considered by the basic program of package 1 of SINUMERIK 8, like start-up, restart and alarm processing.

The following documentations are the basis for this difference description:

- WF 725/726 Planning Instructions 6ZB5 440-0GL02-0AA1
- WF 725/726 Installation Instructions 6ZB5 440-0FW02-0AA0

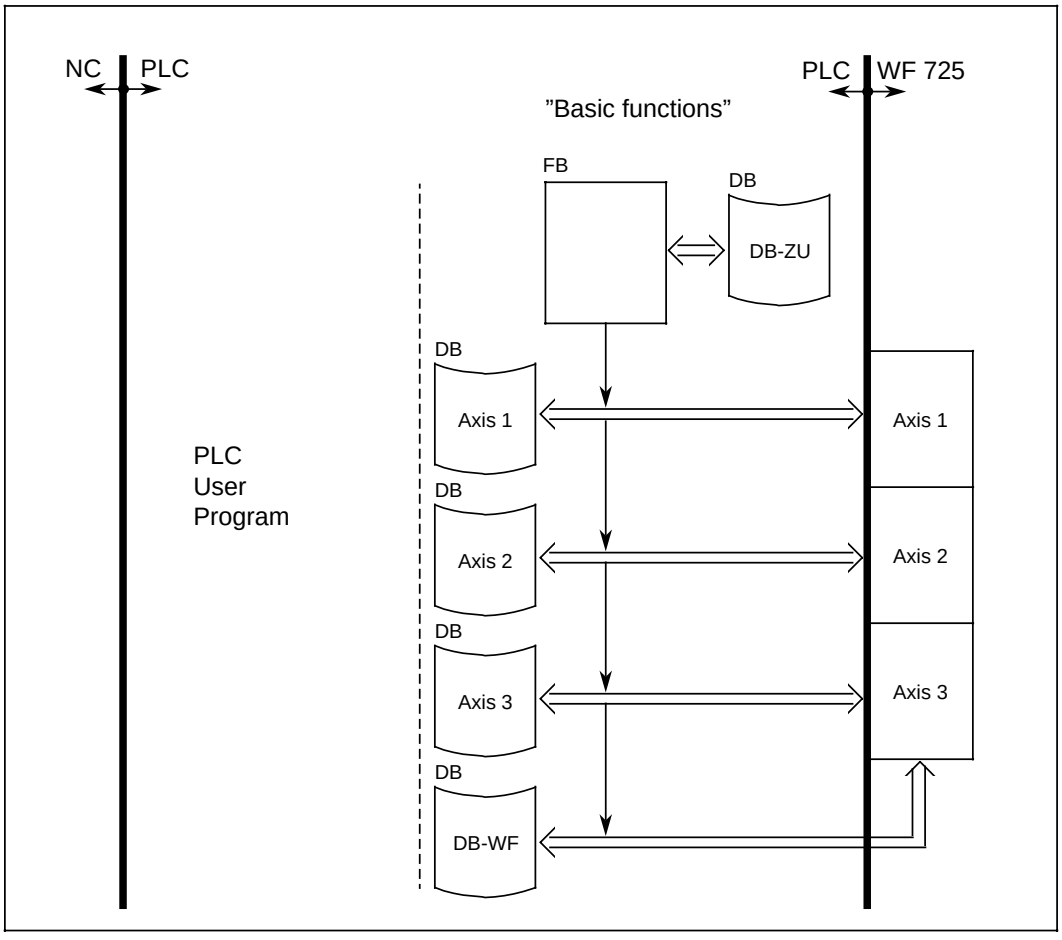


Figure 1.1 Software structure ”Basic functions”

The software structure ”Basic functions” consists of the interface to the PLC user program on the one hand, and the interface for further software packages on the other hand, for example tool magazine operation.
The interface to the WF 725 / WF 726 which is available for the user is realised by the data blocks DB-WF and DB-Axis.

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The user has the possibility to realise the following functions over this interface:

- Display of actual positions and residual traversing paths at NC screen *)
- Display of fault messages *)
- Displaying and changing machine data and operating data *)
- Program input for WF module with NC operator panel keyboard *)
- Selection of operating submodes over the machine control panel

These listed functions however are not part of the software package.

*) A corresponding function block package has been generated for SINUMERIK 3 with WF 725, WF 726.

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2 System configuration

The WF positioning modules are linked in SINUMERIK systems over the S5-Bus of the PLC.

All data and control signals, e.g. user programs, machine data, start and stop signals are sent over this bus. The individual modules are addressed like the input/output modules (E/A modules).
The WF 725 A or the WF 726 A need 1 plug connection.
The WF 725 B or the WF 726 B need 2 plug connections.

2.1 Assignment of plugs

2.1.1 SINUMERIK 3,GA4 C

Type	Frame	Connection area
3T, 3TE	6FC315. - 0FA	116 - 166
3T, 3TE	6FC315. - 0HA	30 - 60, 100 - 180 incl.
3T, 3TE	6FC315. - 0JA	56 - 86, 96 - 166
3M, 3ME	6FC345. - 0FA	116 - 166
3M, 3ME	6FC345. - 0HA	30 - 60, 100 - 180 incl.
3M, 3ME	6FC345. - 0JA	56 - 86, 96 - 166
3TT, 3TTE	6FC373. - 0FA	30 - 60, 100 - 180 incl.
3TT, 3TTE	6FC373. - 0JA	56 - 86, 96 - 166
3G, 3GE	6FC374. - 0FA	116 - 166
3G, 3GE	6FC374. - 0HA	30 - 60, 100 - 180 incl.
3G, 3GE	6FC374. - 0JA	56 - 86, 96 - 166
External DUO-PLC	6FC3871 - 0DA	30 - 60, 100 - 180
Extension rack, P03	6FC3981 - 4FD	30 - 180
PLC-Frame	6FC3871 - 0AA	30 - 60, 100 - 180 incl.
DUO-PLC	6FC3871 - 0BA	56 - 86, 96 - 166
Double frame for DUO-PLC	6FC3881 - 0JA	56 - 86, 96 - 166
Double frame for DUO-PLC	6FC3887 - 0JA	56 - 86, 96 - 166
Double frame with N35	6FC3881 - 0KA	30 - 60, 100 - 180 incl.
Double frame with N43	6FC3881 - 0KA	30 - 60, 100 - 180 excl.
Double frame	6FC3881 - 0FA	30 - 60, 100 - 180 incl.
Double frame	6FC3887 - 0FA	30 - 60, 100 - 180 incl.

2.1.2 SINUMERIK 8

The connection area for the module WF 725 / WF 726 is identical to the connection area for the digital input/output modules N60, N65, N70, N90.

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2.1.3 SINUMERIK 850

Type	Frame	Connection area
850 M with PLC 1 :150 U with EG 183 U	6ES5 183 - 3UA	3 - 163
850 M, 850 T with PLC 1 :150 U with EG 182-3K	6ES5 182 - 3KH	27 - 163
850 M, 850 T with PLC 1 : 130 W (B)	(SINUMERIK frame)	22 - 31, 91 - 181

2.2 Addressing of the WF 725, WF 726

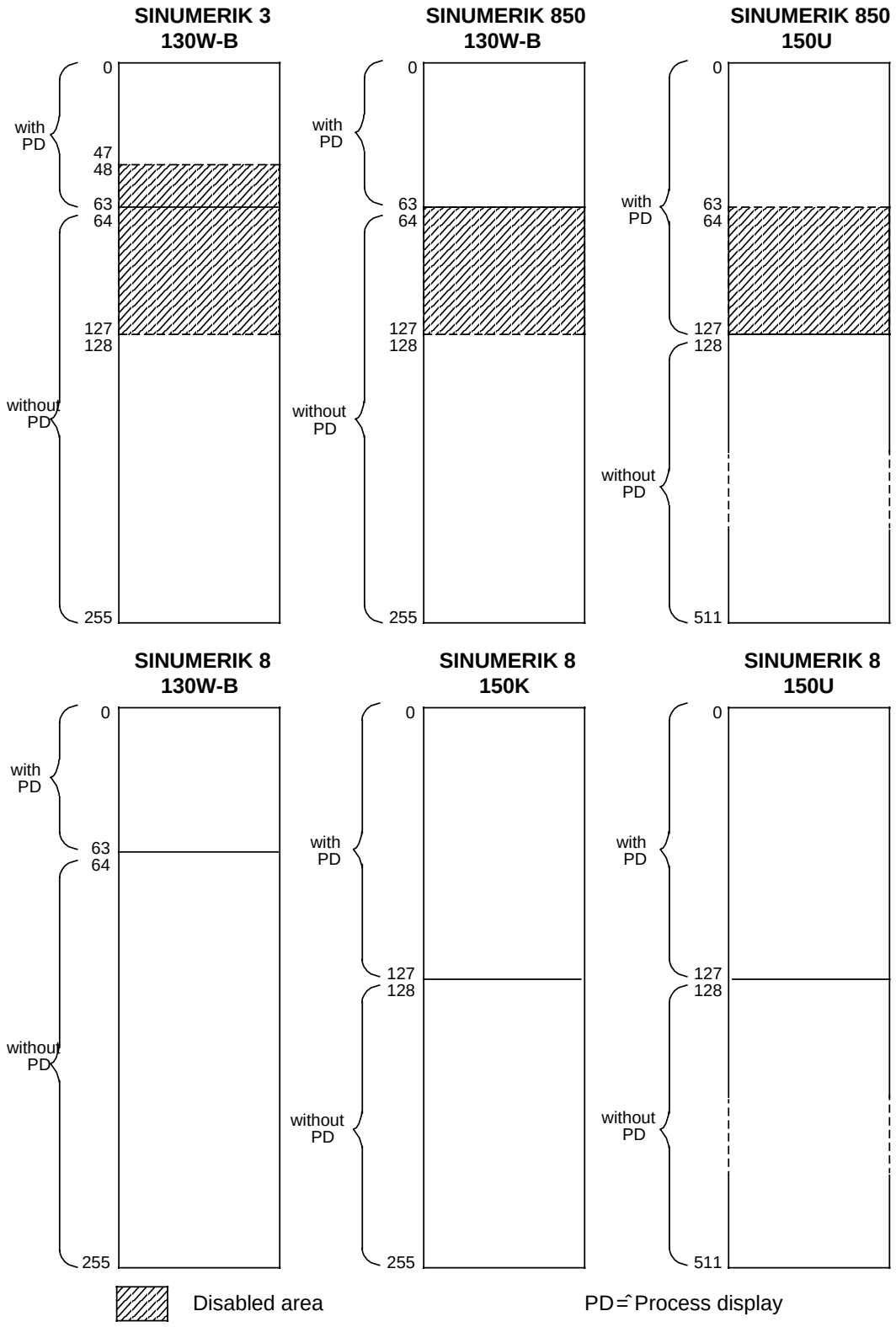
The modules must be addressed like the input/output modules. The allowed addressing ranges are listed in the following overview.

If possible, the addresses should be used which are not in the process display.

Input/output modules can only be addressed in the area with process diplay.
Further information for addressing can be found in the Installation Instructions of the WF modules.

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Permitted address ranges for WF 725, WF 726, valid for inputs/outputs



3 Overview of blocks

3.1 Data blocks

The following data block numbers are available for the user.

SINUMERIK 3,GA4 C	DB 150	-	DB 255
SINUMERIK 8	DB 20	-	DB 255
SINUMERIK 850	DB 100	-	DB 255

The data blocks (of the ”Basic functions”) are parameterised and set up when the function blocks are called.

Overview of data blocks

Cont. no.	Name	Length DW	Note
1.)	DB-ZU	12 - 58	1 DB per PLC
2.)	DB-WF	255	1 DB per module
3.)	DB-Axis	63	1 DB per axis
4.)	DB-Machine data	8 - 255	Comfort version
5.)	DB-Operating data	13 - 255	Comfort version
6.)	DB-Tool length offset values	18 - 255	Comfort version
7.)	DB-Traversing blocks	17 - 255	Comfort version
8.)	DB-Reload buffer	22 - 255	only for WF 726 Comfort version

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3.2 Overview of function blocks

3.2.1 Function blocks of WF 725

PLC / Function*)	SINUMERIK 3 GA4C 130W(B)	SINUMERIK 8 130W(B)	SINUMERIK 8 150K	SINUMERIK 8 150K	SINUMERIK 850 130W(B)	SINUMERIK 850 150U
FB202 ≙ EINR-DB	11	11	1	11	11	11
Setting of data blocks						
FB201 ≙ Block-TR	60	16	16	16	60	60
Block transfer						
FB200 ≙ TR:DB-PW Transfer	207	191	191	191	207	207
Periphery						
FB210 ≙ MOD-726 Main program	210	190	190	190	210	210
FB211 ≙ ANL1-726 Start	211	192	192	192	211	211
FB218 ≙ PRUF-VS Check traversing block	218	193	193	193	218	218
FB221 ≙ MD-TR Transfer Machine data	221	194	194	194	221	221
FB222 ≙ TR-BETR Transfer Operating data	222	195	195	195	222	222
FB223 ≙ WZKORR Transfer Tool offsets	223	196	196	196	223	223
FB229 ≙ TR:PROGR Transf. Traversing blocks	229	197	197	197	229	229

*) Function:

Description see Planning Instructions Part 3; Interface description of the Standard-Software
-726, -726 and -726
(Order number 6ZB5440-0GL02-0AA1)

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3.2.2 Function blocks of WF 726

PLC / Function*)	SINUMERIK 3 GA4C 130W(B)		SINUMERIK 850 130W(B)	SINUMERIK 850 150U
FB202 ≙ EINR-DB	11		11	11
Setting of data blocks				
FB201 ≙ Block-TR	60		60	60
Block transfer				
FB207 ≙ TR:DB-PW Transfer	207		207	207
Periphery				
FB210 ≙ MOD-726 Main program	210		210	210
FB211 ≙ ANL1-726 Start	211		211	211
FB218 ≙ PRUF-VS Check traversing block	218		218	218
FB221 ≙ MD-TR Transfer Machine data	221		221	221
FB222 ≙ TR-BETR Transfer Operating data	222		222	222
FB223 Tool offsets	223		223	223
FB219 ≙ WZKORR Transfer Reload buffer	219		219	219
FB229 ≙ TR:PROGR Transf. Traversing blocks	229		229	229

*) Function:

Description see Planning Instructions Part 3; Interface description of the Standard-Software
-726, -726 and -726
(Order number 6ZB5440-0GL02-0AA1)

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Note for the following block data:

The functions ”Set-Up of data blocks” and ”Block transfer” are used from the basic program of the SINUMERIK 3 or SINUMERIK 850 or from ”Package 1” of SINUMERIK 8.
The function blocks of the ”Basic version” must always be loaded according to the following overviews.
The function blocks of the ”comfort version” must be loaded from additional functions depending on the use.
The positioning module WF 726 A,B uses a DUAL-PORT-RAM length of either 16- , 32 - or 64 - Byte which must be set on the module.
The function blocks ”WF 726-16” or ”WF 726-64” must be loaded according to this setting.

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FB No.	Name	Block length/ Words	Length of Call/ Words	Order No. E88530-B Version 2.0	Pro-cess-ing time ms	Nesting depth	Called FB's	Used DB's in the RAM DB*	RAM Length	EPROM DB	EPROM Length	Used variables	
11	EINR-DB	→ from Basic program											Basic Version
60	BLOCK-TR	→ from Basic program											
207	TR:DB-PB	81		4004-C-50				-				MB 240 - 255	
210	MOD-726	962		4004-C-51			FB207 FB60 FB216 FB217	1.) 2.) 3.)				MB 240 - 255	
211	ANL1-726	213		4004-C-51			FB 11	-				MB 240 - 255	
216	WF726-16	514		4004-C-51			FB207	-				MB 240 - 255	
218	PRUF-VS	206		4004-C-51				-				MB 240 - 255	Comfort Version
221	MD-TR	299		4004-C-50				4.)				MB 240 - 255	
222	TR-BETR	305		4004-C-50				5.)				MB 240 - 255	
223	WZKORR	336		4004-C-50				6.)				MB 240 - 255	
229	TR:PROGR	545		4004-C-51				7.)				MB 240 - 255	

((3.3.1))

FB No.	Name	Block length/ Words	Length of Call/ Words	Order No. E88530-B Version 0.8	Pro-cess-ing time ms	Nesting depth	Called FB's	Used DB's in the RAM DB*	RAM Length	EPROM DB	EPROM Length	Used variables	
11	EINR-DB	→ from package 1											Basic Version
16	BLOCK-TR	→ from package 1											
190	MOD-WF	1367		4001-C-52			FB16 FB191	1.) 2.) 3.)				MB 240 - 255	
191	TR:DB-PB	57		4001-C-50			-					MB 240 - 255	
192	ANLAUF-1	202		4001-C-52			FB 11					MB 240 - 255	
193	PRÜF-VS	191		4001-C-50			-					MB 240 - 255	Comfort Version
194	MD-TR	289		4001-C-50			-	4.)				MB 240 - 255	
195	TR-BETR	293		4001-C-50			-	5.)				MB 240 - 255	
196	WZKORR	292		4001-C-50			-	6.)				MB 240 - 255	
197	TR:PROGR	466		4001-C-50			-	7.)					

((3.3.2))

FB No.	Name	Block length/ Words	Length of Call/ Words	Order No. E88530-B Version 0.8	Pro-cess-ing time ms	Nesting depth	Called FB's	Used DB's in the RAM DB*	RAM Length	EPROM DB	EPROM Length	Used variables	
11	EINR-DB	→ from package 1											Basic Version
16	BLOCK-TR	→ from package 1											
190	MOD-WF	1393		4001-B-52			FB16 FB191	1.) 2.) 3.)				MB 240 - 255	
191	TR:DB-PB	67		4001-B-50			-					MB 240 - 255	
192	ANLAUF-1	202		4001-B-52			FB 11					MB 240 - 255	
193	PRUF-VS	201		4001-B-50			-					MB 240 - 255	Comfort Version
194	MD-TR	300		4001-B-50			-	4.)				MB 240 - 255	
195	TR-BETR	290		4001-B-50			-	5.)				MB 240 - 255	
196	WZKORR	290		4001-B-50			-	6.)				MB 240 - 255	
197	TR:PROGR	494		4001-B-50			-	7.)					

((3.3.3))

FB No.	Name	Block length/ Words	Length of Call/ Words	Order No. E88530-B Version 0.8	Pro-cess-ing time ms	Nesting depth	Called FB's	Used DB's in the RAM DB*	RAM Length	EPROM DB	EPROM Length	Used variables	
11	EINR-DB	→ from package 1											Basic Version
16	BLOCK-TR	→ from package 1											
190	MOD-WF	1260		4001-D-52			FB16 FB191	1.) 2.) 3.)				MB 240 - 255	
191	TR:DB-PB	67		4001-D-50			-					MB 240 - 255	
192	ANLAUF-1	207		4001-D-52			FB 11					MB 240 - 255	
193	PRUF-VS	173		4001-D-50			-					MB 240 - 255	Comfort Version
194	MD-TR	266		4001-D-50			-	4.)				MB 240 - 255	
195	TR-BETR	266		4001-D-50			-	5.)				MB 240 - 255	
196	WZKORR	260		4001-C-50			-	6.)				MB 240 - 255	
197	TR:PROGR	449		4001-D-50			-	7.)					

((3.3.4.))

FB No.	Name	Length of block/ words	Length of call/ words	Order No. E88530-B Version 2.0	Pro-cess-ing time ms	Nesting depth	Called FB's	Used DB's in the RAM EPROM DB*	Length	DB	Length	Used variables
11	EINR-DB	from Basic program										
60	BLOCK-TR	from Basic program										
207	TR:DB-PB	81		4006-C-50								MB 240-255
210	MOD-WF	962		4006-C-50			FB60 FB200	1.) 2.) 3.)				MB 240-255
211	ANL1-726	213		4006-C-50			FB11					MB 240-255
216	WF726-16	527		4006-C-50								
218	PRUF-VS	206		4006-C-50			-					MB 240-255
221	MD-TR	299		4006-C-50			-	4.)				MB 240-255
222	TR-BETR	305		4006-C-50			-	5.)				MB 240-255
223	WZKORR	336		4006-C-50			-	6.)				MB 240-255
229	TR:PROGR	545		4006-C-50			-	7.)				

Basic Version

Comfort Version

((3.3.5.))

FB No.	Name	Block length/ Words	Length of Call/ Words	Order No. E88530-B Version 2.0	Pro-cess-ing time ms	Nesting depth	Called FB's	Used DB's in the RAM DB*	RAM Length	EPROM DB	EPROM Length	Used variables	
11	EINR-DB	→ from Basic program											Basic Version
60	TR:DB-PB	→ from Basic program											
207	TR:DB-PB	69		4006-D-50			-					MB 240 - 255	
210	MOD-WF	884		4006-D-50			FB60 FB200	1.) 2.)				MB 240 - 255	
211	ANL1-726	219		4006-D-50			FB 11					MB 240 - 255	
216	WF726-16	482		4006-D-50									
218	PRUF-VS	190		4006-D-50			-					MB 240 - 255	Comfort Version
221	MD-TR	278		4006-D-50			-	4.)				MB 240 - 255	
222	TR-BETR	275		4006-D-50			-	5.)				MB 240 - 255	
223	WZKORR	285		4006-D-50			-	6.)				MB 240 - 255	
229	TR:PROGR	528		4006-D-50			-	7.)					

((3.3.6))

FB No.	Name	Block length/ Words	Length of Call/ Words	Order No. E88530-B Version 2.0	Pro-cess-ing time ms	Nesting depth	Called FB's	Used DB's in the RAM DB*	RAM Length	EPROM DB	EPROM Length	Used variables	
11	EINR-DB	→ from Basic program											Basic Version
60	BLOCK-TR	→ from Basic program											
207	TR:DB-PB	81		4004-C-50				-				MB 240 - 255	
210	MOD-726	962		4004-C-51			FB207 FB60	1.) 2.)				MB 240 - 255	
211	ANL1-726	213		4004-C-50			FB 11	-				MB 240 - 255	
215	TRKENN	81		4004-C-50				-				MB 240 - 255	
216	WF726-16	514		4004-C-51			FB207	-				MB 240 - 255	
217	WF726-64	1200		4004-C-51			FB60 FB207	-				MB 240 - 255	
218	PRUF-VS	206		4004-C-51				-				MB 240 - 255	Comfort Version
219	NACHLAD	467		4004-C-51				8.)				MB 240 - 255	
221	MD-TR	299		4004-C-50				4.)				MB 240 - 255	
222	TR-BETR	305		4004-C-50				5.)				MB 240 - 255	
223	WZKORR	336		4004-C-50				6.)				MB 240 - 255	
229	TR:PROGR	545		4004-C-51				7.)				MB 240 - 255	

((3.4.1.))

FB No.	Name	Block length/ Words	Length of Call/ Words	Order No. E88530-B Version 2.0	Pro-cess-ing time ms	Nesting depth	Called FB's	Used DB's in the RAM DB*	RAM Length	EPROM DB	EPROM Length	Used variables	
11	EINR-DB	→ from Basic program											Basic Version
60	BLOCK-TR	→ from Basic program											
207	TR:DB-PB	81		4006-C-50				-				MB 240 - 255	
210	MOD-726	962		4006-C-50			FB207 FB60	1.) 2.)				MB 240 - 255	
211	ANL1-726	213		4006-C-50			FB 11	-				MB 240 - 255	
215	TRKENN	81		4006-C-50				-				MB 240 - 255	
216	WF726-16	527		4006-C-50			FB207	-				MB 240 - 255	
217	WF726-64	1230		4006-C-50			FB60 FB207	-				MB 240 - 255	
218	PRUF-VS	206		4006-C-50				-				MB 240 - 255	Comfort Version
219	NACHLAD	467		4006-C-50				8.)				MB 240 - 255	
221	MD-TR	299		4006-C-50				4.)				MB 240 - 255	
222	TR-BETR	305		4006-C-50				5.)				MB 240 - 255	
223	WZKORR	336		4006-C-50				6.)				MB 240 - 255	
229	TR:PROGR	545		4006-C-50				7.)				MB 240 - 255	

((3.4.2.))

FB No.	Name	Block length/ Words	Length of Call/ Words	Order No. E88530-B Version 2.0	Pro-cess-ing time ms	Nesting depth	Called FB's	Used DB's in the RAM DB*	RAM Length	EPROM DB	EPROM Length	Used variables	
11	EINR-DB	→ from Basic program											Basic Version
60	BLOCK-TR	→ from Basic program											
207	TR:DB-PB	69		4006-D-50				-				MB 240 - 255	
210	MOD-726	884		4006-D-50			FB207 FB60	1.) 2.)				MB 240 - 255	
211	ANL1-726	219		4006-D-50			FB 11	-				MB 240 - 255	
215	TRKENN	79		4006-D-50				-				MB 240 - 255	
216	WF726-16	482		4006-D-50			FB207	-				MB 240 - 255	
217	WF726-64	1133		4006-D-50			FB60 FB207	-				MB 240 - 255	
218	PRUF-VS	190		4006-D-50				-				MB 240 - 255	Comfort Version
219	NACHLAD	460		4006-D-50				8.)				MB 240 - 255	
221	MD-TR	278		4006-D-50				4.)				MB 240 - 255	
222	TR-BETR	275		4006-D-50				5.)				MB 240 - 255	
223	WZKORR	285		4006-D-50				6.)				MB 240 - 255	
229	TR:PROGR	528		4006-D-50				7.)				MB 240 - 255	

((3.4.3))

3.5 Typical cycle times

3.5.1 ”Standard 1” WF 725

SIMATIC S5-Type / Submode	130W(B) [ms]	150K [ms]	150U [ms]
Machine data	2,0	2,6	0,5
Program data	1,8	2,3	0,4
Traversing without data exchange	7,5	10	1,5
Traversing with data exchange	5,5	7,3	1,0
Transfer of Machine data (FB 221)			
Transfer of operating data (FB 222)	5,0 - 5,5	6,6 - 7,3	1,0 - 1,5
Transfer of tool offset (FB 223)	5,0 - 5,5	6,6 - 7,3	1,0 - 1,5
Checking of traversing blocks (FB 218)			0,8 - 3,1

All values are only ca.- values.

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3.5.2 ”Standard 1” WF 726

SIMATIC S5-Type / Submode	130W(B) [ms]	150U [ms]
Machine data	2,0	10 2,3 *)
Program data	1,8	1,0 2,3 *)
Traversing without data exchange	7,5	2,0 5,0 *)
Traversing with data exchange	5,5	
Transfer of Machine data (FB 221)	6	
Transfer of operating data (FB 222)	5,0 - 5,5	1,0 - 1,5
Transfer of tool offset (FB 223)	5,0 - 5,5	1,0 - 1,5
Checking of traversing blocks (FB 218)		0,3 - 0,8

All values are only circa-values.

*) Dual-Port-Ram 64 Byte

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4 Software structure

4.1 Special characteristics

The software structure is identical for all SINUMERIK types. The following chapter informs about certain special characteristics.

For SINUMERIK 3 and SINUMERIK 850, the organisation blocks OB20, OB21 and OB22 are parametrised for the start functions by the PLC basic program. The interface for start-up routines between user and basic program is the function block 2. In this FB2, the start-up routine for WF 725, WF 726 must also be integrated by the user.

For SINUMERIK 8, the start-up routines for WF 725 in OB20, OB21 and OB22 must be integrated.

In the start-up blocks FB 211 of SINUMERIK 3 and SINUMERIK 850 (FB 192 for SINUMERIK 8), the parameter ”F” for error message of exceeding the RAM memory is not needed, unlike with the SIMATIC. When this error occurs then the PLC of the SINUMERIK is set to stop in the function blocks ”EINR-DB” (Set-Up of data blocks) and ”Block-TR”(Block transfer). For the SIMATIC, this error is read out over the flag in the FB 211 (FB 192).

The parameter P/Q is given in the FB 211 when a PLC S5-150U is used. This parameter differentiates the addressing between ”normal” und ”extended” address range.

When the WF 726 is used the parameter DPRL is additionally used in the FB 211 (FB 192) for setting the length of the Dual-Port-Ram.
The parameter QUAZ in the FB 211 (FB 192) is only needed when the WF 725 is used, and it is parametrised in the following way:

”0” for WF modules with 6 MHz cycle frequency
”1” for WF modules with 8 MHz cycle frequency

The DUAL-PORT-RAM-Length of the WF 725 is only 16 Byte in contrast to the WF 726; therefore the FB 215 and FB 217 of SINUMERIK 3 and SINUMERIK 850 must not be used.

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4.2 SINUMERIK 3,GA4C or SINUMERIK 850 with WF 726

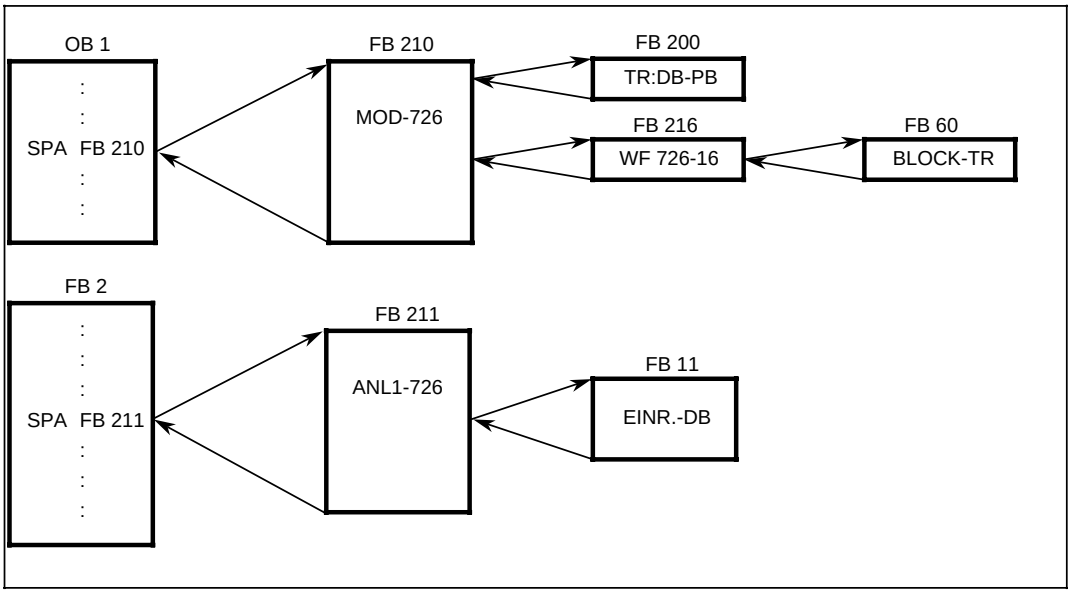


Figure 4.1 Program overview

Block names:

MOD-726	Mode WF
TR:DB-PW	Transfer Data word - periphery word
BLOCK-TR	Block transfer
ANL1-726	Start-up for Standard 1
EINR-DB	Set-Up data blocks
TRKENN	Transfer of Data codings
WF 726-16	Subprogram for DPR-Length 16

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4.3 SINUMERIK 3,GA4C or SINUMERIK 850 with WF 726

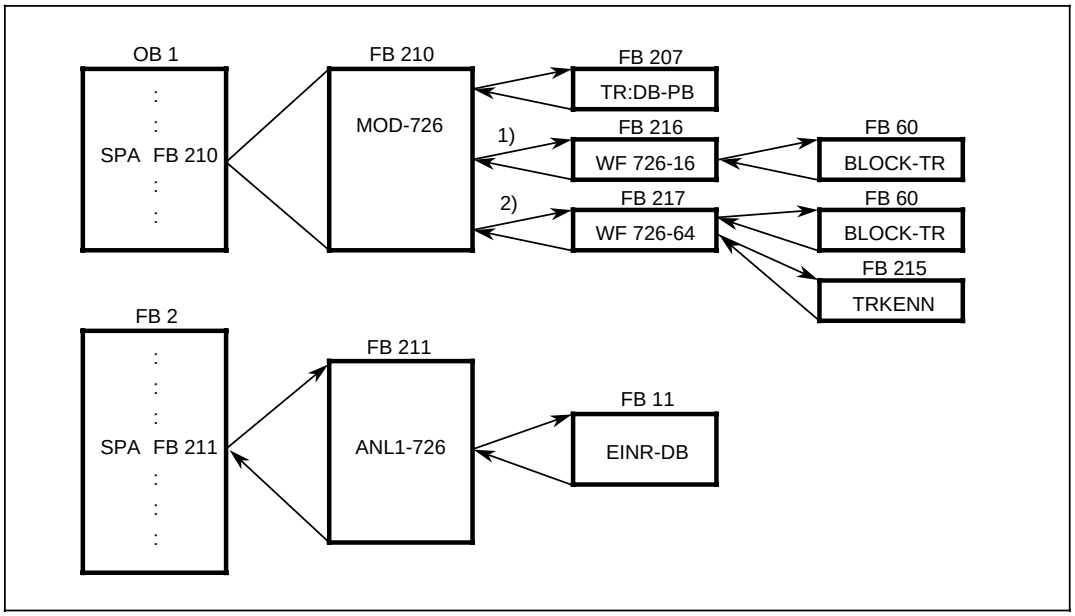


Figure 4.2 Program overview

Block names:	MOD-726	Mode WF
	TR:DB-PW	Transfer data word - periphery word
	BLOCK-TR	Block transfer
	ANL1-726	Start-up for Standard 1
	EINR-DB	Set-Up data blocks
	TRKENN	Transfer data codings
	WF 726-16	Subprogram for DPR-length 16
	WF 726-64	Subprogram for DPR-length 32 and 64

1) FB 216 is only called when a WF 725 or a WF 726 with DPR-length 16 is used.

2) FB 217 is only called when a WF 726 with DPR-length 32/64 is used.

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4.4 SINUMERIK 8 with WF 725

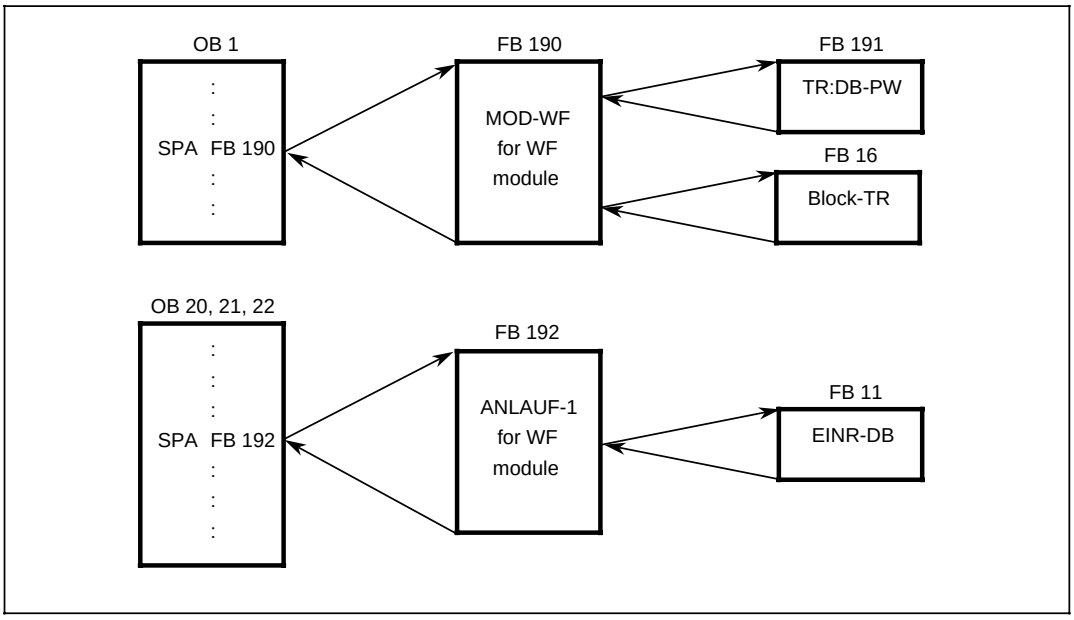


Figure 4.3 Program overview

Block names:		
	MOD-WF	Mode WF
	TR:DB-PW	Transfer data word - periphery word
	BLOCK-TR	Block transfer
	ANLAUF-1	Start-up for Standard 1
	EINR-DB	Set-Up data blocks

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4.5 Alarm processing / Restart

4.5.1 Alarm processing

The standard blocks are intended for use in the cyclic program respectively in the start-up-OBs. However, the used flags are needed beyond the block limits. This has consequences for the use of alarm programs: in the Alarm-OBs the flags MB 240 to MB 255 must either not be used or they must be always saved at the start and written back at the end.

These save and loading routines are not part of the basic version of Standard I.

With SINUMERIK 3,GA4C and SINUMERIK 850, the user does not have to save and load flags. These functions are already part of the basic program.

With SINUMERIK 8, the user must call the corresponding save and loading routines in the OB2.

4.5.2 Restart

For restart after return of voltage, the program continues where it was interrupted, therefore a save/load routine of the dynamic flags (MB 240 - 255) must be used for the OB21 or OB22. The flag area of MW 240 - MW 254 must be saved at the start of OB21 or OB22 in a data block and be written back at the end, as this area is changed by the FB 211.

The save/load function is the same as with the alarm processing. But it is not possible to use the same data area for both cases, as the drop of voltage is also possible in the alarm program.

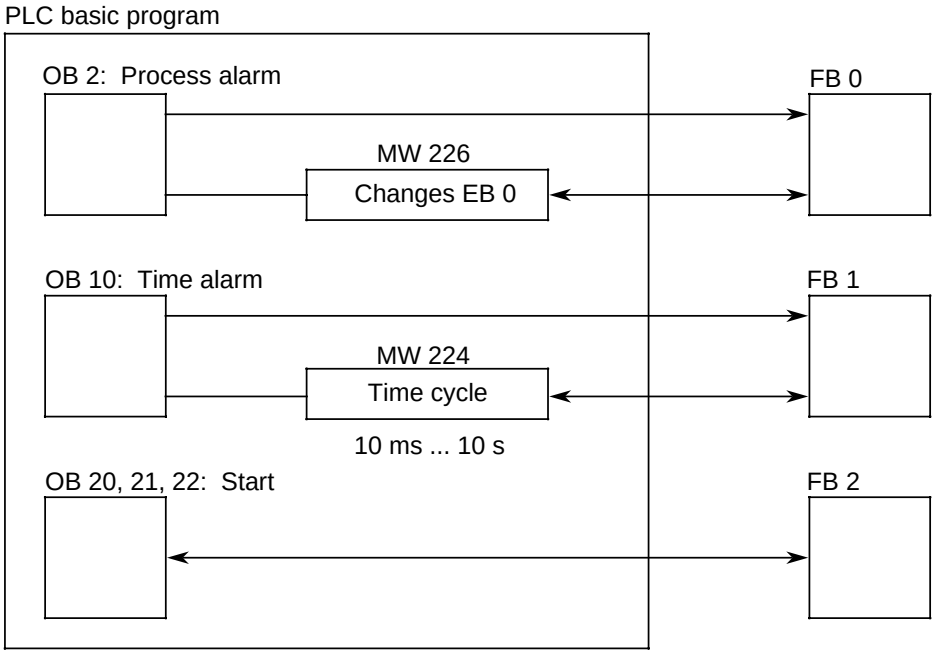
With SINUMERIK 3,GA4C and SINUMERIK 850, the user does not have to save and load flags. These functions are already part of the basic program.

With SINUMERIK 8 the save and loading routines must be set in the OB21 and OB22.

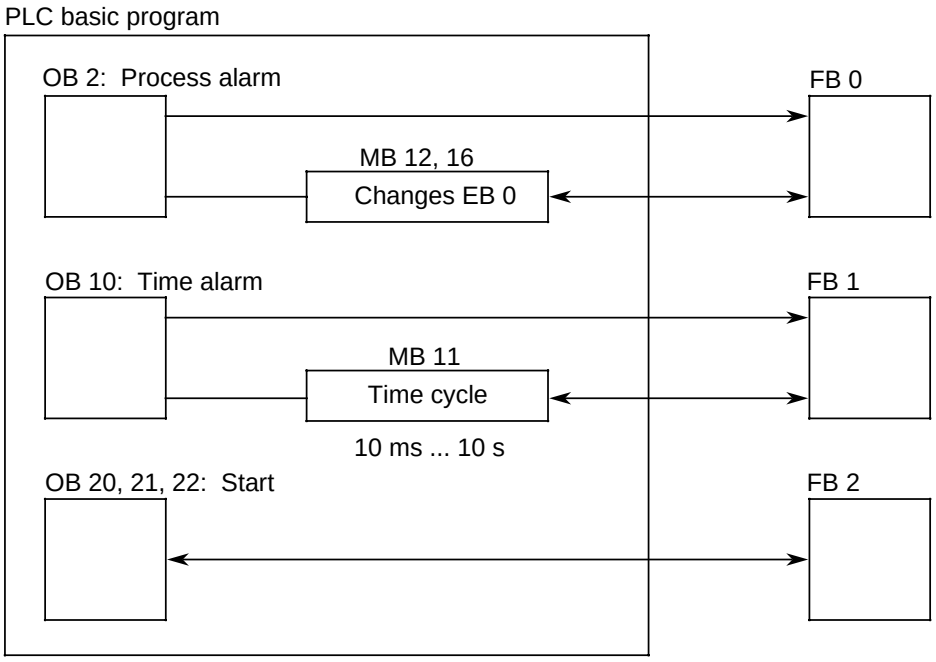
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4.5.3 Alarm and start processing of SINUMERIK 3 and 850

4.5.3.1 Alarm and start processing of SINUMERIK 3,GA4C

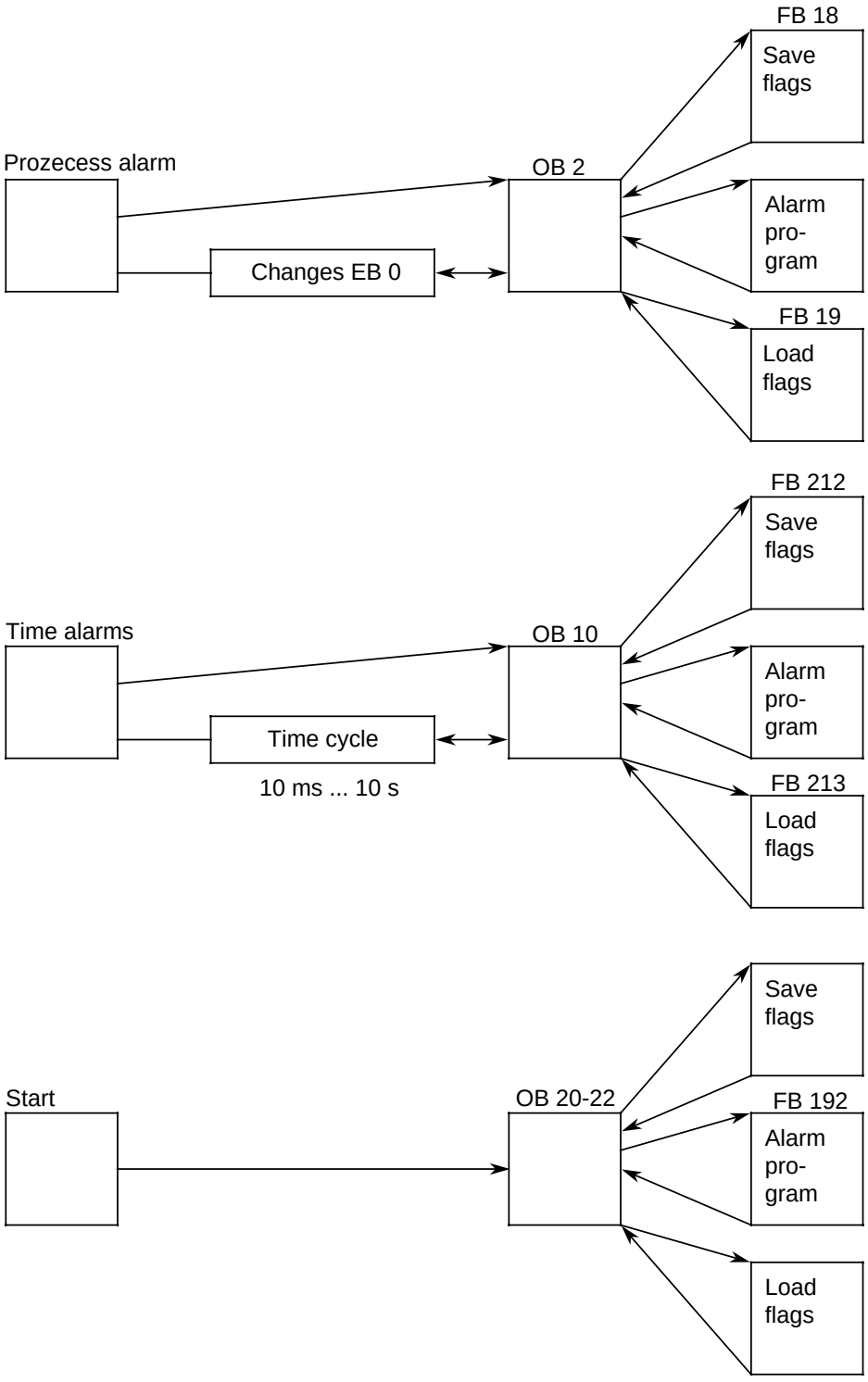


4.5.3.2 Alarm and start processing of SINUMERIK 850 with S5-130W (B) or S5-150U



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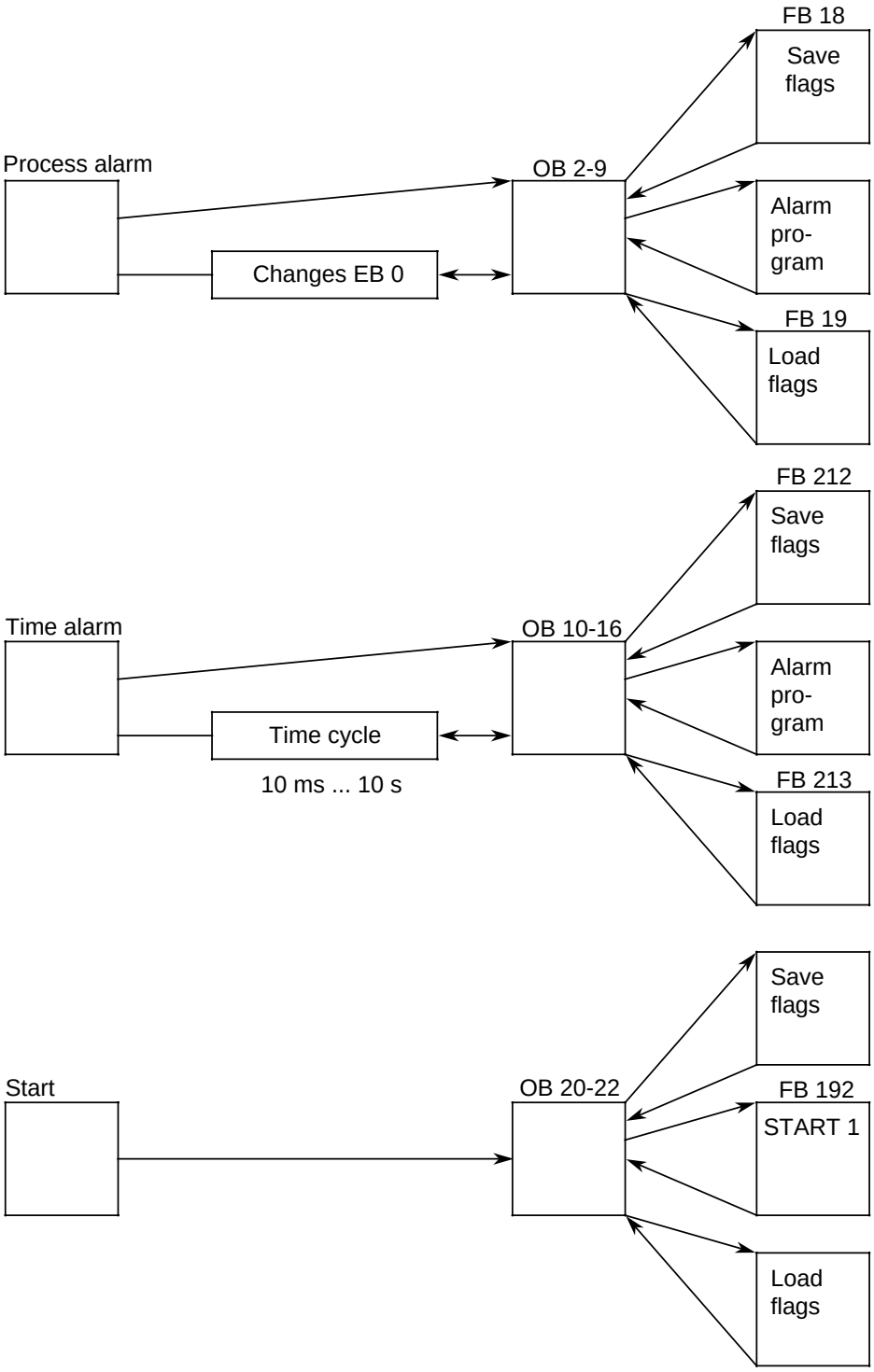
4.5.3.3 Alarm and start processing of SINUMERIK 8 with S5-130W (B)



This figure shows the structure of alarm and start routines in which the flags MB 240 - MB 255 are used.

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4.5.3.4 Alarm and start processing of SINUMERIK 8 with S5-150K, S5-150U



This figure shows the structure of alarm and start routines in which the flags MB 240 - MB 255 are used.

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5 Program examples

5.1 Example 1: SINUMERIK 850 M, T with PLC 1: S5-150U and WF 726

Call-up example FB 210, 211 (1 module)

```
                OB 1
                :
                : SPA   FB210          Module 1
NAME            : MOD-726
DBWF            :       DB150          Data block WF
```

```
                FB 2
                :
                : SPA   FB211          Module 1
NAME            : ANL1-726
DBZU            :       DB150          Data block assignment
DBWF            :       DB160          Data block WF
ANZ             :       KF+3           Total number of axes in the S5
ADR             :       KF+128         Address of the module
A               :       KY2.171        Axis number, DB-Axis for Axis A
B               :       KY1.172        Axis number, DB-Axis for Axis B
C               :       KY3.173        Axis number, DB-Axis for Axis C
AL-A            :       KF+1           Resolution A  (see Chap. 3.1.1 Planning Instructions)
AL-B            :       KF+1           Resolution B  (see Chap. 3.1.1 Planning Instructions)
AL-C            :       KF+2           Resolution C  (see Chap. 3.1.1 Planning Instructions)
QUAZ            :       KF 1           Parameter for quartz
S/EP            :       KH 0050        Number of blocks for EEPROM
P/Q             :       M 155.0        "normal" or "extended" periphery range
                :
                BE
```

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5.2 Example 2: SINUMERIK 8 with PLC 1: S5-130W (B) and WF 725

Call-up example FB 190, 192 (1 module)

```
                OB 1
                :
                : SPA   FB190          Module 1
NAME            : MOD-WF
DBWF            :       DB150          Data block WF
```

```
                OB 20 - 22
                :
                : A     DB170          Save auxiliary flags (only for Restart)
                : L     MW240          (User program)
                : T     DW0            (The data block must be set up before)
                : L     MW241
                : T     MW1
                :       .
                :       .
                :       .
                : L     MW255
                : T     DW15
                :
                : SPA   FB192          Module 1
NAME            : ANLAUF-1
DBZU            :       DB150          Data block Assignment
DBWF            :       DB160          Data block WF
ANZ             :       KF+3           Total number of axes in the S5
ADR             :       KF+128         Address of the module
A               :       KY2.171        Axis number, DB-Axis for Axis A
B               :       KY1.172        Axis number, DB-Axis for Axis B
C               :       KY3.173        Axis number, DB-Axis for Axis C
AL-A            :       KF+1           Resolution A  (see chapter 3.1.1  Planning Instruction)
AL-B            :       KF+1           Resolution B  (see chapter 3.1.1  "  )
AL-C            :       KF+2           Resolution C  (see chapter 3.1.1  "  )
QUAZ            :       KF 1           Parameter for QUARZ
S/EP            :       KH 0050        Number of blocks for EEPROM
1)              :
                :
                :
                : A     DB170          Writing back the auxiliary flags (only for restart)
                : L     DW0            Loading the auxiliary flags (User program)
                : T     MW240
                : L     DW1
                : T     MW241
                :       .
                :       .
                :       .
                : L     DW15
                : T     MW255
                :
                : BE
```

1) When a PLC 150 S/ U is used, a parameter P/Q must also be given.

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5.3 Example 3: SINUMERIK 3,GA4C with PLC 1: S5-130W(B) and WF 726 (Comfort version)

The function blocks of the comfort version are called in dependence to several start signals.

Description of start signals:

Flag Byte 100

Bit-No.	
0	Program 7 is to be transferred to buffer 1
1	Transfer of operating data to axis 1
2	Transfer of tool length offsets to the WF module
3	Transfer traversing blocks in the mode 1
4	Transfer machine data 1 - 48 to axis 1

```
                OB 1
                :
                :SPA   FB101
NAME            :FBST1
                :
                :SPA   FB102
NAME            :FBST2
                :
                :
                :SPA   FB103
NAME            :FBST3
                :
                :
                :SPA   FB104
NAME            :FBST4
                :
                :
                :BE
```

Call of FB210 for handling the DB interface

Call of all blocks which can start data exchange in the mode 0

Call of all blocks which can start data exchange in the mode 1

Call of all blocks which can start data exchange in the mode 3

```
                FB 101
                :
                :SPA   FB210
NAME            :MOD-726
DBWF            :      DB190
                :
                :BE
```

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```
                FB 102
                :
                : UN    M100.1
                : SPB   =WZKO
                : A     DB150          DB data buffer
                : U     M90.1          Auxiliary flag
                : SPB   =TRBE
                : P     D7.14          Command for input
                : SPB   =WZKO
                : L     KH4001         Input; RAM; Axis 1
                : T     DW7
                : S     M90.1
                :
TRBE            : SPA   FB222          FB-Transfer operating data
NAME            : TR-BETR
DBZU            :       DB200
ADR             :       KY150, 120     Address of the data buffer
                : P     D7.14          Command for input
                : SPB   =WZKO
                : L     DW11
                : T     MW122          Output of errors to flags
                : R     M90.1
                :R      M100.1
                :
WZKO            : UN    M100.2
                : SPB   =PUFF
                : A     DB150
                : U     M90.2
                : SPB   =PUFF
                : P     D12.14         Command for input
                : SPB   =TRWZ
                : L     KH4001         Input ; RAM; Axis 1
                : T     DW12
                : S     M90.2
                :
TRWZ            : SPA   FB223          FB - tool length offset
NAME            : WZKORR
DBZU            :       DB200
ADR             :       KY150.140      Address of the data buffer
                : P     D12.14         Command for input
                : SPB   =PUFF
                : L     DW12
                : T     MW124          Output of errors to flags
                : R     M90.2
                : R     M100.2
PUFF            : UN    M100.0
                : BEB
                :
                : L     KB1
                : T     MB151          Axis number ”1”
                : T     MB152          Buffer number ”1”
                : L     KY160, 20
                : T     MW153          DB160, DW 20
                :
                : U     M90.0
                : SPB   =PUTR
                : L     KB1
                : T     MB150          Start ; Input to WF; BCD
                : S     M90.0
                :
PUTR            : SPA   FB219          Reload traversing blocks in buffer
NAME            : NACHLAD
DBZU            :       DB200          Data block assignment
NACH            :       M150.0         Start signal
E/A             :       M150.1         Input / Output
B/D             :       M150.2         BCD/Dual
ACHS            :       MB151          Axis number
ANF             :       MW153          Start address (DB, DW)
PUFF            :       MB152          Buffer number
F-NR            :       MW155          Error number
S : NR          :       MB157          Block number
```


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```
      : U     M150.0
      : BEB
      :
      : L     MW155
      : T     MW126      Error number
      : R     M100.0
      : R     M90.0
      :
      : BE
```

```
      FB 103
      :
      : UN    M100.3
      : BEB
      :
      : L     KB1
      : T     MB161      Axis number
      : T     MB162      Axes for which the program is valid
      : T     MB163      Program number for program to be read out
      : L     KY170, 20
      : F     MW164      Start address
      :
      : U     M90.3
      : SPB   =VSTR
      : L     KB1
      : T     MB160      Start of data transfer (once)
      : S     M90.3
      :
VSTR  : SPA   FB229      Input/Output of traversing programs
NAME  : TR: PROGR
DBZU  :       DB200
TRPR  :       M160.0     Start
E/A   :       M160.1     Transfer to WF
B/D   :       M160.2     BCD format
R/E   :       M160.3     RAM memory
ACHS  :       MB161      Axis number
GUA   :       MB162      valid axes
P-NR  :       MB163      Program number
ANF   :       MW164      Start address (DB, DW)
F-NR  :       MW166      Error number
      :
      : U     M160.0
      : BEB
      :
      : L     MW166
      : T     MW128      Error number
      : R     M90.3
      : R     M100.3
      :
      : BE
```

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```
                FB 104
                :
                :UN     M100.4
                :BEB
                :
                :A      DB150
                :L      KY150, 10       DB, DW
                :T      MW240           Start address in the DB
                :L      KB200           DB number
                :T      MW242           DB-ZU
                :
                :U      M90.4           Auxiliary flags
                :SPB    =TRMD
                :P      D1.14           Transfer to the WF
                :BEB
                :
                :L      KH4001          to WF; BCD; RAM; Axis 1
                :T      DW1
                :S      M90.4
                :
TRMD            :SPA    FB221           Machine data transfer
NAME            :MD-TR
DBZU            :       DB0
ADR             :       KY0, 0
                :
                :P      D1.14           Transfer to the WF
                :BEB
                :
                :L      DW6             Error number
                :T      MW120
                :R      M100.4
                :R      M90.4
                :
                :BE
```

Start functions:

```
                FB 2
                :
                :L      KB0
                :T      MB100           Delete auxiliary flags
                :T      MB90            Delete auxiliary flags
                :
                :SPA    FB211
NAME            :ANL1-726
DBZU            :       DB200           Data block assignment
DBWF            :       DB190           Data block WF module
ANZ             :       KF+3            Total number of axes
ADR             :       KF+128          Address of the module
DPRL            :       KF+16           Length of DPR (only for WF726)
A               :       KY1, 191        Axis number, DB for axis A
B               :       KY2, 192        Axis number, DB for axis B
C               :       KY3, 193        Axis number, DB for axis C
AL-A            :       KF+1            Resolution axis A:  1 µm
AL-B            :       KF+1            Resolution axis B:  1 µm
AL-C            :       KF+2            Resolution axis C:  10 µm
S/EP            :       KH0050          Numer of blocks for EPROM
                :
                :BE
```


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6 Ordering data

6.1 Overview of available software packages for WF 725

Software packages	Order number
”Standard 1” for:	
SINUMERIK 3,GA4B with S5-130W (B)	6FM1 725 - 7SM00
SINUMERIK 8 with S5-130W (B)	6FM1 725 - 7SN00
with S5-150K	6FM1 725 - 7SP00
with S5-150U	6FM1 725 - 7SR00
SINUMERIK 850 with S5-130W (B)	6FM1 725 - 7SS00
with S5-150U	6FM1 725 - 7ST00
SINUMERIK 3,GA4C with S5-130W (B) (Auxiliary axis+tool magazin+display)	6FM1 725 - 7SW00

6.2 Overview of available software packages for WF 726

Software packages	Order number
”Standard 1” for:	
SINUMERIK 3,GA4C with S5-130W (B)	6FM1 725 - 7SM00
SINUMERIK 850 with S5-130W (B)	6FM1 725 - 7SS00
with S5-150U	6FM1 725 - 7ST00
SINUMERIK 3,GA4C with S5-130W (B) (Auxiliary axis+tool magazin+display)	6FM1 725 - 7SW00

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6.3 Documentation

Designation		Order number
WF 725	Positioning modules Description of modules	E80850-J146-X-A2-7600
WF 726	Positioning modules Planning Instructions - Interface description of the hardware	6ZB5440-0GJ02-0AA1
WF 725	Positioning modules Planning Instructions - Interface description (only Standard - 726 is significant for this)	6ZB5440-0GL02-0AA1
WF 725/726	Positioning modules Installation Instructions- Description	6ZB5440-0FW02-0AA0
WF 725/726	Positioning modules Installation Instructions - Lists	6ZB5440-0JQ02-0AA0
WF 725/726	Positioning modules NC - Auxiliary axis and tool magazin for SINUMERIK 3,GA4C	6ZB5440-0JB02-0AA0

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Suggestions

Corrections

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WF 725/WF 726
Positioning Modules

Planning Instructions Part 5

Order-No.: 6ZB5 440-0GN02-0AA0

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