



SINUMERIK 840  
Software Versions 1 and 2  
Installation Lists

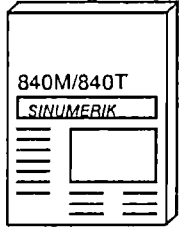
Installation Guide

03.92 Edition

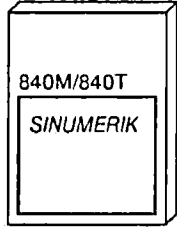
Service Documentation

# SINUMERIK 840

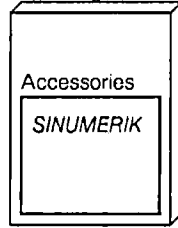
## General Documentation



Technical Data

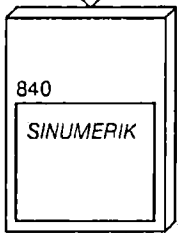


Catalog NC 35

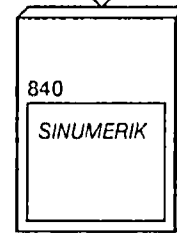


Catalog NC 90

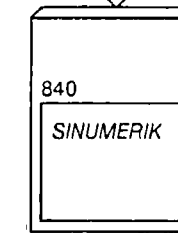
## User Documentation



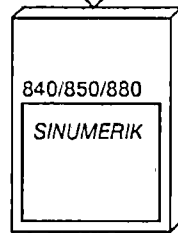
Operator's Guide



Programming Guide

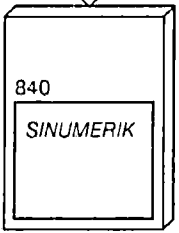


Cycles  
Programming Guide

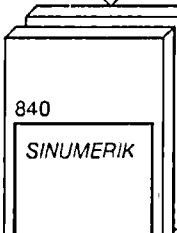


Measuring Cycles  
Version 20

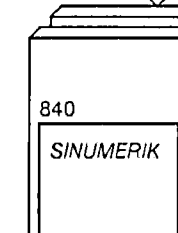
## Manufacturer Documentation



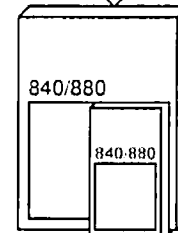
Instruction Manual



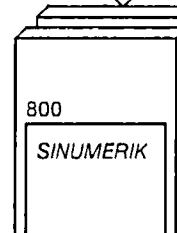
Interface:  
- Signals  
- Cables and  
Connections



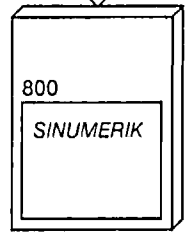
Function Block  
Packages  
Function macros



Quick Reference,  
Planning  
PLC 135 WB  
S5-HLL

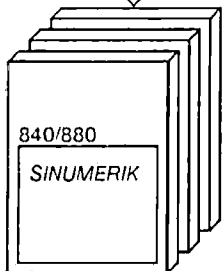


SINUMERIK  
WS 800A  
- CL 800 Cycle language  
- User's Guide

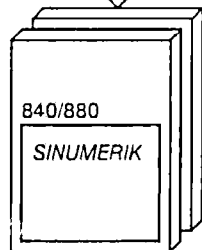


Universal Interface

## Manufacturer Documentation

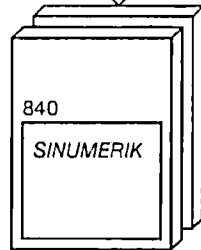


Computer Interface  
- SIN T  
- SIN PS 231  
- SIN PS 315

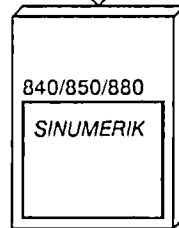


Computer Interface  
- Telegram Description  
- General Description

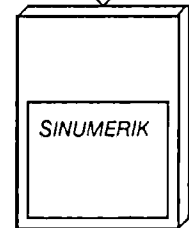
## Service Documentation



Installation Guide  
- Instructions  
- Lists



Measuring Cycles  
Version 20



Spare Parts List



# **SINUMERIK 840 Software Versions 1 and 2**

## **Installation Lists**



**Installation Guide**

**Service Documentation**



**Valid for:**

<i>Control</i>	<i>Software Version</i>
SINUMERIK 840T	1/2
SINUMERIK 840M	1/2



**March 1992 Edition**

# SINUMERIK® documentation

## Printing history

Brief details of this edition and previous editions are listed below.

The status of each edition is shown by the code in the "Remarks" column.

*Status code in "Remarks" column:*

**A** . . . New documentation

**B** . . . Unrevised reprint with new Order No.

**C** . . . Revised edition with new status.

If factual changes have been made on the page since the last edition, this is indicated by a new edition coding in the header on that page.

Edition	Order No.	Remarks
04.90	6ZB5 410-0FD02-OAA0	A
03.92	6ZB5 410-0FD02-OAA2	C

Other functions not described in this documentation might be executable in the control. This does not, however, represent an obligation to supply such functions with a new control or when servicing.

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PLC Machine Data

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Error List for PLC 135WB at System Stop

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# 1 Module Overview

Modules in module carrier	Type	B = Basic version O = Option
Active serial interface 2x	6FX1131 - 5BA. .	O
Active serial interface 3x	6FX1137 - 3BA. .	O
Analog input module	6FX1136 - 1BA. .	O
Output module 32 outputs, 0.5 A	6FX1122 - 8BC. .	O
Output module 32 outputs, 2 A	6FX1122 - 8BD. .	O
Operator panel interface OPI (software version 1)	6FX1138 - 8BA. .	B
Operator panel interface OPI (from software version 2)	6FX1138 - 8BA. .	B
EU interface EU/MPC	6FX1132 - 0BA. .	O
EU interface EU/16 bits	6FX1137 - 8BA. .	O
Input module 64I	6FX1125 - 7BA. .	O
Mixed input/output module	6FX1138 - 4BA. .	O
Handwheel interface MPG	6FX1144 - 0BA. .	O
CPU IFC interface	6FX1123 - 3CA. .	B
DMP interface	6FX1144 - 2BA. .	O
DAC measuring circuit modules	6FX1121 - 4B. . .	O
HMS <sub>20mm</sub> measuring circuit modules	6FX1145 - 6BB. .	O
HMS <sub>40mm</sub> measuring circuit modules	6FX1145 - 6BA. .	O
NC-CPU (master CPU)	6FX1123 - 1CA. .	B
Power supply unit	6EW1861 - 2AE. .	B
PLC-CPU 135 WB	6FX1138 - 6B. . .	B
UMS configuring module	6FX1126 - 7BA. .	O
SINEC H1 interface	6FX1123 - 1BA. .	O



Submodules	Insertable on module	Type	B = Basic version O = Option
EPROM memory	NC-CPU	6FX1124 - 1CA. .	B
EPROM submodule 128 Kbytes		6FX1130 - 5BA. .	
EPROM submodule 64 Kbytes		6FX1130 - 5BB. .	
EPROM submodule 128 Kbytes		6FX1128 - 4B.00	
EPROM submodule 256 Kbytes		6FX1128 - 4B.00	
RAM submodule 64 Kbytes	UMS	6FX1134 - 2BD. .	
RAM submodule 128 Kbytes	UMS	6FX1134 - 2BC. .	
HMS set value	HMS	6FX1132 - 5BA. .	
EXE	DAC		

External modules	Type	B = Basic version O = Option
Selection unit machine control panel DMP	6FX1144 - 8BA. .	
Selection submodule DMP-MOD	6FX1142 - 7BA. .	
Standard machine control panel	6FX1144 - 7BA. .	
Key submodule	6FX1145 - 1BA. .	
I/O submodule DMP 16/16	6FX1142 - 4BA. .	O
Terminal block	6FX1142 - 1BA. .	O
I-module DMP 32I	6FX1142 - 2BA. .	O
Operator panel unit KYRU	6FX1144 - 6BA. .	B
Monitor colour		
Monitor monochrome		

## 2 NC Machine Data

### NC MD allocation

NC MDs	Meaning	Softkey	Installation Guide Section
0 to 999	General MDs	General data	8.2
1000 to 1499	Channel-specific MDs	Channel data	8.3
2000 to 3999	Axis-specific MD 1	Axial data 1	8.4
11000 to 14519	Axis-specific MD 2	Axial data 2	8.5
4000 to 4999	Spindle-specific MD	Spindle data	8.6
20000 to 20449	MDs for CRT display unit	Display data	8.7
	Machine data bits	Bit displays	8.8
5000 to 5199	General MD bits	General bits	8.8.1
5200 to 5399	Spindle-specific MD bits	Spindle bits	8.8.2
5400 to 5999	Channel-specific MD bits 1	Channel bits 1	8.8.3
9000 to 9299	Channel-specific MD bits 2	Channel bits 2	8.8.3
5600 to 5999	Axis-specific MD bits 1	Axial bits 1	8.8.4
18000 to 18599	Axis-specific MD bits 2	Axial bits 2	8.8.5
6000 to 6999	Leadscrew error, compensation bits	Compensation flags	8.8.6

## 2.1 General values

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
1	Speed after SW prelimit switch	500	100000	IS	1000 units/min
2					
3	Corner deceleration rate	500	100000	IS	1000 units/min
6	Threshold for CRC insertion blocks	0	2000	IS	units
7	Circle end point monitoring	5	32000	IS	units
9	Error window on reapproach to circle contour	200	32000	IS	units
10	Feed after block search	1000	100000	IS	1000 units/min
13	Number of TO parameters	10	32	--	
14	Password protected R parameter	0	999	--	
15	Password protected R parameter	0	999	--	
16	Keyswitch protected R parameter	0	999	--	
17	Keyswitch protected R parameter	0	999	--	
18	Zero offset group (L960)	1	10	--	
19	Subsequent cutting edge/ P number in TO memory	10	32	--	
20	Basic angle for nutating head	0	180000	IS	degrees
23	Number of buffer pairs CP 231	16	16	--	--
24	Number of buffer pairs CP 315 - 1	16	16	--	--
25	Number of buffer pairs CP 315 - 2	16	16	--	--
26	User program useful data length CP 231	234	256	--	--
27	User program useful data length CP 315 - 1	234	256	--	--
28	User program useful data length CP 315 - 2	234	256	--	--

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
30	Number of sectors of processing memory (as from SW 2)	10	1000	--	Sector
100	Feedrate override 2nd position	1	150	--	%
101	- // - 3rd position	2	150	--	%
102	- // - 4th position	4	150	--	%
103	- // - 5th position	6	150	--	%
104	- // - 6th position	8	150	--	%
105	- // - 7th position	10	150	--	%
106	- // - 8th position	20	150	--	%
107	- // - 9th position	30	150	--	%
108	- // - 10th position	40	150	--	%
109	- // - 11th position	50	150	--	%
110	- // - 12th position	60	150	--	%
111	- // - 13th position	70	150	--	%
112	- // - 14th position	75	150	--	%
113	- // - 15th position	80	150	--	%
114	- // - 16th position	85	150	--	%
115	- // - 17th position	90	150	--	%
116	- // - 18th position	95	150	--	%
117	- // - 19th position	100	150	--	%
118	- // - 20th position	105	150	--	%
119	- // - 21st position	110	150	--	%
120	- // - 22nd position	115	150	--	%
121	- // - 23rd position	120	150	--	%
122	- // - 24th position	0	150	--	%
123	- // - 25th position	0	150	--	%
124	- // - 26th position	0	150	--	%
125	- // - 27th position	0	150	--	%
126	- // - 28th position	0	150	--	%
127	- // - 29th position	0	150	--	%
128	- // - 30th position	0	150	--	%

## 2.1 General values

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
129	- // - 31st position	0	150	--	%
130	- // - 32nd position	0	150	--	%
131	Spindle override 1st position	50	150	--	%
132	- // - 2nd position	55	150	--	%
133	- // - 3rd position	60	150	--	%
134	- // - 4th position	65	150	--	%
135	- // - 5th position	70	150	--	%
136	- // - 6th position	75	150	--	%
137	- // - 7th position	80	150	--	%
138	- // - 8th position	85	150	--	%
139	- // - 9th position	90	150	--	%
140	- // - 10th position	95	150	--	%
141	- // - 11th position	100	150	--	%
142	- // - 12th position	105	150	--	%
143	- // - 13th position	110	150	--	%
144	- // - 14th position	115	150	--	%
145	- // - 15th position	120	150	--	%
146	- // - 16th position	120	150	--	%
147	Rapid override 1st position	1	100	--	%
148	- // - 2nd position	10	100	--	%
149	- // - 3rd position	50	100	--	%
150	- // - 4th position	100	100	--	%
151	- // - 5th position	0	100	--	%
152	- // - 6th position	0	100	--	%
153	- // - 7th position	0	100	--	%
154	- // - 8th position	0	100	--	%
155	Position controller scan time (SW 1)	8	40	--	0.5 ms
155	Position controller pulse rate (as from SW 2)	8	40	--	Multiple of basic cycle time for drive
156	Switch-off delay Controller enable	200	1000	--	ms

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
157	Control type for standard cycles	T 41.. M 42..	0 0	--	--
160	Ratio of interpolation to position control	4	32	--	--
168	Basic cycle time for drive (as from SW 2)	8	2, 4, 8, 16, 32	--	62.5 µs
200	V.24-RS232C number from PLC	1	2	--	
208	Maximum tool wear P5, P6	999 999	999 999	IS	0.01 units
209	Maximum tool wear P7	999 999	999 999	IS	0.01 units
210	Number of TO areas	1	4	--	--
211	Start D No. for TO area	1	809	--	--
212	" "	2	809	--	--
213	" "	3	809	--	--
214	" "	4	809	--	--
228	User menu for MDA	0	1000	--	--
229	User menu for JOG	0	1000	--	--
230	User menu for TEACH IN	0	1000	--	--
231	User menu for AUTOMATIC	0	1000	--	--
232	User menu for JOG/REFPOINT	0	1000	--	--
250	Change of language (as from SW 2)	0	1	--	--
260	M function "C axis ON" (as from SW 2)	-1	9999	--	--
261	M function "C axis OFF" (as from SW 2)	-1	9999	--	--

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
730	1st transformation, param. 1	0	± 99999999	IS	units
731	1st transformation, param. 2	0	± 99999999	IS	units
732	1st transformation, param. 3	0	± 99999999	IS	units
733	1st transformation, param. 4	0	± 99999999	IS	units
734	1st transformation, param. 5	0	± 99999999	IS	units
735	1st transformation, param. 6	0	± 99999999	IS	units
736	1st transformation, param. 7	0	± 99999999	IS	units
737	1st transformation, param. 8	0	± 99999999	IS	units
738	1st transformation, param. 9	0	± 99999999	IS	units
739	1st transformation, param. 10	0	± 99999999	IS	units
740	2nd transformation, param. 1	0	± 99999999	IS	units
.	"	"	"	"	"
750	3rd transformation, param. 1	0	± 99999999	IS	units
.	"	"	"	"	"
760	4th transformation, param. 1	0	± 99999999	IS	units
.	"	"	"	"	"
770	5th transformation, param. 1	0	± 99999999	IS	units
.	"	"	"	"	"
780	6th transformation, param. 1	0	± 99999999	IS	units
.	"	"	"	"	"
790	7th transformation, param. 1	0	± 99999999	IS	units
.	"	"	"	"	"
800	8th transformation, param. 1	0	± 99999999	IS	units
.	"	"	"	"	"

MD No.	Designation		Standard value	Maximum input value	Reference system	Input unit
876	Leading axis	No. 1	0	9	--	--
877	Following axis	No. 1	0	9	--	--
878	Leading axis	No. 2	0	9	--	--
879	Following axis	No. 2	0	9	--	--
880	Leading axis	No. 3	0	9	---	---
881	Following axis	No. 3	0	9	---	---
882	Leading axis	No. 4	0	9	---	---
883	Following axis	No. 4	0	9	---	---
884	Leading axis	No. 5	0	9	---	---
885	Following axis	No. 5	0	9	---	---
886	Leading axis	No. 6	0	9	---	---
887	Following axis	No. 6	0	9	---	---
888	Leading axis	No. 7	0	9	---	---
889	Following axis	No. 7	0	9	---	---
890	Leading axis	No. 8	0	9	---	---
891	Following axis	No. 8	0	9	---	---
892	Leading axis	No. 9	0	9	---	---
893	Following axis	No. 9	0	9	---	---
894	Leading axis	No. 10	0	9	---	---
895	Following axis	No. 10	0	9	---	---
896	Leading axis	No. 11	0	9	---	---
897	Following axis	No. 11	0	9	---	---
898	Leading axis	No. 12	0	9	---	---
899	Following axis	No. 12	0	9	---	---
900						
901						
902						
903						
904						



## 2.2 Channel-specific values (max. 4 channels)

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
100*	MD for control configuration	1	--	--	--
104*	TO area for channel	1	4	--	--
106*	No. of enabled program	0	1)	--	--
108*	Delete position 1st G group	01	35		--
110*	Delete position 3rd G group	840M:17 840T:18	19	--	--
112*	Delete position 6th G group	54	57	--	--
114*	Delete position 8th G group	840M:60 840T:64	64	--	--
116*	Delete position 9th G group	0	0	--	--
118*	Delete position 12th G group	840M:94 840T:95	97	--	--
120*	Delete position 15th G group	150	159	--	--
122*	Delete position 20th G group (as from SW 2)	0	202	--	--
130*	Interface for external processing (as from SW 2)	1	1, 2, 5	--	--

1) % +9999  
L - 999  
all %, L = 0

## 2.3 Axis-specific values (max. 12 axes)

MD No..	Designation	Standard value	Maximum input value	Reference system	Input unit
2000	Assign. act. axis value 1st axis	01 01 00 00		--	--
2001	Assign. act. axis value 2nd axis	01 02 00 00			
2002	Assign. act. axis value 3rd axis	00 00 00 00			
:	:	840T			
2002	Assign. act. axis value 3rd axis	01 03 01 00			
:	:	840M			
:	:	:	0		
2011	Assign. act. axis value 12th axis	0		--	--
204*	Exact stop limit coarse	40	16.00	MS	units
208*	Exact stop limit fine	10	16000	MS	units
212*	Zero speed control	100	16000	MS	units
216*	Tolerance band zero mark monitoring				valid to SW 1
220*	Backlash compensation	0	+/- 255	MS	units
224*	1st software limit switch plus	+ 99999999	+/- 99999999	MS	units
228*	1st software limit switch minus	- 99999999	+/- 99999999	MS	units
232*	2nd software limit switch plus	+ 99999999	+/- 99999999	MS	units
236*	2nd software limit switch minus	- 99999999	+/- 99999999	MS	units
240*	Reference point value	0	+/- 99999999	MS	units
244*	Reference point offset	0	+/- 9999	MS	units
248*					
252*	Servo gain factor	1.666	10000		1/100 sec
256*					
260*	Multgain	2.400	64000	MS	min/1000 units
264*	Threshold for drive error	9.600	15000	--	VELO
268*	Max. set speed (DAC)	8.192	8192	--	VELO
272*	Drift compensation	0	+/- 500	--	VELO
276*	Acceleration	50	4000	IS	10000 units/s <sup>2</sup>
280*	Max. speed	10.000	4900000	IS	1000 units/min
284*	Ref. point switch-off speed	300	4900000	IS	1000 units/min
288*	Jog speed	2.000	4900000	IS	1000 units/min
292*	Jog rapid	5.000	4900000	IS	1000 units/min
296*	Ref. point approach speed	10.000	4900000	IS	1000 units/min

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
300*	Incremental speed	500	4900000	IS	1000 units/min
304*	Interpolation parameter name	1, 2, 3	3	1 = I; 2 = J; 3 = K	
308*	Cut-off frequency C encoder (as from SW 2)	200	16000		kHz
312*	Feedforward factor (as from SW 2)	0	1000		0.1%
316*	Reference pointer compensation +	0	249	--	MD offset
320*	Reference pointer compensation -	0	249	--	MD offset
324*	Distance between 2 leadscrew error compensation values	0	32000	MS	units
328*	Compensation value with leadscrew error compensation	0	100	MS	units
332*	Tolerance band contour monitoring	1000	16000	MS	units
336*	Threshold speed contour	5	1000000	IS	1000 units/min
344*	Modulo value rotary axis for leadscrew error compensation	0	+ 92160000	MS	units
360*	Axis valid in mode group	1	2		
364*	Factor for position controller pulses	1	16000	--	--
368*	Factor for actual value pulses	2	16000	--	--
372*	Delay zero speed control	200	1000		ms
3840	Assignment set axis value	01 04 00 00		--	--
3841	1st axis	01 05 00 00		--	--
3842	Assignment set axis value	00 00 00 00		--	--
	2nd axis	00 00 00 00		--	--
	Assignment set axis value	01 06 00 00		--	--
	3rd axis				
	840 T				
	840 M				
3843	Assignment set value 4th axis	00 00 00 00		--	--
:	::	:		--	--
3851	Assignment set value 12th axis	00 00 00 00		--	--
388*	Weighting factor for path conversion	0	99999999	--	--
392*	Feedforward time constant (as from SW 2)	0	1000		0.1 ms
396*	Absolute offset (as from SW 2)	0	99999999	IS	units

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
1100*	Prelimit switch	20000	± 99999999	MS	units
1104*	Divider number (as from SW 2)	0	999	--	--
1108*	Divider reference dimension (as from SW 2)	0	99999999	MS	units
1112*	Divider dimension offset (as from SW 2)	0	± 99999999	MS	units
1116*	Pulse multiplication HMS (as from SW 2)	1	128	MS	--
1124*	D portion feedforward (as from SW 2)	0	1000	--	0.1%
1224*	Servo enable delay (as from SW 2)	400	1000	--	ms
1272*	Setpoint filter time constant (as from SW 2)	0	1000	--	0.1 ms
1396*	Position controller clock frequency (as from SW 2)	1	64	--	Multiple of position controller's basic clock frequency

## 2.4 Spindle-specific values (max. 4 spindles)

## 2.4 Spindle-specific values (max. 4 spindles)

MD No.	Designation		Standard value	Maximum input value		Reference system	Input unit
4000	Assignment	1st spindle	1 03 00 01	03 03 00 00		--	--
4001	-//-	2nd spindle	0	"		--	--
4002	-//-	3rd spindle	0	"		--	--
4003	-//-	4th spindle	0	"		--	--
401*	Drift compensation (spindle)		0	+/- 500		--	VELO
402*			--	--		--	--
403*	Max. speed for	1st gear	500	SW1 SW2	16000 99999	--	rev/min <sup>1)</sup>
404*	-//-	2nd gear	1000	SW1 SW2	16000 99999	--	rev/min <sup>1)</sup>
405*	-//-	3rd gear	2000	SW1 SW2	16000 99999	--	rev/min <sup>1)</sup>
406*	-//-	4th gear	4000	SW1 SW2	16000 99999	--	rev/min <sup>1)</sup>
407*	-//-	5th gear	4000	SW1 SW2	16000 99999	--	rev/min <sup>1)</sup>
408*	-//-	6th gear	4000	SW1 SW2	16000 99999	--	rev/min <sup>1)</sup>
409*	-//-	7th gear	4000	SW1 SW2	16000 99999	--	rev/min <sup>1)</sup>
410*	-//-	8th gear	4000	SW1 SW2	16000 99999	--	rev/min <sup>1)</sup>
411*	Min. speed for	1st gear	50	SW1 SW2	16000 99999	--	rev/min <sup>1)</sup>
412*	-//-	2nd gear	500	SW1 SW2	16000 99999	--	rev/min <sup>1)</sup>
413*	-//-	3rd gear	1000	SW1 SW2	16000 99999	--	rev/min <sup>1)</sup>
414*	-//-	4th gear	2000	SW1 SW2	16000 99999	--	rev/min <sup>1)</sup>
415*	-//-	5th gear	2000	SW1 SW2	16000 99999	--	rev/min <sup>1)</sup>
416*	-//-	6th gear	2000	SW1 SW2	16000 99999	--	rev/min <sup>1)</sup>
417*	-//-	7th gear	2000	SW1 SW2	16000 99999	--	rev/min <sup>1)</sup>
418*	-//-	8th gear	2000	SW1 SW2	16000 99999	--	rev/min <sup>1)</sup>

<sup>1)</sup> if MD 520\* bit3 = 1, input resolution 0.1/min

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
419*	Acceleration time constant for 1st gear	SW1 200 SW2 800	16000 50000	--	4 ms 1 ms
420*	- // - 2nd gear	SW1 200 SW2 800	16000 50000	--	4 ms 1 ms
421*	- // - 3rd gear	SW1 200 SW2 800	16000 50000	--	4 ms 1 ms
422*	- // - 4th gear	SW1 200 SW2 800	16000 50000	--	4 ms 1 ms
423*	- // - 5th gear	SW1 200 SW2 800	16000 50000	--	4 ms 1 ms
424*	- // - 6th gear	SW1 200 SW2 800	16000 50000	--	4 ms 1 ms
425*	- // - 7th gear	SW1 200 SW2 800	16000 50000	--	4 ms 1 ms
426*	- // - 8th gear	SW1 200 SW2 800	16000 50000	--	4 ms 1 ms

<sup>1)</sup> if MD 520\* bit3 = 1, input resolution is 0.1/min

## 2.4 Spindle-specific values (max. 4 values)

MD-No.	Designation	Standard value	Maximum input value	Reference system	Input unit
427*	Switch-off speed for M19 1st gear	100	1500	--	rev/min <sup>1)</sup>
428*	- // - 2nd gear	100	1500	--	rev/min <sup>1)</sup>
429*	- // - 3rd gear	100	1500	--	rev/min <sup>1)</sup>
430*	- // - 4th gear	100	1500		rev/min <sup>1)</sup>
431*	- // - 5th gear	100	1500	--	rev/min <sup>1)</sup>
432*	- // - 6th gear	100	1500	--	rev/min <sup>1)</sup>
433*	- // - 7th gear	100	1500	--	rev/min <sup>1)</sup>
434*	- // - 8th gear	100	1500	--	rev/min <sup>1)</sup>
435*	Gain factor for M19 1st gear	200	10000	--	SW1 rev/min/360 SW2 rev/100 sec
436*	- // - 2nd gear	200	10000	--	SW1 rev/min/360 SW2 rev/100 sec
437*	- // - 3rd gear	200	10000	--	SW1 rev/min/360 SW2 rev/100 sec
438*	- // - 4th gear	200	10000	--	SW1 rev/min/360 SW2 rev/100 sec
439*	- // - 5th gear	200	10000	--	SW1 rev/min/360 SW2 rev/100 sec
440*	- // - 6th gear	200	10000	--	SW1 rev/min/360 SW2 rev/100 sec
441*	- // - 7th gear	200	10000	--	SW1 rev/min/360 SW2 rev/100 sec
442*	- // - 8th gear	200	10000	--	SW1 rev/min/360 SW2 rev/100 sec

<sup>1)</sup> if MD 520\* bit3 = 1, input resolution is 0.1/min

MD-No.	Designation	Standard value	Maximum input value	Reference system	Input unit
443*	Position limit for M19	SW1 22 SW2 2000	4096 720000	--	approx. 1/11° position controller resolution
444*	Tolerance of spindle speed	10	100	--	%
445*	Tolerance max. spindle speed	10	100	--	%
446*	Tolerance zero speed	SW1 10 SW 2 100	10000 16000	--	0.01 %
447*	Waiting time for controller enable	1000	16000	--	ms
448*	Lowest set motor speed	SW1 50 SW2 3	8192 16000	--	VELO 1/min <sup>1)</sup>
449*	Desired speed	50	SW1 9999 SW2 99999	--	1/min <sup>1)</sup>
450*	Set oscillation speed	SW1 50 SW2 3	8192 16000	--	VELO rev/min <sup>1)</sup>
451*	Max. spindle speed	4000	SW1 16000 SW2 99999	--	rev/min <sup>1)</sup>
452*	Spindle position with ext. M19	0	SW1 3599 SW2 35999	--	0.1 degree 0.01 degree
453*	Spindle valid in mode group	1	2	--	

<sup>1)</sup> if MD 520\* bit3 = 1, input resolution is 0.1/min



## 2.4 Spindle-specific values (max. 4 values)

MD-No.	Designation	Standard value	Maximum input value	Reference system	Input unit
455*	Pulses variable increment weighting (as from SW 2)	32	65000	--	--
456*	Traversing path variable increment weighting (as from SW2)	5625	65000	--	--
458*	Pulse multiplication for HMS (as from SW 2)	0	128	--	--
459*	Zero mark offset (as from SW 2)	0	± 18000	--	0.01 degrees
460*	Spindle assignment setpoint output (as from SW 2)	840T 01060003 840M 01060003		--	--
461*	Global axis number of assigned C axis (as from SW 2)	0	12	--	--
462*	Cut-off frequency of spindle encoder (as from SW 2)	200	16000	--	kHz
466*	Position controller clock frequency factor spindle (as from SW 2)	1	64	--	Multiple of position controller's basic clock frequency
468*	Multgain factor (as from SW 2)	10000	10000	--	0.01%
469*	Factor for gain changeover (as from SW 2)	100	16000	--	%
478*	Acceleration time constant with position controller (as from SW 2) 1st gear	2000	50000	--	1 ms
479*	- // - 2nd gear	2000	50000	--	1 ms
480*	- // - 3rd gear	2000	50000	--	1 ms
481*	- // - 4th gear	2000	50000	--	1 ms
482*	- // - 5th gear	2000	50000	--	1 ms
483*	- // - 6th gear	2000	50000	--	1 ms
484*	- // - 7th gear	2000	50000	--	1 ms
485*	- // - 8th gear	2000	50000	--	1 ms

## 2.5 MDs for display screen

### Positive colour representation as from SW 2

MD No.	Designation	Standard value	Maximum input value	Clut No. 1)
20000	Colour register configuration	0	62	254
20001	-//-	0	62	254
20002	-//-	0	62	254
20003	-//-	0	62	253
20004	Colour register standard assignments	32	62	253
20005	-//-	28	62	253
20006	-//-	10	62	252
20007	-//-	10	62	252
20008	-//-	10	62	252
20009	Colour register configuration	0	62	251
20010	-//-	0	62	251
20011	-//-	0	62	251
20012	-//-	0	62	250
20013	-//-	0	62	250
20014	-//-	0	62	250
20015	Colour register standard assignments	50	63	249
20016	-//-	25	63	249
20017	-//-	1	63	249
20018	-//-	28	63	248
20019	-//-	33	63	248
20020	-//-	34	63	248
20021	-//-	60	63	247
20022	-//-	62	63	247
20023	-//-	60	63	247
20024	-//-	0	63	246
20025	-//-	63	63	246
20026	-//-	63	63	246
20027	-//-	33	63	245
20028	-//-	7	63	245
20029	-//-	25	63	245
20030	-//-	63	63	244
20031	-//-	63	63	244
20032	-//-	0	63	244
20033	-//-	0	63	243
20034	-//-	0	63	243
20035	-//-	45	63	243
20036	-//-	0	63	242
20037	-//-	45	63	242
20038	-//-	0	63	242
20039	-//-	63	63	241
20040	-//-	0	63	241
20041	-//-	0	63	241
20042	-//-	0	63	240
20043	-//-	0	63	240
20044	Colour register standard assignments	0	63	240

1) CLUT = Colour look up table. 3MD for the three colours red, green, blue.

**MDs for display screen**  
**Negative colour representation as from SW 2**

MD No.	Designation	Standard value	Maximum input value	Clut No. 1)
20000	Colour register configuration	0	62	254
20001	-//-	0	62	254
20002	-//-	0	62	254
20003	-//-	0	62	253
20004	Colour register standard assignments	32	62	253
20005	-//-	28	62	253
20006	-//-	10	62	252
20007	-//-	10	62	252
20008	-//-	10	62	252
20009	Colour register configuration	0	62	251
20010	-//-	0	62	251
20011	-//-	0	62	251
20012	-//-	0	62	250
20013	-//-	0	62	250
20014	-//-	0	62	250
20015		63	63	249
20016	-//-	31	63	249
20017	-//-	0	63	249
20018	-//-	28	63	248
20019	-//-	33	63	248
20020	-//-	34	63	248
20021	-//-	63	63	247
20022	-//-	63	63	247
20023	-//-	63	63	247
20024	-//-	0	63	246
20025	-//-	63	63	246
20026	-//-	63	63	246
20027	-//-	41	63	245
20028	-//-	0	63	245
20029	-//-	41	63	245
20030	-//-	63	63	244
20031	-//-	63	63	244
20032	-//-	0	63	244
20033	-//-	0	63	243
20034	-//-	0	63	243
20035	-//-	63	63	243
20036	-//-	0	63	242
20037	-//-	45	63	242
20038	-//-	0	63	242
20039	-//-	63	63	241
20040	-//-	0	63	241
20041	-//-	0	63	241
20042	-//-	0	63	240
20043	-//-	0	63	240
20044	Colour register standard assignments	0	63	240

1) CLUT = Colour look up table. 3MD for the three colours red, green, blue.

### MDs for display screen

#### Positive monochrome representation as from SW 2

MD No.	Designation	Standard value	Maximum input value	Clut No. 1)
20000	Colour register configuration	0	62	254
20001	-//-	0	62	254
20002	-//-	0	62	254
20003	-//-	32	62	253
20004	Colour register standard assignments	32	62	253
20005	-//-	32	62	253
20006	-//-	44	62	252
20007	-//-	44	62	252
20008	-//-	44	62	252
20009	Colour register configuration	0	62	251
20010	-//-	0	62	251
20011	-//-	0	62	251
20012	-//-	0	62	250
20013	-//-	0	62	250
20014	-//-	0	62	250
20015	Colour register standard assignments	26	63	249
20016	-//-	26	63	249
20017	-//-	26	63	249
20018	-//-	33	63	248
20019	-//-	33	63	248
20020	-//-	33	63	248
20021	-//-	63	63	247
20022	-//-	63	63	247
20023	-//-	63	63	247
20024	-//-	44	63	246
20025	-//-	44	63	246
20026	-//-	44	63	246
20027	-//-	26	63	245
20028	-//-	26	63	245
20029	-//-	26	63	245
20030	-//-	0	63	244
20031	-//-	0	63	244
20032	-//-	0	63	244
20033	-//-	0	63	243
20034	-//-	0	63	243
20035	-//-	0	63	243
20036	-//-	0	63	242
20037	-//-	0	63	242
20038	-//-	0	63	242
20039	-//-	16	63	241
20040	-//-	16	63	241
20041	-//-	16	63	241
20042	-//-	0	63	240
20043	-//-	0	63	240
20044	Colour register standard assignments	0	63	240

1) CLUT = Colour look up table. 3MD for the three colours red, green, blue.

**MDs for display screen**  
**Negative monochrome representation as from SW 2**

MD No.	Designation	Standard value	Maximum input value	Clut No. 1)
20000	Colour register configuration	0	62	254
20001	-//-	0	62	254
20002	-//-	0	62	254
20003	-//-	32	62	253
20004	Colour register standard assignments	32	62	253
20005	-//-	32	62	253
20006	-//-	10	62	252
20007	-//-	10	62	252
20008	-//-	10	62	252
20009	Colour register configuration	0	62	251
20010	-//-	0	62	251
20011	-//-	0	62	251
20012	-//-	0	62	250
20013	-//-	0	62	250
20014	-//-	0	62	250
20015	Colour register standard assignments	26	63	249
20016	-//-	26	63	249
20017	-//-	26	63	249
20018	-//-	33	63	248
20019	-//-	33	63	248
20020	-//-	33	63	248
20021	-//-	63	63	247
20022	-//-	63	63	247
20023	-//-	63	63	247
20024	-//-	44	63	246
20025	-//-	44	63	246
20026	-//-	44	63	246
20027	-//-	38	63	245
20028	-//-	38	63	245
20029	-//-	38	63	245
20030	-//-	63	63	244
20031	-//-	63	63	244
20032	-//-	63	63	244
20033	-//-	63	63	243
20034	-//-	63	63	243
20035	-//-	63	63	243
20036	-//-	63	63	242
20037	-//-	63	63	242
20038	-//-	63	63	242
20039	-//-	50	63	241
20040	-//-	50	63	241
20041	-//-	50	63	241
20042	-//-	0	63	240
20043	-//-	0	63	240
20044	Colour register standard assignments	0	63	240

1) CLUT = Color look up table. 3MD for the three colours red, green, blue.

## MDs for colour representation on display screen

Conversion list No.	MD No.	Display elements	Standard value			
			positive		negative	
			Value	Colour	Value	Colour
	20192	Flashing colour (for system)	254	orange		yellow
	20 193		50	rd, gr	63	rd <sub>1</sub>
	20 194		25	gn	63	gn <sub>1</sub>
	20 195		1	bl	0	bl <sub>1</sub>
	20 196		60	wh	0	rd <sub>2</sub>
	20 197		62	wh	0	gn <sub>2</sub>
	20198		60	wh	0	bl <sub>2</sub>
	20 199	Flashing colours				
	to	(available for configuration)				
	20 247					

Positive colour flashes orange/white  
Negative colour flashes yellow/black

**MDs for monochrome representation on screen**

Conversion list No.	MD No.	Display elements	Standard value			
			positive		negative	
			Value	Colour	Value	Colour
	20192	Flashing colour (for system)	254	bk/wh		wh/bk
	20 193		0		63	rd
	20 194		0		63	gn
	20 195		0		63	bl
	20 196		63		0	rd2
	20 197		63		0	gn2
	20198		63		0	bl2
	20 199	Flashing colours				
	to	(available for configuration)				
	20 247					

MD No.	Designation	Standard value 1)	Maximum input value
20248 . . . 20311	Conversion list display elements configuring	0 . . . 0	254 . . . 254
20312 . . . 20343	Conversion list display elements standard assignments (see table)	see table	249 . . . 249
20344 . . . 20375	Conversion list display elements configuring	0 . . . 0	254 . . . 254
20400 . . . 20449	MDs for channel in information memory	1 or 2	4 . . . 4



Table for conversion list of display elements as from SW 2

Conversion list No.	MD No.	Display elements	Standard value			
			positive		negative	
			Value	Colour	Value	Colour
64	20 312	Softkey text and margin	247	wh	247	wh
65	20 313	Softkey background and text deleting color	248	gr	248	gr
66	20 314	Softkey text and margin active	247	wh	247	wh
67	20 315	Softkey background and text deleting color active	248	gr	248	gr
68	20 316	ETC /RCL character	241	rd	241	rd
69	20 317	Dialog line text	245	vi	245	vi
70	20 318	Dialog line background	247	wh	240	bk
71	20 319	Special text	247	wh	247	wh
72	20 320	Input line - text	245	vi	245	vi
73	20 321	Input values text, PP cursor	249	or	244	ye
74	20 322	Input line - background	247	gr	240	bk
75	20 323	Alarm text	241	rd	241	rd
76	20 324	Alarm text - background	252	gr9	252	gr9
77	20 325	Message text	249	or	244	ye
78	20 326	Message text - background	252	gr9	252	gr9
79	20 327	Comment text	247	wh	247	wh
80	20 328	Comment text background	252	gr9	252	gr9
81	20 329	Status display - text	242	gn	242	gn
82	20 330	Window caption - text	247	wh	247	wh
83	20 331	Actual values	245	vi	245	vi
84	20 332	Data area strip - text	240	bk	240	bk
85	20 333	Data area strip - background	253	si	253	si
86	20 334	Data area strip - text active	247	wh	247	wh
87	20 335	Data area strip - background active	248	gr	248	gr
88	20 336	Central display portion - background	247	wh	240	bk

Conversion list No.	MD No.	Display elements	Standard value			
			positive		negative	
			Value	Colour	Value	Colour
89	20 337	Outer display portion - background	252	gr9	252	gr9
90	20 338	Total display - background	252	gr9	252	gr9
91	20 339	Other text and margin	240	bk	247	wh
92	20 340	Line red	241	rd	241	rd
93	20 341	Line blue/green	243	bl	242	gn
94	20 342	Line orange/yellow	249	or	244	ye
95	20 343	Line black/blue	240	bk	243	bl
96	20 344	Line violet/cyan	245	vi	246	bl
97	20 345	Line violet	245	vi	245	vi
98	20 346	Line orange	249	or	249	or
99	20 347	Line grey	248	gr	248	gr
100	20 348	Flashing colour	254	flashing	254	flashing
101	20 349	Line white	247	wh	247	wh
102	20 350	Line black	240	bk	240	bk
103	20 351	Line blue/cyan	243	bl	246	cy
104	20 352	Line cyan/blue	246	cy	243	bl
105	20 353	Line green	242	gn	242	gn
106	20 354	Line yellow	244	ye	244	ye

## 2.6 General bits

MD No.	Bit No.							
	7	6	5	4	3	2	1	0
5000						Name of radius and chamfer		
5001						Name of angle		
5002	Input resolution							
5003	No delay at limit switch	Working area limitat. effective with JOG.	Interpolation parameters dependent on G90/G91	Polar coordinate angle dependent on G90/G91	PRESET-Offset not deleted at Power on	Auxil. function output before traversing		
5004		Mode group-specific single block Type B      Type A		Own rapid override	NC start without reference pt.		2nd	1st Handwheel available
5005				Keyswitch effective with ZO fine    ZO coarse R parameters angle of rot.    TO wear    TO geometry				
5006			Selection Start-up	Keyswitch effective with PP manual input    Dry run feedrate    DRF    Overstore				
5007	TO in diameter	Do not include TO wear	Mixed programming G90/G91 in block		TO basic dimension active	No output from M17	G53 like @706	Length comp. also in non-program. axes
5008	Path dimen. from PLC without NC Stop	REPOS in jog mode	INC and REF in jog mode	TO type 0 like type 20				
5009								
5011	MD for transverse axes							
		Actual val. display in diameter	Diam. programming with G91	Diam. progr.G90; TO in diam.	Tool length (P2) Type 1-9 in diameter	Inc.hand-wheel, DRF in diameter	Settable, ext. prog. ZO in diam.	
5012						Writing machine data via @ disabled		
5013	Circle radius programming	Polar coordinates (as from SW 2)		Feed not related to contour		M and S address extension for spindle at PLC	Tapping without sensor	G63 without delay
5014	TNRC / CRC		Cycles (Reference conditioning)					Thread and revolution feedrate G33/G95 (as from SW2)
5015		User memory submodule					External data input	
5024								Abort if contour violation TNRC/CRC

MD No.	Bit No.							
	7	6	5	4	3	2	1	0
5038								Declaration of PLC
5039								Display PLC config.
5051								Keyswitch effect. with SD cycles
5060								Channel number of the transformation (1st transformation block)
5061								G function for transformation selection (1st transformation block)
5062								Axis name 1st fictitious axis (1st transformation block)
5063								Axis name 2nd fictitious axis (1st transformation block)
5064								Axis name 3rd fictitious axis (1st transformation block)
5065								Axis name 1st real axis (1st transformation block)
5066								Axis name 2nd real axis (1st transformation block)
5067								Axis name 3rd real axis (1st transformation block)
5068								Axis name 4th real axis (1st transformation block)
5069								Axis name 5th real axis (1st transformation block)
5070								Channel number of transformation (2nd transformation block)
5071								G function for transformation selection (2nd transformation block)
5072								Axis name 1st fictitious axis (2nd transformation block)

MD No.	Bit No.								
	7	6	5	4	3	2	1	0	
5073									Axis name 2nd fictitious axis (2nd transformation block)
5074									Axis name 3rd fictitious axis (2nd transformation block)
5075									Axis name 1st real axis (2nd transformation block)
5076									Axis name 2nd real axis (2nd transformation block)
5077									Axis name 3rd real axis (2nd transformation block)
5078									Axis name 4th real axis (2nd transformation block)
5079									Axis name 5th real axis (2nd transformation block)
5080									Channel number of transformation (3rd transformation block)
5081									G function for transformation selection (3rd transformation block)
5082									Axis name 1st fictitious axis (3rd transformation block)
5083									Axis name 2nd fictitious axis (3rd transformation block)
5084									Axis name 3rd fictitious axis (3rd transformation block)
5085									Axis name 1st real axis (3rd transformation block)
5086									Axis name 2nd real axis (3rd transformation block)
5087									Axis name 3rd real axis (3rd transformation block)
5088									Axis name 4th real axis (3rd transformation block)

MD No.	Bit No.								
	7	6	5	4	3	2	1	0	
5089									Axis name 5th real axis (3rd transformation block)
5090 to 5139									MDs for later expansion. Do not change standard values
5141									Ethernet-address byte 1 (computer link)
5142									Ethernet-address byte 2 (computer link)
5143									Ethernet-address byte 3 (computer link)
5144									Ethernet-address byte 4 (computer link)
5145									Ethernet-address byte 5 (computer link)
5146									Ethernet-address byte 6 (computer link)
5147									EPRO-cycles as against scales      Erase prot. program. Do not erase      File transfer Acknowledge frames immediately      Pos. ackn. to end frame
5148									Logical node receiver for execution from external via computer link (as from SW 2)
5149									Logical node receiver for execution from external via computer link (as from SW 2)
5150									Logical node receiver for execution from external via computer link (as from SW 2)
5151									Logical node receiver for execution from external via computer link (as from SW 2)
5152									Receiver location for execution from external via computer link (as from SW 2)

MD No.	Bit No.							
	7	6	5	4	3	2	1	0
5156	G 151 Definition of traversing motion of traversing axis no.							
	4 (MD883)		3 (MD881)		2 (MD879)		1 (MD877)	
5158	8 (MD891)		7 (MD889)		6 (MD887)		5 (MD885)	
5159	12 (MD899)		11 (MD897)		10 (MD895)		9 (MD893)	
5160	G 152 Definition of traversing motion of traversing axis no.							
	4 (MD883)		3 (MD881)		2 (MD879)		1 (MD877)	
5161	8 (MD891)		7 (MD889)		6 (MD887)		5 (MD885)	
5162 — 5164					G 153			
5165 — 5167					G 154			
5168 — 5170					G 155			
5171 — 5173					G 156			
5174 — 5176					G 157			
5177 — 5179					G 158			
5180 — 5182					G 159			
5185								Change from G64 to G00
5186				FIFO active (as from SW 2)	G 176 active			
5197								Display T/M active (as from SW 2)
5199				Display PLC message texts (as from SW 2)				UMS submodule size

## 2.6.1 General bits, standard assignments

MD No.	SINUMERIK 840M								SINUMERIK 840T							
	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
5000	0	0	0	0	0	1	1	0 (U)	0	0	0	0	0	1	0	0 (B)
5001	0	0	0	0	0	0	1	1 (A)	0	0	0	0	0	0	1	1 (A)
5002	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
5003	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
5004	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5006	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5007	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
5008	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
5009	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
5010	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5011	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
5012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5013	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
5014	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	1
5015	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
5024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5038	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
5039	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
5051	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5060	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5061	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5062 to 5069	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5070	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5071	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5072 to 5079	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5081	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



	SINUMERIK 840M								SINUMERIK 840T							
MD No.	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
5082 to 5089	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	:	1	1	1	1	1	1	1	:	1	1	1
5090 5091	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5092 to 5099	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	:	1	1	1	1	1	1	1	:	1	1	1
5100 5101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5102 to 5109	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	:	1	1	1	1	1	1	1	:	1	1	1
5110 5111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5112 to 5119	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	:	1	1	1	1	1	1	1	:	1	1	1
5120 5121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5122 to 5129	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	:	1	1	1	1	1	1	1	:	1	1	1
5130 5131	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5132 to 5139	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	:	1	1	1	1	1	1	1	:	1	1	1
5141	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
5142	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5143	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0
5144	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
5145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5147	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5159 to 5182	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	:	0	0	0	0	0	0	0	:	0	0	0

SINUMERIK 840M								SINUMERIK 840T								
MD No.	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
5185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5186	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5197	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5199	0	0	0	0	0	0	0	0 <sup>1)</sup>	0	0	0	0	0	0	0	0 <sup>1)</sup>

## 2.7 Spindle-specific bits (max. 4 spindles)

MD No.	Bit No.							
	7	6	5	4	3	2	1	0
520*	Spindle override active for threading	No M19 abort on Reset	M19 with axis movement	M19 orient. spindle stop	Spindle speed in 0.1 rev/min	Pulse encoder available	Sign change actual	Act. value x 2 (valid up to SW 1).
521*	Spindle available	Spindle not brought to a stop with M30 and Reset	New S value after PLC acknowledgement		No measur.-circuit monitoring (as from SW 2)		Sign change set value	
524*					Position control resolution (as from SW 2)			

### 2.7.1 Spindle-specific bits, standard assignments

SINUMERIK 840M								SINUMERIK 840T								
MD No.	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
5200	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
5201	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5202	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5210	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
5211	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5212	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5213	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1) Activated in overall reset mode

## 2.8 Channel-specific bits (max. 4 channels)

MD No.	Bit No.							
	7	6	5	4	3	2	1	0
540*	Transformation not deselected on Reset	Feed in r/min					G functions to PLC	Auxil. functions to PLC
542*					Fast auxiliary functions (as from SW 2)			
					T	S	F	D
544*	Output of the auxiliary functions in BCD							No F value output to PLC
	F	H	D	T	S	M		
546*	Auxiliary functions which are output immediately on block search and not collected.							No aux. functs. on bl. search
	F	H	D	T	S	M		
548*	Name of abscissa (horizontal axis) (coding as for axis definition)							
550*	Name of ordinate (perpendicular axis) (coding as for axis definition)							
552*	Name of applicate (vertical axis) (coding as for axis definition)							
554*	Axis with constant cutting speed G96							
558*								Axis extension after bl. search
914*								Channel with FIFO (as from SW2)

\* ....      0 → channel 1      2 → channel 3  
               1 → channel 2      3 → channel 4

## 2.8.1 Channel-specific bits, standard assignments

MD No.	SINUMERIK 840M								SINUMERIK 840T							
	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
540*	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1
544*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
546*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
548*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550*	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
552*	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
554*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
558*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

\* ....      0 → spindle 1              2 → spindle 3  
               1 → spindle 2              3 → spindle 4

## 2.8.2 Channel-specific bits, multi-channel display

MD No.	Bit No.							
	7	6	5	4	3	2	1	0
<b>9000</b>	Channel-specific axis assignment with multi-channel display (as from SW 2) channel 1							
	Axis 8	Axis 7	Axis 6	Axis 5	Axis 4	Axis 3	Axis 2	Axis 1
<b>9001</b>	Axis 8	Axis 7	Axis 6	Channel 2	Axis 4	Axis 3	Axis 2	Axis 1
<b>9002</b>	Axis 8	Axis 7	Axis 6	Channel 3	Axis 4	Axis 3	Axis 2	Axis 1
<b>9003</b>	Axis 8	Axis 7	Axis 6	Channel 4	Axis 4	Axis 3	Axis 2	Axis 1
<b>9020</b>				Channel 1				Axis 9
<b>9021</b>				Channel 2				Axis 9
<b>9022</b>				Channel 3				Axis 9
<b>9023</b>				Channel 4				Axis 9
<b>9100</b>	Channel-specific spindle assignment with multi-channel display (as from SW 2)							
				Channel 1	Spindle 4	Spindle 3	Spindle 2	Spindle 1
<b>9101</b>				Channel 2				
<b>9102</b>				Channel 3				
<b>9103</b>				Channel 4				
<b>9140</b>								Channel with FIFO (as from SW2)
<b>9141</b>								Channel with FIFO (as from SW2)
<b>9142</b>								Channel with FIFO (as from SW2)
<b>9143</b>								Channel with FIFO (as from SW2)

## 2.9 Axis-specific MD bits 1 (max. 12 axes)

MD No.	Bit No.							
	7	6	5	4	3	2	1	0
560*	Actual value display modulo 360 degrees	Automat. reference point approach	Software limit switch effective	No start inhibit for ref. point	Rounding for rotary axes	Rounding to whole/half degrees		No measuring circuit monitoring
564*	Axis exists	Fictitious axis	Position control for rotary axis	Indexing axis	Index-related actual values	Sign change actual value	Sign change set value	Ref. pt. in minus direction
568*	Axis name							
572*				Traversing in the rotary axis modulo 360°	Mirroring TO with transverse axis	Rotary axis modulo 360 degrees	Transverse axis	Axes without TO at preset
576*					Axis disabled for channel			
					4	3	2	1
580*								
584*								

\* ....0 → 1st axis  
 1 → 2nd axis

⋮

11 → 12th axis

## 2.9.1 Axis-specific MD bits (max. 12 axes)

## 2.9.1 Axis-specific MD bits (max. 12 axes)

MD No.	Designation	Standard-value	Maximum input value	Reference system	Input unit
1104*	No. of divisions (as from SW 2)	0	999	MS	
1108*	Division reference (as from SW 2)	0	999 999 999	MS	units
1112*	Division reference offset (as from SW 2)	0	999 999 999	MS	units

MD No.	Bit No.							
	7	6	5	4	3	2	1	0
1800*	Display resolution				Position control resolution			
1808*					Absolute offset valid (as from SW 2)			SIPOS absolute encoder available (as from SW 2)
1820*		Puls encoder monitoring ON (SW 2)					Zero monitoring ON (SW 2)	

## 2.9.2 Axis-specific bits, standard assignment

MD No.	SINUMERIK 840M								SINUMERIK 840T							
	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
5600	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
5601	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
5602	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5603	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5604 to 5611	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	:	0	0	0	0	0	0	0	:	0	0	0
5640	1	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0
5641	1	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0
5642	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
5643 to 5651	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	:	0	0	0	0	0	0	0	:	0	0	0
5680	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5681	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
5682	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5683 to 5691	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	:	0	0	0	0	0	0	0	:	0	0	0
5720	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
5721 to 5731	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	:	0	0	0	0	0	0	0	:	0	0	0
5760 to 5771	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	:	0	0	0	0	0	0	0	:	0	0	0
5840 to 5851	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	:	0	0	0	0	0	0	0	:	0	0	0
18000 to 18011	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0
	0	1	0	0	:	0	1	0	0	1	0	0	:	0	1	0



## 2.10 Compensation points for leadscrew error compensation

MD No.	Bit No.							
	7	6	5	4	3	2	1	0
<b>6000</b>	C point 4 yes / no    + / -		C point 3 yes / no    + / -		C point 2 yes / no    + / -		C point 1 yes / no    + / -	
<b>6001</b>	C point 8 yes / no    + / -		C point 7 yes / no    + / -		C point 6 yes / no    + / -		C point 5 yes / no    + / -	
<b>6002</b>	C point 12 yes / no    + / -		C point 11 yes / no    + / -		C point 10 yes / no    + / -		C point 9 yes / no    + / -	
-//-								
-//-								
-//-								
-//-								
-//-								
-//-								
-//-								
-//-								
-//-								
-//-								
-//-								
-//-								
<b>6248</b>	C point 996 yes / no    + / -		C point 995 yes / no    + / -		C point 994 yes / no    + / -		C point 993 yes / no    + / -	
<b>6249</b>	C point 1000 yes / no    + / -		C point 999 yes / no    + / -		C point 998 yes / no    + / -		C point 997 yes / no    + / -	

- bit = 0    negative    compensation  
 + bit = 1    positive    compensation  
 no bit = 0    no            compensation  
 yes bit = 1    no            compensation

## 2.11 Coding of resolutions

Table 1 shows the codes for the various resolutions.

If illegal values are entered into the machine data an alarm message 4 "Input system impermissible" will ensue. Bit 4 (machine data 5002) is used for designating the unit system. The metric input system G71 (bit 4 = 0) is the deleting position.

Code table for resolutions

Bit 7	Bit 6	Bit 5	Bit 4	Input resolution			NC-MD 5002	
Bit 7	Bit 6	Bit 5	Bit 4		Display resolution		NC-MD 1800*	
Bit 3	Bit 2	Bit 1	Bit 0			Position control resolution	NC-MD 1800*	
0	0	0	0	_____	10 <sup>-1</sup> [mm] [degrees]	0.5 x 10 <sup>-1</sup> [degrees]	metric (degrees)	
1	0	0	0	10 <sup>-2</sup> [mm] [degrees]	10 <sup>-2</sup> [mm] [degrees]	0.5 x 10 <sup>-2</sup> [degrees]		
0	1	0	0	10 <sup>-3</sup> [mm] [degrees]	10 <sup>-3</sup> [mm] [degrees]	0.5 x 10 <sup>-3</sup> [degrees]		
1	1	0	0	_____	_____	2 x 10 <sup>-4</sup> [degrees]		
0	0	1	0	10 <sup>-4</sup> [mm] [degrees]	10 <sup>-4</sup> [mm] [degrees]	0.5 x 10 <sup>-4</sup> [degrees]		
1	0	1	0	10 <sup>-5</sup> [mm] [degrees]	10 <sup>-5</sup> [mm] [degrees]	0.5 x 10 <sup>-5</sup> [degrees]		
0	1	1	0	_____	_____	_____		
1	1	1	0	_____	_____	_____		
0	0	0	1	_____	10 <sup>-1</sup> [degrees]	0.5 x 10 <sup>-1</sup> [degrees]		inches (degrees)
1	0	0	1	_____	10 <sup>-2</sup> [degrees]	0.5 x 10 <sup>-2</sup> [degrees]		
0	1	0	1	10 <sup>-3</sup> [inches] [degrees]	10 <sup>-3</sup> [inches] [degrees]	0.5 x 10 <sup>-3</sup> [inches] [degrees]		
1	1	0	1	10 <sup>-4</sup> [inches] [degrees]	10 <sup>-4</sup> [inches] [degrees]	0.5 x 10 <sup>-4</sup> [inches] [degrees]		
0	0	1	1	_____	_____	2 x 10 <sup>-5</sup> [inches]		
1	0	1	1	10 <sup>-5</sup> [inches] [degrees]	10 <sup>-5</sup> [inches] [degrees]	0.5 x 10 <sup>-5</sup> [inches] [degrees]		
0	1	1	1	10 <sup>-6</sup> [inches] [degrees]	_____	_____		
1	1	1	1	_____	_____	_____		

0 1 0 0 = Standard machine data

**Permissible combinations of position control resolution and input resolution**

Unit system	Position control resolution	Input resolution							
		10 <sup>-2</sup> [mm] [degrees]	10 <sup>-3</sup> [mm] [degrees]	10 <sup>-4</sup> [mm] [degrees]	10 <sup>-5</sup> [mm] [degrees]	10 <sup>-3</sup> [inches] [degrees]	10 <sup>-4</sup> [inches] [degrees]	10 <sup>-5</sup> [inches] [degrees]	10 <sup>-6</sup> [inches] [degrees]
mm	0.5x10 <sup>-1</sup> [degrees]	y 1)	y 1)	-	-	-	-	-	-
mm	0.5x10 <sup>-2</sup> [mm][degrees]	xy	xy 1)	xy 1)	-	x	x	x	-
mm	0.5x10 <sup>-3</sup> [mm][degrees]	xy	xy 2)	xy 1)	-	x	x	x	-
mm	2x10 <sup>-4</sup> [mm] 3)	x	x	x	x	-	-	x	x
mm	0.5x10 <sup>-4</sup> [mm][degrees] 3)	xy	xy	xy	xy 1)	-	-	x	x
mm	0.5x10 <sup>-5</sup> [degrees] 3)	y	y	y	y	-	-	-	-
inches	0.5x10 <sup>-1</sup> [degrees]	-	-	-	-	y 1)	-	-	-
inches	0.5x10 <sup>-2</sup> [degrees]	-	-	-	-	y 1)	y 1)	-	-
inches	0.5x10 <sup>-3</sup> [inches][degrees]	x	x	-	-	xy	xy 1)	x	-
inches	0.5x10 <sup>-4</sup> [inches][degrees]	x	x	-	-	xy	xy	xy 1)	-
inches	2x10 <sup>-5</sup> [inches]	x	x	x	x	x	x	x	x
inches	0.5x10 <sup>-5</sup> [inches][degrees]	x	x	x	x	xy	xy	xy	xy 1)

- x ... Linear axes only
- y ... Rotary axes only
- xy ... Linear and rotary axes
- ... Linear and rotary axes inhibited
- 1) ... Not with endlessly rotating rotary axes (NC MD 572\* bit 2 = 0)
- 2) Standard machine data
- 3) Caution with option E50 (high-resolution rotary axis)

## Permissible combinations of position control resolution and display resolution

Unit system	Position control resolution	Display resolution										
		mm					inches					
		10 <sup>-1</sup>	10 <sup>-2</sup>	10 <sup>-3</sup>	10 <sup>-4</sup>	10 <sup>-5</sup>	10 <sup>-1</sup>	10 <sup>-2</sup>	10 <sup>-3</sup>	10 <sup>-4</sup>	10 <sup>-5</sup>	
mm	0.5x10 <sup>-1</sup> [degrees]	xy	-	-	-	-	-	-	-	-	-	-
mm	0.5x10 <sup>-2</sup> [mm][degrees]	-	xy	-	-	-	-	-	x	-	-	-
mm	0.5x10 <sup>-3</sup> [mm][degrees]	-	-	xy	-	-	-	-	-	x	-	-
mm	2x10 <sup>-4</sup> [mm] <sup>3)</sup>	-	-	xy	xy	-	-	-	-	-	-	x
mm	0.5x10 <sup>-4</sup> [mm][degrees] <sup>3)</sup>	-	-	-	xy	-	-	-	-	-	-	x
mm	0.5x10 <sup>-5</sup> [degrees] <sup>3)</sup>	-	-	-	-	xy	-	-	-	-	-	-
inches	0.5x10 <sup>-1</sup> [degrees]	-	-	-	-	-	xy	-	-	-	-	-
inches	0.5x10 <sup>-2</sup> [degrees]	-	-	-	-	-	-	xy	-	-	-	-
inches	0.5x10 <sup>-3</sup> [inches][degrees]	-	x	-	-	-	-	-	xy	-	-	-
inches	0.5x10 <sup>-4</sup> [inches][degrees]	-	x	-	-	-	-	-	-	xy	-	-
inches	2x10 <sup>-5</sup> [inches]	-	-	x	-	-	-	-	-	-	xy	xy
inches	0.5x10 <sup>-5</sup> [inches][degrees]	-	-	x	-	-	-	-	-	-	-	xy

- x ... Linear axes only  
 y ... Rotary axes only  
 xy ... Linear and rotary axes  
 - ... Linear and rotary axes prohibited  
 1) ... Not with endlessly turning rotary axes (NC MD 572\* bit 2 = 0)  
 2) ... Standard machine data  
 3) ... Caution with option E50 (high-resolution rotary axis)

**Maximum traversing path (metric)**

Unit system	Position control resolution	Input resolution					
mm	0.5 x 10 <sup>-1</sup> [degrees]	-- -- ± 999999.9 degr.					
mm	0.5 x 10 <sup>-2</sup> [mm] [degrees]	± 99999.99mm ± 3937.007 inches ± 99999.99 degr.					
mm	0.5 x 10 <sup>-3</sup> [mm] [degrees]	± 99999.99mm ± 3937.007Inches ± 99999.99 degr.					
mm	2 x 10 <sup>-4</sup> [mm]	± 99999.99mm ± 3937.0078inches ± 99999.99 degr.					
mm	0.5 x 10 <sup>-4</sup> [mm] [degrees]						
mm	0.5 x 10 <sup>-5</sup> [degrees]						
inches	0.5 x 10 <sup>-1</sup> [degrees]						
inches	0.5 x 10 <sup>-2</sup> [degrees]						
inches	0.5 x 10 <sup>-3</sup> [inches] [degrees]						
inches	0.5 x 10 <sup>-4</sup> [inches] [degrees]						
inches	2 x 10 <sup>-5</sup> [inches]						
inches	0.5 x 10 <sup>-5</sup> [inches] [degrees]						

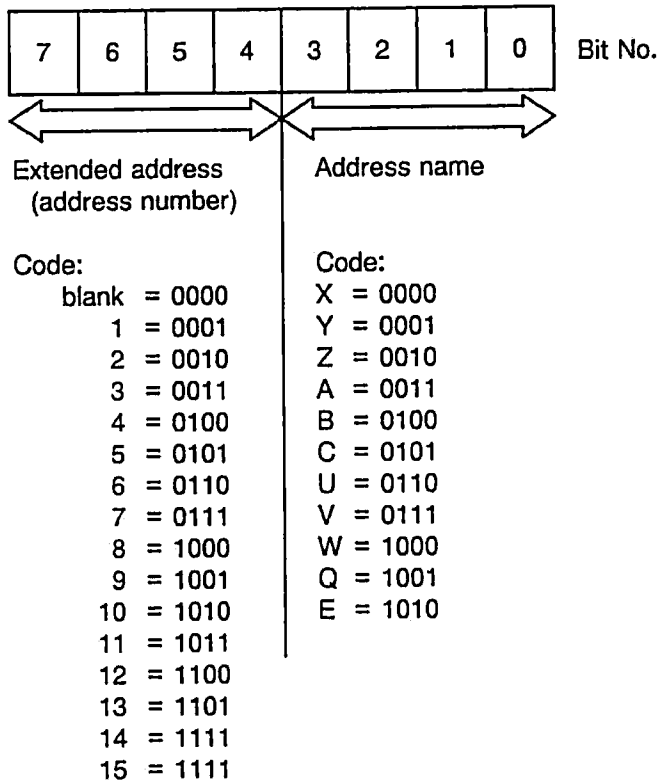
**Minimum programmable path velocity as a function of input resolution**

Input resolution	Minimum programmable path velocity
10 <sup>-2</sup> mm, degrees	0.1 mm/min, degrees/min
10 <sup>-3</sup> mm, degrees	0.01 mm/min, degrees/min
10 <sup>-4</sup> mm, degrees	0.001 mm/min, degrees/min
10 <sup>-5</sup> mm, degrees	0.0001 mm/min, degrees/min
10 <sup>-3</sup> inches, degrees	0.1 inch/min, degrees/min
10 <sup>-4</sup> inches, degrees	0.01 inch/min, degrees/min
10 <sup>-5</sup> inches, degrees	0.001 inch/min, degrees/min
10 <sup>-6</sup> inches, degrees	0.0001 inch/min, degrees/min

**Maximum path velocity as a function of input resolution**

Input resolution	Maximum path velocity
10 <sup>-2</sup> mm, degrees	1000 m/min, 27000 rev/min
10 <sup>-3</sup> mm, degrees	1000 m/min, 27000 rev/min
10 <sup>-4</sup> mm, degrees	1000 m/min, 27000 rev/min
10 <sup>-5</sup> mm, degrees	100 m/min, 2700 rev/min
10 <sup>-3</sup> inches, degrees	10000 inches/min, 27000 rev/min
10 <sup>-4</sup> inches, degrees	10000 inches/min, 27000 rev/min
10 <sup>-5</sup> inches, degrees	1000 inches/min, 2700 rev/min
10 <sup>-6</sup> inches, degrees	100 inches/min, 270 rev/min

## 2.12 Code table for axis name



Example: 0000 0010 = Z  
 0001 1001 = Q1

The names in MD 5000, MD 5001 and 568\* must not overlap. An equal address name with differently extended address is not considered to be an overlap.

### Permissible names for axes, angles, chamfer and radius

<b>A</b>	freely assignable address	<b>N</b>	subordinate block
<b>B</b>	freely assignable address	<b>O</b>	can be confused with 0 (zero)
<b>C</b>	freely assignable address	<b>P</b>	subroutine - number of passes
<b>D</b>	tool offset number	<b>Q</b>	freely assignable address
<b>E</b>	freely assignable address	<b>R</b>	arithmetic parameter
<b>F</b>	feed	<b>S</b>	spindle speed, S function
<b>G</b>	G function	<b>T</b>	tool
<b>H</b>	H function	<b>U</b>	freely assignable address
<b>I</b>	interpolation parameter	<b>V</b>	freely assignable address
<b>J</b>	interpolation parameter	<b>W</b>	freely assignable address
<b>K</b>	interpolation parameter	<b>X</b>	freely assignable address
<b>L</b>	subroutine	<b>Y</b>	freely assignable address
<b>M</b>	M function	<b>Z</b>	freely assignable address

## 3 PLC Machine Data

### 3.1 PLC machine data for operating system (DB 60)

MD No.	DB60 DW	Designation	Standard mach. data	Maximum input value	Input resolution
2	2	Call button for timer OB 5	1	1 to 3	2.5 ms
3	3	Call button for timer OB 6	1	1 to 9	10 ms
4	4	Call button for timer OB 7	1	1 to 255	100 ms
5	5	Last step 5 timer	64	255	
8	8	Last active channel	1	4	
9	9	Last active spindle	1	4	
10	10	Last active axis	2 for T 3 for M	12	
11	11	Delete threshold input image	127	64 ... 127	
12	12	Delete threshold output image	127	64 ... 127	
13	13	Number of EUs at 1st EU interface	0	4	
14	14	Number of EUs at 2nd EU interface	0	4	
17	17	Number of wait cycles with occupied UI, for CL	1	10	
18	18	Number of UIs processed on synchronization, for CL	0	31	
19	19	Number of function numbers, for CL	3	10	
20	20	Function number for core sequence triggering, for CL	25	255	
21	21	Function number for core sequence triggering, for CL	26	255	
22	22	Function number for core sequence triggering, for CL	30	255	
23	23	Function number for core sequence triggering, for CL	0	255	
24	24	Function number for core sequence triggering, for CL	0	255	
25	25	Function number for core sequence triggering, for CL	0	255	
26	26	Function number for core sequence triggering, for CL	0	255	
27	27	Function number for core sequence triggering, for CL	0	255	

CL = Computer link



## 3.1 PLC machine data for operating system (DB 60)

MD No.	DB60 DW	Designation	Standard-mach. data	Maximum input value	Input resolution
28	28	Function number for core sequence triggering, for CL	0	255	
29	29	Function number for core sequence triggering, for CL	0	255	
30	30	Number of interrupt byte of 1st EU interface	-1	127	
31	31	Number of interrupt byte of 2nd EU interface	-1	127	
33	33	Number of user interfaces for command channel (DB41)	0	8	
34	34	Start address of DMP submodules	see Table	158	--
.	.			.	.
.	.			.	.
.	.			.	.
123	123	(see table for MD34 to MD123)		158	--
124	124	Byte number of 1st alarm byte	-1	127	--
125	125	Byte number of 2nd alarm byte	-1	127	--
126	126	Byte number of 3rd alarm byte	-1	127	--
127	127	Byte number of 4th alarm byte	-1	127	--
128	128	Start address for 1st machine control panel	64	120	--
129	129	Start address for 2nd machine control panel	72	120	
130	130	No. of interrupt byte of 1st int. DMP interface, 1st line 1)	-1	158	--
131	131	No. of interrupt byte of 1st int. DMP interface, 2nd line 1)	-1	158	--
132	132	No. of interrupt byte of 2nd int. DMP interface, 1st line 1)	-1	158	--
133	133	No. of interrupt byte of 2nd int. DMP interface, 2nd line 1)	-1	158	--
134	134	No. of interrupt byte of 3rd int. DMP interface, 1st line 1)	-1	158	--
135	135	No. of interrupt byte of 3rd int. DMP interface, 2nd line 1)	-1	158	--

CL = Computer link

1) as from SW 2

Table for MD 34 to MD 123

PLC-MD, DB60 DW	DMP interface	MPC	DMP submo- dule	PLC-MD standard value	DMP-M rotary switch position
34	1	1	1	64	E
35	1	1	2	-1	D
36	1	1	3	-1	C
37	1	1	4	-1	B
38	1	1	5	-1	A
39	1	1	6	-1	9
40	1	1	7	-1	8
41	1	1	8	-1	7
42	1	1	9	-1	6
43	1	1	10	-1	5
44	1	1	11	-1	4
45	1	1	12	-1	3
46	1	1	13	-1	2
47	1	1	14	-1	1
48	1	1	15	-1	0
49	1	2	1	-1	E
50	1	2	2	-1	D
51	1	2	3	-1	C
52	1	2	4	-1	B
53	1	2	5	-1	A
54	1	2	6	-1	9
55	1	2	7	-1	8
56	1	2	8	-1	7
57	1	2	9	-1	6
58	1	2	10	-1	5
59	1	2	11	-1	4
60	1	2	12	-1	3
61	1	2	13	-1	2
62	1	2	14	-1	1
63	1	2	15	-1	0
64	2	1	1	-1	E
65	2	1	2	-1	D
66	2	1	3	-1	C
67	2	1	4	-1	B
68	2	1	5	-1	A
69	2	1	6	-1	9
70	2	1	7	-1	8
71	2	1	8	-1	7
72	2	1	9	-1	6
73	2	1	10	-1	5
74	2	1	11	-1	4
75	2	1	12	-1	3
76	2	1	13	-1	2
77	2	1	14	-1	1
78	2	1	15	-1	0

## 3.1 PLC machine data for operating system (DB 60)

PLC-MD, DB 60 DW	DMP interface	MPC	DMP submo- dule	PLC-MD standard value	DMP-M rotary switch position
79	2	2	1	-1	E
80	2	2	2	-1	D
81	2	2	3	-1	C
82	2	2	4	-1	B
83	2	2	5	-1	A
84	2	2	6	-1	9
85	2	2	7	-1	8
86	2	2	8	-1	7
87	2	2	9	-1	6
88	2	2	10	-1	5
89	2	2	11	-1	4
90	2	2	12	-1	3
91	2	2	13	-1	2
92	2	2	14	-1	1
93	2	2	15	-1	0
94	3	1	1	-1	E
95	3	1	2	-1	D
96	3	1	3	-1	C
97	3	1	4	-1	B
98	3	1	5	-1	A
99	3	1	6	-1	9
100	3	1	7	-1	8
101	3	1	8	-1	7
102	3	1	9	-1	6
103	3	1	10	-1	5
104	3	1	11	-1	4
105	3	1	12	-1	3
106	3	1	13	-1	2
107	3	1	14	-1	1
108	3	1	15	-1	0
109	3	2	1	-1	E
110	3	2	2	-1	D
111	3	2	3	-1	C
112	3	2	4	-1	B
113	3	2	5	-1	A
114	3	2	6	-1	9
115	3	2	7	-1	8
116	3	2	8	-1	7
117	3	2	9	-1	6
118	3	2	10	-1	5
119	3	2	11	-1	4
120	3	2	12	-1	3
121	3	2	13	-1	2
122	3	2	14	-1	1
123	3	2	15	-1	0

## 3.2 General PLC machine data for functions blocks (DB 61)

Machine data words for functions blocks (IA)		
DW No. PLC MD No.	High byte (DL)	Low byte (DR)
DW 0 2000 : : : : : : : : :	Reserved for tool management	
DW 78 2078	Reserved for tool management	
DW 79 2079 : :	Reserved for computer link	
DW 89 2089	Reserved for computer link	
DW 90 2090	Reserved for code carrier loading/unloading	
DW 91 2091 : :	Reserved	
DW 95 2095	Reserved	
DW 96 2096 : :	Reserved for computer link	
DW 119 2119	Reserved for computer link	
DW 120 2120 : : :	Reserved for tool management	
DW139 2139	Reserved for tool management	

3.2 General PLC machine data for functions blocks (DB 61)

Machine data words for functions blocks (IA)		
DW No. PLC MD No.	High byte (DL)	Low byte (DR)
DW 140 2140 : : : DW149 2149	Reserved	

3.3 User PLC machine data (DB 62)

PLC MD No.	Designation	Standard- mach.data	Maximum input value		Input unit
4000					
4001					
4002					
4003					
4004					
4005					
4006					
4007					
4008					
4009					
4010					
4011					
4012					
4013					
4014					
4015					
4016					
4017					
4018					
.					
4048					
4049					

### 3.4 General bits (DB 63)

MD No. DB63 DW No.	15	14	13	12	11	10	9	8	
	Bit No.								
	7	6	5	4	3	2	1	0	
<b>6000</b> DL 0	Signals from/to NC channel								
					4	3	2	1	
<b>6001</b> DR 0									
<b>6008</b> DL 4									
<b>6009</b> DR 4	M decoding with extended address for NC channel								
					4	3	2	1	
<b>6012</b> DL 6	Signals from/to spindle								
					4	3	2	1	
<b>6013</b> DR 6									
<b>6016</b> DL 8	Signals from/to axis								
	8	7	6	5	4	3	2	1	
<b>6017</b> DR 8									
	Signals from/to axis								
					12	11	10	9	
<b>6026</b> DL13	Serial interface		Desel. autom. NC start spin. with MDA		Save flag (as from SW 2)	Access to PLC data via @ command disable	Command channel active		
<b>6027</b> DR13									
<b>6028</b> DL14									
<b>6029</b> DR14								T/H word jumperings	
<b>6030</b> DL15	Error and operational messages with non-active channels								
					4	3	2	1	
<b>6031</b> DR15									
<b>6032</b> DL16	DR 9	DL 9	Error messages SIGNALS TO NC CHANNEL						DL 6
			DR 8	DL 8	DR 7	DL 7	DR 6		
<b>6033</b> DR16			Error messages SIGNALS TO NC CHANNEL						DL 10
					DR 11	DL 11	DR 10		
<b>6034</b> DL17			Error messages SIGNALS TO SPINDLE						DL K+3
							DR K+3		
<b>6035</b> DR17			Error messages SIGNALS TO AXIS						DL K+3
							DR K+3		

MD No. DB63 DW No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
<b>6036</b> <b>DL18</b>	Error messages DB 58 MESSAGES							
	DR 4	DL 4	DR 3	DL 3	DR 2	DL 2	DR 1	DL 1
<b>6037</b> <b>DR18</b>	Error messages DB 58 MESSAGES							
	DR 8	DL 8	DR 7	DL 7	DR 6	DL 6	DR 5	DL 5
<b>6038</b> <b>DL19</b>	Error messages DB 58 MESSAGES							
	DR 12	DL 12	DR 11	DL 11	DR 10	DL 10	DR 9	DL 9
<b>6039</b> <b>DR19</b>	Error messages DB 58 MESSAGES							
		DL 16	DR 15	DL 15	DR 14	DL 14	DR 13	DL 13
<b>6040</b> <b>DL20</b>	Operational messages SIGNALS TO NC CHANNEL							
	DR 9	DL 9	DR 8	DL 8	DR 7	DL 7	DR 6	DL 6
<b>6041</b> <b>DR20</b>	Operational messages SIGNALS TO NC CHANNEL							
					DR 11	DL 11	DR 10	DL 10
<b>6042</b> <b>DL21</b>	Operational messages SIGNALS TO SPINDLE							
							DR K+3	DL K+3
<b>6043</b> <b>DR21</b>	Operational messages SIGNALS TO AXIS							
							DR K+3	DL K+3
<b>6044</b> <b>DL22</b>	Operational messages DB 58 MESSAGES							
	DR 4	DL 4	DR 3	DL 3	DR 2	DL 2	DR 1	DL 1
<b>6045</b> <b>DR22</b>	Operational messages DB 58 MESSAGES							
	DR 8	DL 8	DR 7	DL 7	DR 6	DL 6	DR 5	DL 5
<b>6046</b> <b>DL23</b>	Operational messages DB 58 MESSAGES							
	DR 12	DL 12	DR 11	DL 11	DR 10	DL 10	DR 9	DL 9
<b>6047</b> <b>DR23</b>	Operational messages DB 58 MESSAGES							
		DL 16	DR 15	DL 15	DR 14	DL 14	DR 13	DL 13

MD No. DB 63 DW No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
6048 DL24	PLC STOP for timeout in							
	OB7	OB6	OB5	OB4	OB3	OB2		
6049 DR24							Cold restart on Reset (as from SW2)	Test bit
6050 DL25	Disabling of							
	OB7	OB6	OB5	OB4	OB3	OB2		
6051 DR25							PG mode	PLC mode
6052 DL26	Enabling the interrupt inputs of the 1st EU interface							
	7	6	5	4	3	2	1	0
6053 DR26	Enabling the interrupt inputs of the 2nd EU interface							
	7	6	5	4	3	2	1	0
6054 DL27								
6055 DR27	Interrupt triggering edges for interrupt input of 1st EU interface							
	7	6	5	4	3	2	1	0
6056 DL28	Interrupt triggering edges for interrupt input of 2nd EU interface							
	7	6	5	4	3	2	1	0
6057 DR28								
6061 DR30								No Stop on IFC failure
6064 DL32								
6065 DR32	Mach. contr. panel selection (as from SW2)					100% keys = customer keys (as from SW 2)		Travel key pointer
6066 DL32	1st machine control panel configuration							
			Dual slide block				via IFC	via DMP I/O
6067 DR33	2nd machine control panel configuration							
			Dual slide block				via IFC	via DMP I/O



Machine data bits (as from SW 2)								
Byte No. PLC MD No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
<b>DL 34</b> <b>6068</b>	Interrupt-triggering edge for interrupt inputs 1st interface DMP interface				1st line, bits 0...7			
<b>DR 34</b> <b>6069</b>	Interrupt-triggering edge for interrupt inputs 1st interface DMP interface				2nd line, bits 0...7			
<b>DL 35</b> <b>6070</b>	Interrupt-triggering edge for interrupt inputs 2nd interface DMP interface				1st line, bits 0...7			
<b>DR 35</b> <b>6071</b>	Interrupt-triggering edge for interrupt inputs 2nd interface DMP interface				2nd line, bits 0...7			
<b>DL 36</b> <b>6072</b>	Interrupt-triggering edge for interrupt inputs 3rd interface DMP interface				1st line, bits 0...7			
<b>DR 36</b> <b>6073</b>	Interrupt-triggering edge for interrupt inputs 3rd interface DMP interface				2nd line, bits 0...7			
<b>DL 37</b> <b>6074</b>	Enabling of interrupt inputs 1st interface DMP interface				1st line, bits 0...7			
<b>DR 37</b> <b>6075</b>	Enabling of interrupt inputs 1st interface DMP interface				2nd line, bits 0...7			
<b>DL 38</b> <b>6076</b>	Enabling of interrupt inputs 2nd interface DMP interface				1st line, bits 0...7			
<b>DR 38</b> <b>6077</b>	Enabling of interrupt inputs 2nd interface DMP interface				2nd line, bits 0...7			
<b>DL 39</b> <b>6078</b>	Enabling of interrupt inputs 3rd interface DMP interface				1st line, bits 0...7			
<b>DR 39</b> <b>6079</b>	Enabling of interrupt inputs 3rd interface DMP interface				2nd line, bits 0...7			

Extended error and operational messages (as from SW 2)								
Byte No. PLC MD No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 40 6080	Error messages DB 58 MESSAGES							
	DR 20	DL 20	DR 19	DL 19	DR 18	DL 18	DR 17	DL 17
DR 40 6081	Error messages DB 58 MESSAGES							
	DR 24	DL 24	DR 23	DL 23	DR 22	DL 22	DR 21	DL 21
DL 41 6082	Error messages DB 58 MESSAGES							
	DR 28	DL 28	DR 27	DL 27	DR 26	DL 26	DR 25	DL 25
DR 41 6083	Error messages DB 58 MESSAGES							
		DL 32	DR 31	DL 31	DR 30	DL 30	DR 29	DL 29
DL 42 6084	Error messages DB 58 MESSAGES							
	DR 20	DL 20	DR 19	DL 19	DR 18	DL 18	DR 17	DL 17
DR 42 6085	Error messages DB 58 MESSAGES							
	DR 24	DL 24	DR 23	DL 23	DR 22	DL 22	DR 21	DL 21
DL 43 6086	Error messages DB 58 MESSAGES							
	DR 28	DL 28	DR 27	DL 27	DR 26	DL 26	DR 25	DL 25
DR 43 6087	Error messages DB 58 MESSAGES							
		DL 32	DR 31	DL 31	DR 30	DL 30	DR 29	DL 29
DL 44 6088	Reserved							
DR 44 6089	Reserved							
DL 45 6090	Reserved							
DR 45 6091	Reserved							
DL 46 6092	Reserved							
DR 46 6093	Reserved							
:	⋮							
:								
DR 49 6099	Reserved							

MD No.	Bit No.							
	7	6	5	4	3	2	1	0
6400 ⋮ 6419	Internal system bits Bit 0 must be set to 1							
6480 ⋮ 6499	Internal system bits Bit 0 must be set to 1							

MD 6400 to 6499 without DB

### 3.4.1 PLC MD bits standard assignments

MD No.	7	6	5	4	3	2	1	0	MD No.	7	6	5	4	3	2	1	0
6000	0	0	0	0	1	1	1	1	6400	0	0	0	0	0	0	0	1
6009	0	0	0	0	0	0	0	0	⋮								
6012	0	0	0	0	0	0	0	1	6419	0	0	0	0	0	0	0	1
6016	0	0	0	0	0	1	1	1	6420	0	0	0	0	0	0	0	0
6017	0	0	0	0	0	0	0	0	⋮								
6026	1	0	0	0	0	0	0	0	6479	0	0	0	0	0	0	0	0
6029	0	0	0	0	0	0	0	0	6480	0	0	0	0	0	0	0	1
⋮									⋮								
6047	0	0	0	0	0	0	0	0	6499	0	0	0	0	0	0	0	1
6048	1	1	1	1	1	1	0	0	6500	0	0	0	0	0	0	0	0
6049	0	0	0	0	0	0	0	0	⋮								
6050	1	1	1	1	1	1	0	0	6559	0	0	0	0	0	0	0	0
6051	0	0	0	0	0	0	0	1									
6052	0	0	0	0	0	0	0	0									
6055	0	0	0	0	0	0	0	0									
6061	0	0	0	0	0	0	0	0									
6062	0	0	0	0	0	1	0	0									
6063	0	0	0	0	0	0	0	1									
6064	0	0	0	0	0	0	0	0									
6065	0	0	0	0	0	0	0	0									
6066	0	0	0	0	0	0	0	1									
6067	0	0	0	0	0	0	0	0									

## 3.5 General PLC machine data bits for function blocks (DB 64)

Byte No. PLC MD No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 0 7000	Reserved for computer link							
DR 0 7001	"							
DL 1 7002	"							
DR 1 7003	"							
DL 2 7004	"							
DR 2 7005	Reserved for computer link							
DL 3 7006								
DR 3 7007								
DL 4 7008								
DR 4 7009								
DL 5 7010 ⋮	Reserved for tool management ⋮							
DR 21 7043	Reserved for tool management							
DL 22 7044							Message areas 2 1 (as from SW 2)	
DR 22 7045								
DL 23 7046								
DR 23 7047								
DL 24 7048								
DR 24 7049								

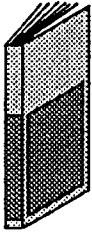
### 3.6 User PLC machine data bits (DB 65)

MD No. DB65 DW No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
8000 DL 0								
8001 DR 0								
8002 DL 1								
8003 DR 1								
8004 DL 2								
8005 DR 2								
8006 DL 3								
8007 DR 3								
8008 DL 4								
8009 DR 4								
.								
.								
8048 DL24								
8049 DR24								

## 4 Cycles Machine Data

The cycles machine data can be activated only in conjunction with the measuring cycles available from Version 20 onwards.

For details on cycles measuring data please refer to



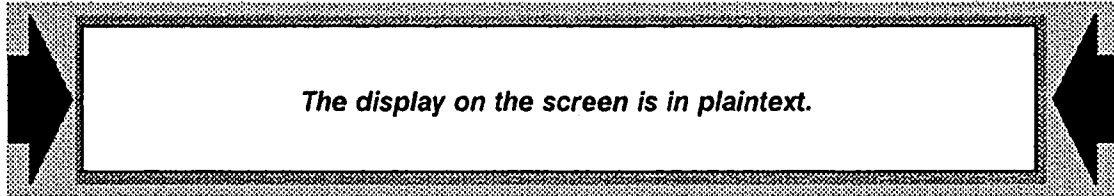
### **Start-up Guide Measuring Cycles, Versions 20 and 30**

(Available from: LZW-Lager, Fürth Bislohe  
Order number: see SINUMERIK Documentation List)



## 5 NC Setting Data

### 5.1 NC values



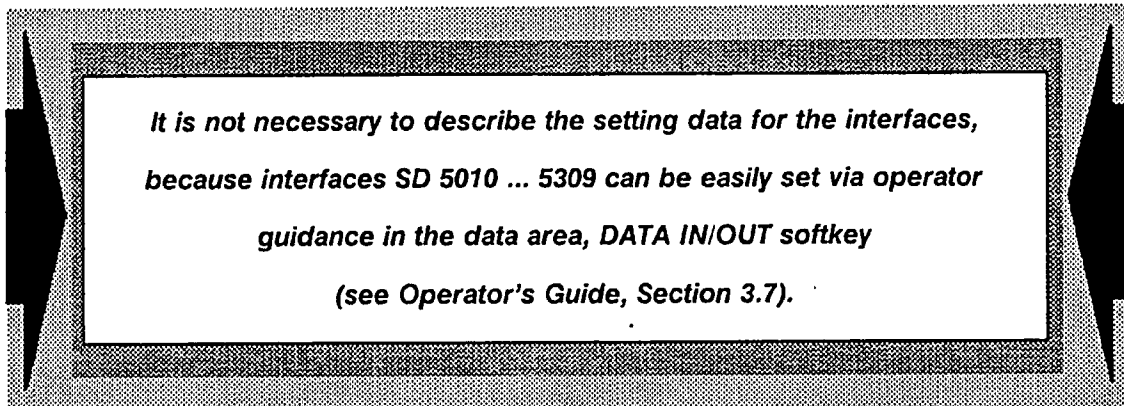
SD No.	Softkey No.	Designation	Standard-value	Maximum input value	Input unit
0	2	Dryrun feedrate	0	24000	1000 units/min
1	2	Dynamic smoothing time thread	0	5	--
5	2	PLC alarm text file (as from SW 2)	1	9999	--
9	2	INC, variable	50	+/-9999,999	mm
200*1)	4	Scale factor	1	99,999	--
202*	4	Starting angle for thread	0	9999 9999	10 <sup>-5</sup> degrees
300*2)	1	Min. working area limitation	-99999,999	+/-99999,999	mm
304*2)	1	Max. working area limitation	99999,999	+/-99999,999	mm
312*2)	4	Scale centre NC	0	+/-99999,999	mm
401*3)	3	Programmable spindle speed limitation G96	0	99999	rev/min or 0.01rev/min
402*3)	3	Oriented spindle stop	0	35999	0.01 degrees
403*3)	3	Spindle speed limitation	100	99999	rev/min or 0.01 degrees

- 1) Channel-specific value, \* = 0 → Channel 1 to 3 → Channel 4  
 2) Axis-specific value, \* = 0 → Axis 1 to 11 → Axis 12  
 3) Spindle-specific value, \* = 0 → Spindle 1 to 3 → Spindle 4

## 5.2 NC setting data bits

SD No.	Bit No.							
	7	6	5	4	3	2	1	0
5000	Calculation of overtravel compensation					Turning cycles	Drilling and milling patterns	Drilling cycles
5001								Display workp.-related actual value system
560* 1)						Scale factor effective at machine	Rapid override not active	Feed override not active

1) Axis-specific value, \* = 0 → Axis 1 to 11 → Axis 12





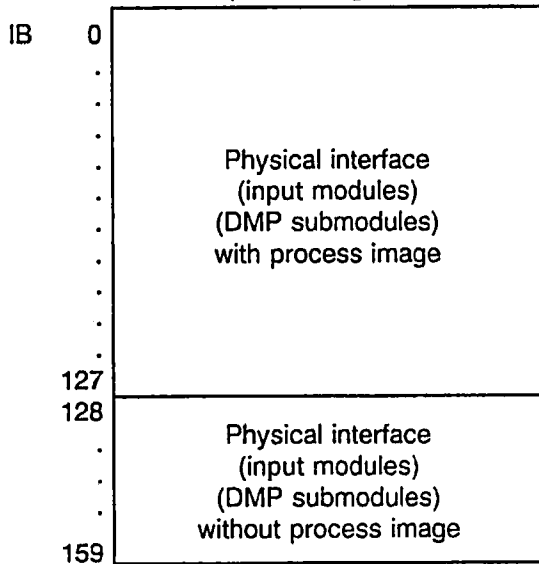
# 6 PLC Interface

## 6.1 Overview PLC interface

### 6.1.1 Inputs, outputs, flags

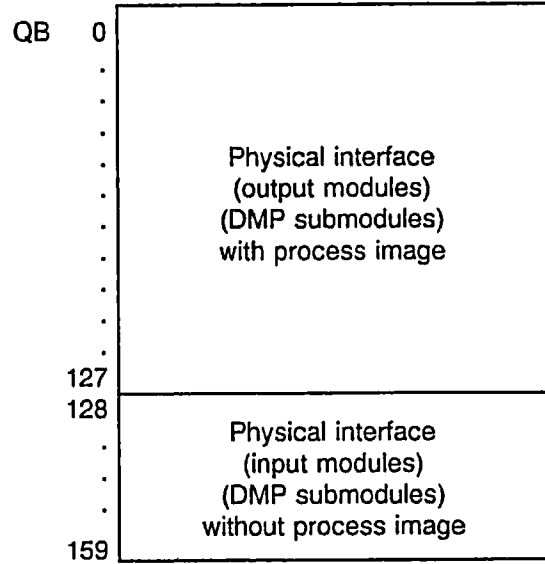
#### Inputs

Example of assignment



#### Outputs

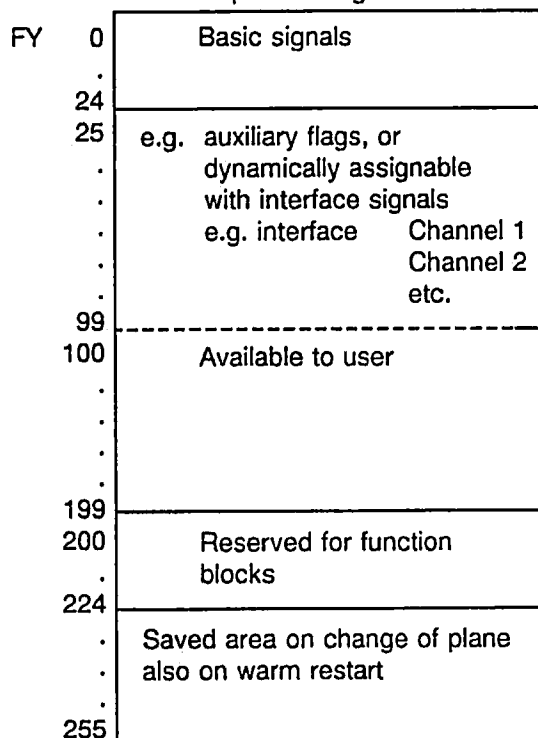
Example of assignment



Output 127.7 is disabled

#### Flags

Example of assignment



## 6.1.2 Data blocks (DB, DX)

### Data blocks of class DB

Data blocks DB 1 to DB 149 are reserved for Siemens applications.  
Data blocks DB 150 to DB 255 can be used by the user.

DB No.	DB designation	DB name	Pack- age
1	DIAG-DB	Diagnostic DB for	OS
2	STATUS-DB	PLC status channel	OS
3	DATKAN-DB	PLC data channel	OS
4	FM/BM-DB	Error and operational messages	OS
10 *	NS KN 1	Interface NC channel 1	OS
11 *	NS KN 2	Interface NC channel 2	OS
12 *	NS KN 3	Interface NC channel 3	OS
13 *	NS KN 4	Interface NC channel 4	OS
29	NS ELG	Reserved for ELG signals	OS
30 *	DEC MFU	Decoded M functions (list)	OS
31 *	SPI SIG	Interface for spindle-specific signals	OS
32 *	ACHS SIG	Interface for axis-specific signals	OS
33		Reserved	
34	E-PU	Input buffer, computer link	CL
35	A-PU	Output buffer, computer link	CL
36 *	DUE NC	Interface for data transfer NC <-> PLC	OS
37 *	SER SCH.	Interface for serial interface	OS
38	RK:ZW-DB	Status DB computer link	CL
39			
40 *	NS BEDT.	Interface operator panel	OS
41 *	NS KK	Interface command channel	OS
48 *	NS COM	Interface to communication area NC/PLC	OS
49			
50	E : PLC 1	Input signals from PLC 1 Irrelevant for 840	OS
51	A : PLC 1	Output signals to PLC 1 Irrelevant for 840	OS
52	E : PLC 2	Input signals from PLC 2 Irrelevant for 840	OS
53	A : PLC 2	Output signals to PLC 2 Irrelevant for 840	OS
54	E : PLC 3	Input signals from PLC 3 Irrelevant for 840	OS
55	A : PLC 3	Output signals to PLC 3 Irrelevant for 840	OS
56	E : PLC 4	Input signals from PLC 4 Irrelevant for 840	OS
57	A : PLC 4	Output signals to PLC 4 Irrelevant for 840	OS
58 *	MELD	Interface for general messages	OS
59	DB-ZENTRAL	Central DB in link RAM Irrelevant for 840	OS
60 *	MDG WO	MD words basic program	OS
61 *	MDF WO	MD words function blocks	OS
62 *	MDA WO	MD words user	OS
63 *	MDG BI	MD bits basic program	OS
64 *	MDF BI	MD bits function blocks	OS
65 *	MDA BI	MD bits user	OS
66			
67			
68 *	SEA WO	SE user words	OS
69			
70			
71 *	SEA BI	SE user bits	OS

#### Abbreviations:

OS Operating system  
CL Computer link

#### Note:

The data blocks marked with an \* are set up and initialized after overall reset on cold restart by the PLC operating system. These blocks are always initialized anew on each cold restart.

DB No.	DB designation	DB name	Pack- age
76	Quit FM/BM	Acknowledgement signals FM/OM	0
77	DB FM/BM	DB status words FM/OM	0
78	Quit FM/BM	Acknowledgement signals FM/OM	0
79	QUITFMBM	Acknowledgement signals FM/OM	0
80	LMDKN 1	List for M decoding NC channel 1	UR
81	LMDKN 2	List for M decoding NC channel 2	UR
82	LMDKN 3	List for M decoding NC channel 3	UR
83	LMDKN 4	List for M decoding NC channel 4	UR
99	Log-Part	Assignment user interface/logical partner target	CL
100	NCDAT-T	Texts for display file transfer (operator request)	CL, 4
101	EIN ASS	Input user interface	CL
102	AUS ASS	Output user interface	CL
103	ZWSP-WZD	Buffer memory tool data	CL, 4
104	WZ-V-BO	Tool management operator interface	
105		Reserved	CL
.		.	CL
.		.	CL
.		.	CL
122		Reserved	CL
123			CL
124			
125	S-SIGNALE	Standard signals	CL
126	FORM-DB	Format list	6
127	ZUST-DB	Status DB	6
128	E-PUFFER	User interface input useful data DB	6
129	A-PUFFER	User interface output useful data DB	6
130		Reserved	6
131			
132			
133			1
134	ZW-STAZ	Status DB for life, quantity	1
135	ZW	Status words DB for punched tape input	1
136	DYNPUFF 1	Dynamic buffer	1
137	DYNPUFF 2	Dynamic buffer	1
138	DYNPUFF 3	Dynamic buffer	1
139	DYNPUFF 4	Dynamic buffer	1
140	DYNPUFF 5	Dynamic buffer	1
141	DYNPUFF 6	Dynamic buffer	1
142	DYNPUFF 7	Dynamic buffer	1
143	DYNPUFF 8	Dynamic buffer	1
144	ZW-DATVT	Status words DB data distributor <sup>1)</sup>	1
145	ZW-BT	Status words DB operator panel <sup>1)</sup>	1
146	ZW-ANZBT	Display parameter operator panel	1
147	ZW-MESS	Interface for measuring	1
148	TO-DATVT	TO memory distributor	1
149	TO-DATLS	Buffer for TO data read/write (FB 61/FB 62)	1
150	ZW-WZV	Status words tool management	1

**Abbreviations:**

OS PLC operating system  
0 FB Package 0  
1 FB Package 1  
6 FB Package 6  
CL Computer link  
UR User

**Note:**

The data blocks marked with an \* are set up and initialized after overall reset on cold restart by the PLC operating system. These blocks are always initialized anew on each cold restart.

<sup>1)</sup> These data blocks are set up contiguously in accordance with the tool management configuration.

DB No.	DB designation	DB name	Pack- age
151	KENN 1	Identifiers	1
152	KENN 2	Identifiers	1
153	KENN 3	Identifiers	1
154	IDENT 1	Ident number	1
155	IDENT 2	Ident number	1
156	DUPLO	Duplo number	1
157	ANWEND 1	User data <sup>1)</sup>	1
158	ANWEND 2	User data <sup>1)</sup>	1
159	ANWEND 3	User data <sup>1)</sup>	1
160	ANWEND 4	User data <sup>1)</sup>	1
161	ANWEND 5	User data <sup>1)</sup>	1
162	ANWEND 6	User data <sup>1)</sup>	1
163	ANWEND 7	User data <sup>1)</sup>	1
164	D-NR. 1	Reference list <sup>1)</sup>	1
165	D-NR. 2	Reference list <sup>1)</sup>	1
166	D-NR. 3	Reference list <sup>1)</sup>	1
167	D-NR. 4	Reference list <sup>1)</sup>	1
168	D-NR. 5	Reference list <sup>1)</sup>	1
169	D-NR. 6	Reference list <sup>1)</sup>	1
170	D-NR. 7	Reference list <sup>1)</sup>	1
171	D-NR. 8	Reference list <sup>1)</sup>	1
172	D-NR. 9	Reference list <sup>1)</sup>	1
173	ERSATZPL	Spare location number <sup>1)</sup>	1
174	WZAUF1 L1	Tool holder L1 <sup>1)</sup>	1
175	WZAUF2 L1	Tool holder L1 <sup>1)</sup>	1
176	WZAUF1 L2	Tool holder L2 <sup>1)</sup>	1
177	WZAUF2 L2	Tool holder L2 <sup>1)</sup>	1
178	ADAGE1 L1	Tool holder L1 <sup>1)</sup>	1
179	ADAGE2 L1	Adapter geometry L1 <sup>1)</sup>	1
180	ADAGE1 L2	Adapter geometry L2 <sup>1)</sup>	1
181	ADAGE1 L2	Adapter geometry L2 <sup>1)</sup>	1
182	ADALAGE	Adapter position <sup>1)</sup>	1

**Abbreviations:**

OS PLC operating system  
 0 FB Package 0  
 1 FB Package 1  
 CL Computer link  
 UR User

**Note:**

The data blocks marked with an \* are set up and initialized after overall reset on cold restart by the PLC operating system. These blocks are always initialized anew on each cold restart.

<sup>1)</sup> These data blocks are set up contiguously in accordance with the tool management configuration.

**DB 150 up to DB 182 are required when tool management is used.  
 The actual number of data blocks depends on the "width"  
 of the magazine table.**

### 6.1.3 Function blocks (FB, FX)

#### Function blocks of class FB

Function blocks FB 0 to FB 199 are reserved for Siemens applications.  
Function blocks FB 200 to FB 255 can be employed by the user.

FB No.	FB design.	FB name	Pack- age
11 *	EINR-DB	Setting up the data blocks	OS
12 *	WDTRG	Retriggering of cycle time monitoring	OS <sup>1)</sup>
17	STATUS	PLC status channel	0
30	MUL:16	Multiplication of two binary-coded numbers of 16 bits each	0
31			
32	DIV:16	Division of two binary-coded numbers of 16 bits each	0
33	DIV:32	Division of two binary-coded numbers of 32 bits each	0
34			
35	DIV/100	Divide by 100	0
36	ADD:32	Addition of two binary-coded numbers	0
37	SUB:32	Subtraction of two binary-coded numbers	0
38			
39	DUAL/BCD	Code conversion BINARY/BCD 4 decades	0
40	COD:16	Conversion of a fixed point binary number (16 bits) to a number in BCD code	0
41	COD:32	Conversion of a fixed point binary number (32 bits) to a number in BCD code (flags used: FW 220, 222)	0
42	COD:B4	Conversion of a number in BCD code (4 decades) to a fixed point binary number	0
43	COD:B8	Conversion of a number in BCD code (8 decades) to a fixed point binary number	0
44			
45	GST-FMBM	Basic setting error messages/operational messages	0
46	UP:54/55	Subroutines FB54, FB55	0
47	PSP:FMBM	Buffer memory error/operational messages	0
48	FMBM:HSG	Auxiliary signals for FM/OM	0
49	UP:57/58	Subroutines FB57, FB58	0
50	UP:FB49	Subroutine FB49	0
51	BTR_8_16	Subroutine FB45	0
52 *	FM-ANZ	Block transfer between 8-bit and 16-bit memory <sup>1)</sup>	
54	BM-ANZ	Display error messages	0
55	MG-ANZ	Display operational messages	0
56	FM-ABFR	Display message groups	0
57	BM-ABFR	Scan error messages	0
58	MG-ABFR	Scan operational messages	0
59	NCD-LESE	Scan message groups	0
60 *	BLOCK-TR	Block transfer	OS
61 *	NCD-LESE	Read NC data	OS
62 *	NCD-SCHR	Write NC data	OS
63 *	PCD-LESE	Read PLC data from PLC 1/ 2/ 3/ 4 w/o significance for 840	OS
64 *	PCDSCHR	Write PLC data to PLC 1/ 2/ 3/ 4 without significance for 840	OS

#### Abbreviations:

OS PLC operating system  
0 FB package 0

#### Note:

The blocks marked with \* are function macros integrated in the PLC operating system.  
(see function macros description)

1) Included as from SW 2

FB No.	FB design.	FB name	Pack- age
65*	M-STACK	Transfer flags → flag stack	OS
66*	STACK-M	Flag stack → transfer flags	OS
67*	T:RI->ACH	Transfer direction keys (840T) to axes	OS
68*	AP RUF	Aperiodic program call	OS
69*	G-DECOD	G functions decoding	OS
70*	T:NS->EAM	Transfer interfaces DB to I/Q/F	OS
71*	T:EAM->NS	Transfer I/Q/F to interfaces DB	OS
72*	T:NCK->DB	Transfer NC channel → DB channel	OS
73*	T:DB->NCK	Transfer DB channel → NC channel	OS
74*	T:SPI->DB	Transfer spindle → DB spindle	OS
75*	T:DB->SPI	Transfer DB spindle → spindle	OS
76*	T:ACH->DB	Transfer axis → DB axis	OS
77*	T:DB->ACH	Transfer DB axis → axis	OS
78*	T:MS->KN	Transfer machine control panel → NC channel	OS
79*	T:MS->ACH	Transfer machine control panel → DB axis (840M)	OS
80			
88*	BA-LAMPE	Operating modes - LED selection	OS
89*	BAA-LESE	Reading block start address	OS
90			
91	AK2:V/R	Sequence cascade forwards/backwards	0
92	AK3:AUT	Sequence cascade automatic	0
93	ALS:V/R	Sequence cascade forwards/backwards Graph 5	0
94	ALS:AUT	Sequence cascade automatic Graph 5	0
95	RK:S880	Computer link FB	CL, 4
96	RK:TWZD	Reserved, transfer tool data	CL, 5
97		Reserved	CL
98		Reserved	CL
99		Reserved	CL
100	RK:GLOBA	Global functions	CL, 4
101	RK:MELDG	Messages	CL, 4
102	RK:NCDAT	File transfer (operator request)	CL, 4
103		Reserved	CL
104		Reserved	CL
105		Reserved	CL
106		Reserved	CL
107	UP:FB101	Subroutine for FB101	CL, 4
108	UP:RK880	Subroutine	CL, 4
109		Reserved	CL
110	SUCH	Search for word	0
111	SUCHROUT	Search routine	1
112		Search for empty location without presetting	1
113*	SUCH-SYM	Search direction symmetrical	OS
114	SUCH-VOR	Search direction forwards	1
115	SUCH-RWS	Search direction backwards	1
116	WZV-INIT	Initialization of tool management	
117	EINR-MAG	Setting up magazine table	1
118	WZ-GR:ST	Tool size, standard	1
119		Reserved	1
120		Reserved	1

**Abbreviations:**

OS PLC operating system  
 0 FB package 0  
 1 FB package 1  
 4 FB package 4 of computer link  
 CL Computer link

**Note:**

The blocks marked with an \* are function macros integrated in the PLC operating system. (see function macro description).

FB No.	FB design.	FB name	Pack- age
121		Reserved	1
122	LEERPL2	Search for empty location with presetting	1
123	WZ-BS	Prepare tool	1
124	UP: T = ID	Tool search subroutine T = Ident	1
125	UP: T = PL	Tool search subroutine T = Location	1
126			1
127	UP:ZW-SP		1
128	TRANSFER	Transfer tool data	1
129		Reserved	1
130	TOS-VER	Subroutine	1
131	UP: MD-B	Subroutine MD bits	1
132	UP: MD-W	Subroutine MD words	1
133	RI-AUSW	Choice of direction	1
134	TODAT-W	Subroutine	1
135	D-NR:WZW	Prepare D No. after tool change	1
136	WZDAT-LS	Read tool data	1
137		Reserved	1
138	DYN-PUFF	Management data I/O buffer	1
139	DAT-VERT	Prepare data I/O buffer	1
140	UP: FB139	FB 139 subroutines	1
141	UP: KC-0	FB 139 subroutines	1
142	UP: KC1-4	FB 139 subroutines	1
143	UP: KC5-7	FB 139 subroutines	1
144	UP:KC8 + 9	FB 139 subroutines	1
145	BEL-CDTR	Load tool with code carrier	6
146	ENT-CDTR	Unload tool with code carrier	6
147	CT-FORMAT	Formatting	6
148		Reserved	6
149		Reserved	6
150		Reserved	1
151		Reserved	1
152	NP-SIF	Subroutine	1
153	AD-AD	Subroutine	1
154	RK: AW-SS	User interface to CL (processing)	1
155	LOCHSTEG	Punched tape input	1
156	STAZ/VWG	Life monitoring/prewarning limit	1
157	STUE/VWG	Quantity monitoring/prewarning limit	1
158	WZ-SPER	Disable tool	1
159	BCD-DUAL	BCD/BINARY conversion	1
160 1)		Central call block	1
161 1)		Subroutine check	1
162 1)		Reserved	1
163 1)		Reserved	1
164 1)		Transfer tool selection	1
165 1)		Reserved	1
166 1)		Signal: Load spindle	1
167 1)		Signal: Unload spindle	1
168 1)		Acknowledge spindle	1
169 1)		Reserved	1
170 1)		Buffer memory assignment	1

**Abbreviations:**

- 1 FB Package 1  
6 FB Package 6

**Note:**

The blocks marked with 1) are part of the operator interface example of tool management.

FB No.	FB design.	FB name	Pack- age
171 1)		Load magazine	1
172 1)		Select tool according to T number	1
173 1)		Load/unload magazine from preselection/spindle	1
174 1)		Reserved	1
175 1)		Display tool data from buffer memory assignment	1
176 1)		Modify tool data from buffer memory assignment	1
177 1)		Display tool data from magazine assignment	1
178 1)		Edit tool data from magazine assignment	1
179 1)		Select tool acc. to cursor position from magazine assignment	1
180 1)		Further cutting edge from buffer memory and magazine	1
181 1)		Further cutting edge from loading	1
182 1)		Load	1
183 1)		Unload	1
184 1)		Reserved	1
185 1)		Manual acknowledgement	1
186 1)		Manual abort magazine/spindle	1
187 1)		Display next cutting edge	1
188 1)		Reactivate tool	1
189 1)		Cancel last cutting edge	1
190 1)		Select loading display, punched tape	1
191 1)		Positive/negative acknowledgement, punched tape	1
192 1)		Abort punched tape	1
193 1)		Reserved	1
194 1)		Reserved	1
195		Reserved	1
196		Reserved	1
197	WZ-LISTE	Create tool list	1
198	TAUSCHL	Create replacement list	1
199	FIFO	Buffer processing	1

**Abbreviations:**

1 FB Package 1

**Note:**

The blocks marked with 1) are part of the operator panel example of tool management.



**Class FX function blocks**

The function blocks FX 0 to 55 are reserved for Siemens applications.

FX No.	FX design.	FX name	Pack- age
0	SI	Self-installation (available soon)	OS
.		.	
.		.	
31		GRAY-BINARY	
32		BINARY-GRAY	
.		.	
.		.	
38		Coordination (available soon)	0
39		Coordination (available soon)	0
40	RK:WZABF	Scan tool	CL, 5
41	RK: WZM	Report tool	CL, 5
42	RK: WZBEL	Load tool	CL, 5
43	RK: WZENT	Unload tool	CL, 5
44	RK:WZRGB	Load magazine assignment data	CL, 5
45		Reserved	CL
46		Reserved	
47		Reserved	
48		Reserved	CL
49	TWZDAT	Transfer tool data	CL, 5
50	UPWZDIAL	Subroutine tool dialogs	CL, 5
51		Reserved	CL
52		Reserved	CL
53		Reserved	CL
54		Reserved	CL
55		Reserved	CL

**Abbreviations:**

OS PLC operating system  
 5 FB package 5  
 0 FB package 0  
 CL Computer link

## 6.2 Connection machine control panel

### Inputs machine control panel SINUMERIK 840T

Machine control panel, basic group of keys								
Byte No.	Bit No.							
	7	6	5	4	3	2	1	0
IB m	Spindle override				Keyswitch (as from SW 2)			
	D	C	B	A		1	3	4
IB m + 1	Direction key +X	Direction key -X	Rap. trav.	Direction key +C	Direction key -C	Slide 1		Slide 2
IB m + 2	Direction key +Z	Direction key -Z	Spindle start	Spindle hold	Feed start	Feed hold	NC Start	NC Stop
IB m + 3	Reset	Keyswitch 2	Single block	Feedrate/rapid traverse override				
				E	D	C	B	A
IB m + 4					JOG key	TEACH IN key	MDA key	AUT key
IB m + 5	REPOS key	REF key	VAR	10 000	1 000	100	10	1
					INC			
Unassigned direction keys (M10 Option)								
Byte No.	Bit No.							
	7	6	5	4	3	2	1	0
EB m + 6	Key 8 <sup>1)</sup>	Key 6 <sup>1)</sup>	Key 7		Key 1			Key 3
EB m + 7				Key 5	Key 4	Key 2		

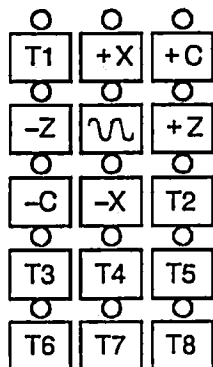
Determine address m with PLC-MD 128 (standard setting: 64) for the 1st machine control panel and with PLC-MD 129 (standard setting: 72) for the 2nd machine control panel.

**Note:**

Address m is identical for the input and output area.

\* So-called "inverse signal" causing an effect as 0-signal instead of 1-signal.

1) not with 840T

**Unassigned direction keys SINUMERIK 840T:**

Keys T6 and T8 not with 840TT

**Outputs machine control panel SINUMERIK 840T**






















LEDs selection								
Byte No.	Bit No.							
	7	6	5	4	3	2	1	0
QB m					LED JOG key	LED TEACH IN key	LED MDA key	LED AUT key
QB m + 1	LED REPOS key	LED REF key	LED VAR key	LED 10 000 key	LED 1 000 key	LED 100 key	LED 10 key	LED 1 key
QB m + 2	LED spindle key 100% (up to SW 1)	LED feedrate key 100% (up to SW 1)	Spindle LED Start key LED Hold key		Feed LED Start key LED Hold key		LED NC Start key	LED NC Stop key
QB m + 3			LED Single block key					
QB m + 4	LED slide 2 or T8 key	LED slide 1 or T6 key	LED key 7		LED key 1	LED Direction key - Z	LED Direction key - C	LED key 3
QB m + 5	LED Direction key +X	LED Direction key +C	LED Rapid traverse key	LED key 5	LED key 4		LED Direction key - X	LED Direction key +Z

Determine address m with PLC-MD 128 (standard setting: 64) for the 1st machine control panel and with PLC-MD 129 (standard setting: 72) for the 2nd machine control panel.

**Note:**

Address m is identical for the input and output areas.

### Outputs machine control panel SINUMERIK 840M

Machine control panel, basic group of keys								
Byte No.	Bit No.							
	7	6	5	4	3	2	1	0
IB m	Spindle override				Keyswitch (as from SW 2)			
	D	C	B	A		1	3	4
IB m + 1	Direction key +	Direction key -	Rapid 	E	D	C	B	A
IB m + 2			Spindle start 	Spindle * hold 	Feed start 	Feed * hold 	NC Start 	* NC Stop 
IB m + 3	Reset 	Keyswitch 2	Single blk. 	E	D	C	B	A
IB m + 4					JOG key 	TEACH IN key 	MDA key 	AUT key 
IB m + 5	REPOS key 	REF key 	VAR 	10 000 	1 000 	100 	10 	1 

Unassigned direction keys (Option M10)								
Byte No.	Bit No.							
	7	6	5	4	3	2	1	0
IB m + 6								Key 1
IB m + 7				Key 3	Key 2			

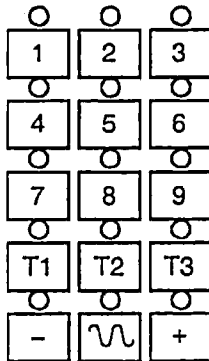
Determine address m with PLC-MD 128 (standard setting: 64) for the 1st machine control panel and with PLC-MD 129 (standard setting: 72) for the 2nd machine control panel.

**Note:**

Address m is identical for the input and output area.

\* So-called „inverse signal” causing an effect as 1-signal instead of 0-signal.

## Unassigned direction keys SINUMERIK 840M:



## Outputs machine control panel SINUMERIK 840M

LEDs selection								
Byte No.	Bit No.							
	7	6	5	4	3	2	1	0
QB m					LED JOG key	LED TEACH IN key	LED MDA key	LED AUT key
QB m + 1	LED REPOS key	LED REF key	LED VAR key	LED 10 000 key	LED 1 000 key	LED 100 key	LED 10 key	LED 1 key
QB m + 2	LED Spindle 100% key (up to SW 1)	LED feedrate 100% key (up to SW 1)	Spindle LED Start key    LED Hold key		Feed LED Start key    LED Hold key		LED NC Start key	LED NC Stop key
QB m + 3			LED Single block key					
QB m + 4	LED Direction key +	LED Direction key -	LED Rapid traverse key		LED X Axis	LED Axis 4	LED Axis 7	LED Axis 1
QB m + 5	LED Y axis	LED Z axis	LED Axis 5	LED Key 3	LED Key 2	LED Axis 9	LED Axis 8	LED Axis 6

Determine address m with PLC-MD 128 (standard setting: 64) for the 1st machine control panel and with PLC-MD 129 (standard setting: 72) for the 2nd machine control panel.

**Note:**

Address m is identical for the input and output areas.

### 6.3 Basic signals

PLC auxiliary signals								
Byte No.	Bit No.							
	7	6	5	4	3	2	1	0
FY 0	Flashing frequency 0.5 Hz						One	Zero
FY 1	No. of current machining plane (OB No.)							
FY 2	Basic setting							
	OB 7	OB 6	OB 5	OB 4	OB 3	OB 2	OB 1	
FY 3	Cold restart							
	OB 7	OB 6	OB 5	OB 4	OB 3	OB 2	OB 1	OB 20
FY 4	Parameter test							
	OB 7	OB 6	OB 5	OB 4	OB 3	OB 2	OB 1	
FY 5	Addressing error detection (as from SW 2)	Segment overwrite of block (as from SW 2)						PLC selection
FY 6	Processing delay						Group signal LIM/SIM (as from SW 2)	I/Os not ready/changed
	OB 7	OB 6	OB 5	OB 4	OB 3	OB 2		
PLC ready signals								
Byte No.	Bit No.							
	7	6	5	4	3	2	1	0
FY 7								PLC CPU ready
FY 8	Interrupt inputs				1st EU interface			
	Interrupt input 7	Interrupt input 6	Interrupt input 5	Interrupt input 4	Interrupt input 3	Interrupt input 2	Interrupt input 1	Interrupt input 0
FY 9	Interrupt inputs				2nd EU interface			
	Interrupt input 7	Interrupt input 6	Interrupt input 5	Interrupt input 4	Interrupt input 3	Interrupt input 2	Interrupt input 1	Interrupt input 0
FY 10	Reserved							
FY 11								

Signals for alarm-controlled processing								
Byte No.	Bit No.							
	7	6	5	4	3	2	1	0
FY 12	Negative edge of the process alarm byte Byte No. n							
FY 13	Byte No. (n + 1)							
FY 14	Byte No. (n + 2)							
FY 15	Byte No. (n + 3)							
FY 16	Positive edge of the process alarm byte Byte No. n							
FY 17	Byte No. (n + 1)							
FY 18	Byte No. (n + 2)							
FY 19	Byte No. (n + 3)							
NC ready signals								
Byte No.	Bit No.							
	7	6	5	4	3	2	1	0
FY 20								
FY 21	2nd inter- face module CL	1st inter- face module CL						NC CPU ready
FY 22								Interface CPU ready
FY 23								
Single signals								
Byte No.	Bit No.							
	7	6	5	4	3	2	1	0
FY 24	Meas. probe actuated 1	Meas. probe actuated 2	NC alarm with machining stop	CPU failure		Power available	Battery fault	NC alarm

### 6.3.1 Assignment of DB 1 (diagnostics)

	DW	15	14	13	12	11	10	9	8
		Bit No.							
		7	6	5	4	3	2	1	0
<b>Input I/O module not ready</b>  1: fault 0: no fault	DL 12	15	14	13	12	11	10	9	8
	DR 12	7	6	5	4	3	2	1	0
	DL 13								
	DR 13					19	18	17	16
<b>Output I/O module not ready</b>  1: fault 0: no fault	DL 14	15	14	13	12	11	10	9	8
	DR 14	7	6	5	4	3	2	1	0
	DL 15								
	DR 15					19	18	17	16

Semaphore technique within processing planes										
Byte No.	15	14	13	12	11	10	9	8		
	Bit No.									
	7	6	5	4	3	2	1	0		
DW 16									Number of lost requests during LIM/SIM OB2	
DW 17									Number of lost requests during LIM/SIM OB3	
DW 18									Number of lost requests during LIM/SIM OB4	
DW 19									Number of lost requests during LIM/SIM OB5	
DW 20									Number of lost requests during LIM/SIM OB6	
DW 21									Number of lost requests during LIM/SIM OB7	



Detailed error code (as from SW 2)		
DW No. PLC	High byte (DL)	Low byte (DR)
DW 22	Reserved	
DW 23	Reserved	
⋮	Reserved	
⋮	Reserved	
⋮	Reserved	
DW 159	Reserved	
DW 160	Detailed error code in diagnostics DB error number	
DW 161	Supplementary error details 1st word	
DW 162	Supplementary error details 2nd word	
DW 163	Supplementary error details 3rd word	

## 6.4 NC/PLC interface

### 6.4.1 Channel-specific signals

#### 6.4.1.1 Signals to NC channel (DB10 to DB13)

Signals to NC channel									
Byte No.	15	14	13	12	11	10	9	8	
	Bit No.								
	7	6	5	4	3	2	1	0	
DL 0	DRF <sup>1)</sup>	Reset <sup>1)</sup>							
DR 0	Skip block	Single block	DEC single block	Dry run feedrate	M01 effective				
DL 1			Feedrate override effective <sup>3)</sup>	E	D	C	B	A	
DR 1			Rapid traverse override effective <sup>3)</sup>			C	B	A	
DL 2	External processing (as from SW 2)	Block search with calculation	Block search with calculation from last main block						
DR 2					Delete distance to go	Delete number of passes of subroutine	NC Stop	NC Start	
DL 3						C	B	A	
DR 3									
DL 4									
DR 4									
DL 5				Operating modes <sup>1)</sup>					
DR 5	REPOS	REF	VAR	10 000	1 000	100	10	1	

- 1) If this signal is defaulted in the 1st channel (master channel) of a mode group, it also applies to all other channels in this mode group. Mode group-specific Reset can only be defaulted in the master channel.
- 2) Takes effect only when master channel has been selected (mode group specific).
- 3) Feedrate and rapid override take effect channel-specific.

Signals to NC channel								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 6	Feed rate disable total							
	m+7	m+6	m+5	m+4	m+3	m+2	m+1	m+0
DR 6	Feed rate disable total							
	m+15	m+14	m+13	m+12	m+11	m+10	m+9	m+8
DL 7	Feed rate disable total and read-in disable							
	m+23	m+22	m+21	m+20	m+19	m+18	m+17	m+16
DR 7	Feed rate disable total and read-in disable							
	m+31	m+30	m+29	m+28	m+27	m+26	m+25	m+24
DL 8	Feed rate disable total and read-in disable							
	m+39	m+38	m+37	m+36	m+35	m+34	m+33	m+32
DR 8	Feed rate disable total and read-in disable							
	m+47	m+46	m+45	m+44	m+43	m+42	m+41	m+40
DL 9	Read-in disable							
	m+55	m+54	m+53	m+52	m+51	m+50	m+49	m+48
DR 9	Read-in disable							
	m+63	m+62	m+61	m+60	m+59	m+58	m+57	m+56
DL 10	Read-in disable							
	m+71	m+70	m+69	m+68	m+67	m+66	m+65	m+64
DR 10	Read-in disable							
	m+79	m+78	m+77	m+76	m+75	m+74	m+73	m+72
DL 11	Disable NC Start							
	m+87	m+86	m+85	m+84	m+83	m+82	m+81	m+80
DR 11	Disable NC Start							
	m+95	m+94	m+93	m+92	m+91	m+90	m+89	m+88
DL 12								
DR 12								

Channel	NS DB	Message text address m
1	DB 10	6000
2	DB 11	6100
3	DB 12	6200
4	DB 13	6300

**Note:**

Bytes DL 6-DR 11 can also be evaluated for error/operational messages. Setting is via PLC-MD 6032-6047.

6.4.1.2 Signals from NC channel (DB 10 to DB 13)

Signals from NC channel								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 13	M00 / M01	M02/ M30/ Reset	G33/ G63	G00	G96	Block search active	Program interrupted	Program running
DR 13	Transformation active							
DL 14	Skip block selected	Reserved	DEC single block selected	Dry run feedrate selected	M 01 selected	Feedrate override selected for rapid traverse	DRF selected	
DR 14	External processing selected (as from SW2)	Block search with calculation	Block search with calculation from last main block					
DL 15		Block search with calculation without errors	Block search with cal. from 1st main block without errors					
DR 15		Errors in block search with calculation	Errors in block search with calc. from 1st main block					
DL 16	NC Start disable		NC alarm with standstill (as from SW2)	NC Start possible (as from SW2)	NC channel in Reset st. (as from SW2)	NC Start ineffective	Mode group ready	
DR 16								

## 6.4.1.3 Auxiliary functions from NC channel (DB 10 to DB 13)

Modification signals								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 17	F Modification	D Modification	H Modification	T Modification	S Modification	M word 3 Modification	M word 2 Modification	M word 1 Modification
DR 17	Last information					M word 3 not decoded	M word 2 not decoded	M word 1 not decoded

Decoded M functions								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 18	Dynamic M signals							
	M7	M6	M5	M4	M3	M2	M1	M0
DR 18	Static M signals							
	M7	M6	M5	M4	M3	M2	M1	M0
DL 19	Dynamic M signals							
	M15	M14	M13	M12	M11	M10	M9	M8
DR 19	Static M signals							
	M15	M14	M13	M12	M11	M10	M9	M8
DL 20	Dynamic M signals							
	M23	M22	M21	M20	M19	M18	M17	M16
DR 20	Static M signals							
	M23	M22	M21	M20	M19	M18	M17	M16
DL 21	Dynamic M signals							
	M31	M30	M29	M28	M27	M26	M25	M24
DR 21	Static M signals							
	M31	M30	M29	M28	M27	M26	M25	M24

Decoded M functions								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
<b>DL 22</b>	Dynamic M signals							
	M39	M38	M37	M36	M35	M34	M33	M32
<b>DR 22</b>	Static M signals							
	M39	M38	M37	M36	M35	M34	M33	M32
<b>DL 23</b>	Dynamic M signals							
	M47	M46	M45	M44	M43	M42	M41	M40
<b>DR 23</b>	Static M signals							
	M47	M46	M45	M44	M43	M42	M41	M40
<b>DL 24</b>	Dynamic M signals							
	M55	M54	M53	M52	M51	M50	M49	M48
<b>DR 24</b>	Static M signals							
	M55	M54	M53	M52	M51	M50	M49	M48
<b>DL 25</b>	Dynamic M signals							
	M63	M62	M61	M60	M59	M58	M57	M56
<b>DR 25</b>	Static M signals							
	M63	M62	M61	M60	M59	M58	M57	M56
<b>DL 26</b>	Dynamic M signals							
	M71	M70	M69	M68	M67	M66	M65	M64
<b>DR 26</b>	Static M signals							
	M71	M70	M69	M68	M67	M66	M65	M64
<b>DL 27</b>	Dynamic M signals							
	M79	M78	M77	M76	M75	M74	M73	M72
<b>DR 27</b>	Static M signals							
	M79	M78	M77	M76	M75	M74	M73	M72
<b>DL 28</b>	Dynamic M signals							
	M87	M86	M85	M84	M83	M82	M81	M80
<b>DR 28</b>	Static M signals							
	M87	M86	M85	M84	M83	M82	M81	M80
<b>DL 29</b>	Dynamic M signals							
	M95	M94	M93	M92	M91	M90	M89	M88
<b>DR 29</b>	Static M signals							
	M95	M94	M93	M92	M91	M90	M89	M88
<b>DL 30</b>	Dynamic M signals							
					M99	M98	M97	M96
<b>DR 30</b>	Static M signals							
					M99	M98	M97	M96

Stored words of block information		
Data word No.	High byte (DL)	Low byte (DR)
DW 31	Bit 15 Extended address M word 1 (binary)	Bit 0
DW 32	Bit 15 M word 1 (binary)	Bit 0
DW 33	Bit 15 Extended address M word 1 (binary)	Bit 0
DW 34	Bit 15 M word 2 (binary)	Bit 0
DW 35	Bit 15 Extended address M word 3 (binary)	Bit 0
DW 36	Bit 15 M word 3 (binary)	Bit 0
DW 37	Bit 15 Extended S address (binary or BCD)	Bit 0 10 <sup>1</sup> 10 <sup>0</sup>
DW 38	Bit 31 S word (binary or BCD)	Bit 16 10 <sup>7</sup> 10 <sup>6</sup> 10 <sup>5</sup> 10 <sup>4</sup>
DW 39	Bit 15 S word (binary or BCD)	Bit 0 10 <sup>3</sup> 10 <sup>2</sup> 10 <sup>1</sup> 10 <sup>0</sup>

Chan- nel	NS DB	NC MD for BCD output				
		S	T	D	H	F
1	DB 10	5440.3	-4	-5	-6	-7
2	DB 11	5441.3	-4	-5	-6	-7
3	DB 12	5442.3	-4	-5	-6	-7
4	DB 13	5443.3	-4	-5	-6	-7

Stored words of block information			
Data word No.	High byte (DL)		Low byte (DR)
DW 40	Bit 15	Extended T address (binary or BCD)	Bit 0
		$10^1$	$10^0$
DW 41	Bit 31	T word (binary or BCD)	Bit 0
	$10^7$	$10^6$	$10^4$
DW 42	Bit 15	T word (binary or BCD)	Bit 0
	$10^3$	$10^2$	$10^0$
DW 43	Bit 15	Extended H address (binary or BCD)	Bit 0
		$10^1$	$10^0$
DW 44	Bit 31	H word (binary or BCD)	Bit 0
	$10^7$	$10^6$	$10^4$
DW 45	Bit 15	H word (binary or BCD)	Bit 0
	$10^3$	$10^2$	$10^0$
DW 46	Bit 15	D word (binary or BCD)	Bit 0
		$10^2$	$10^0$
DW 47	Bit 31	Extended F address	Bit 16
		$10^1$	$10^0$
DW 48	Bit 15	F word	Bit 0
	$10^5$	$10^4$	$10^2$
DW 49	Bit 15	F word	Bit 0
	$10^1$	$10^0$	$10^{-2}$
DW 50		Reserved	
:		:	
DW 62		Reserved	



Signals from program coordination (as from SW 2)								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 52								Program coord. change
DR 52	Error code							
DL 53	Mark/program number (BCD)				Mark/program number (BCD)			
	$10^7$						$10^6$	
DR 53	Mark/program number (BCD)				Mark/program number (BCD)			
	$10^5$						$10^4$	
DL 54	Mark/program number (BCD)				Mark/program number (BCD)			
	$10^3$						$10^2$	
DR 54	Mark/program number (BCD)				Mark/program number (BCD)			
	$10^1$						$10^0$	
DL 55	Program coordination (SET) effective in							
	Chan. 16	Chan. 15	Chan. 14	Chan. 13	Chan. 12	Chan. 11	Chan. 10	Chan. 9
DR 55	Program coordination (SET) effective in							
	Chan. 8	Chan. 7	Chan. 6	Chan. 5	Chan. 4	Chan. 3	Chan. 2	Chan. 1

Signals to program coordination (as from SW 2)								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 56								Buffer occupied
DR 56	Buffer for error code							
DL 57	Buffer for mark/program number (BCD)							
DR 57	Buffer for mark/program number (BCD)							
DL 58	Buffer for mark/program number (BCD)							
DR 58	Buffer for mark/program number (BCD)							
DL 59	Buffer for program coordination (SET) effective in							
	Chan. 16	Chan. 15	Chan. 14	Chan. 13	Chan. 12	Chan. 11	Chan. 10	Chan. 9
DR 59	Buffer for program coordination (SET) effective in							
	Chan. 8	Chan. 7	Chan. 6	Chan. 5	Chan. 4	Chan. 3	Chan. 2	Chan. 1
DL 60	Program coordination (ACT) reached in							
	Chan. 16	Chan. 15	Chan. 14	Chan. 13	Chan. 12	Chan. 11	Chan. 10	Chan. 9
DR 60	Program coordination (ACT) reached in							
	Chan. 8	Chan. 7	Chan. 6	Chan. 5	Chan. 4	Chan. 3	Chan. 2	Chan. 1
DL 61	Detailed error code							
DR 61	Detailed error code							
DL 62					End of program reached [WAIT E]	NC alarm 3166 "Program coord. wrong"	Read disable 1)	NC START 1)

1) These signals are only allowed for program coordination.

T/H word routing								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 63	Suppress routing (as from SW2)				Reserved			
DR 63	Coordination error						H word valid	T word valid
DW 64	Bit 15	Number of source channel (address extension, binary)						Bit 0
DW 65	Bit 15	Routed T word			Routed T word			Bit 0
		$10^3$				$10^2$		
DW 66	Bit 15	Routed T word			Routed T word			Bit 0
		$10^1$				$10^0$		
DW 67	Bit 15	Routed H word (address extension)			Routed H word (address extension)			Bit 0
		$10^1$				$10^0$		
DW 68	Bit 15	Routed H word			Routed H word			Bit 0
		$10^3$				$10^2$		
DW 69	Bit 15	Routed H word			Routed H word			Bit 0
		$10^1$				$10^0$		

Chan- nel	NS- DB	NC-MD for BCD output				
		S	T	D	H	F
1	DB 10	5440.3	-.4	-.5	-.6	-.7
2	DB 11	5441.3	-.4	-.5	-.6	-.7
3	DB 12	5442.3	-.4	-.5	-.6	-.7
4	DB 13	5443.3	-.4	-.5	-.6	-.7

### 6.4.2 M signals decoded according to list (DB 30)

Signals decoded according to list								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 0	Dynamic M signals							
DR 0	Static M signals							
DL 1	Dynamic M signals							
DR 1	Static M signals							
DL 63	Dynamic M signals							
DR 63	Static M signals							

The bit field is common to all channels.  
 Per channel a maximum of 64 M functions can be decoded according to list.

Chan-nel	Decoding list	PLC MD for decoding
1	DB 80	6009.0
2	DB 81	.1
3	DB 82	.2
4	DB 83	.3

Contents of decoding list				
	Extended M address	M address	Def. of DW No. in DB30	Def. of bit No. in DB30
	0 - 99 (KF)	0 - 9999 (KF)	0 - 63 (KY)	0 - 7 (KY) Stat. bit
1st value	DW 0	DW 1	DL 2	DR 2
2nd value	DW 3	DW 4	DL 4	DR 5
...				
64th value	DW 190	DW 191	DL 192	DR 192

## 6.4.3 Spindle-specific signals (DB 31)

Signals from spindle								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL K	Actual dir. or rotation clockwise	Progr. speed too high	Spindle in set range	Spindle position reached	Spindle has stopped	Spindle synchronized	Spindle positioning running	Speed limit exceeded
DR K	Change gear						Set gear stage C B A	

Signals to spindle								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL K + 1	Change gain factor (as from SW2)	Controller enable	Default 0 as set speed	Spindle compensation effective	Spindle compensation D C B A			
DR K + 1			Reset spindle	Invert M03/M04	Initiate C axis operation (as from SW 2)	Actual gear stage C B A		
DL K + 2						Channel number C B A		
DR K + 2	Set direction of rotation clockwise	Reciprocation speed	Basic speed	Position spindle	Resynchronize spindle	Acknowledge M19		PLC spindle control
DL K + 3	Spindle disable n+7 n+6 n+5 n+4 n+3 n+2 n+1 n+0							
DR K + 3	Spindle disable n+15 n+14 n+13 n+12 n+11 n+10 n+9 n+8							

Spindle	Address K	Message text address n	PLC MD for processing
1	0	8000	6012.0
2	4	8020	.1
3	8	8040	.2
4	12	8060	.3

**Notes:**

- 1) A maximum of 9 measuring circuits are possible (axes and spindles).
- 2) Message test address n is required for error or operational messages. Via PLC MD 6034 the SPINDLE DISABLE signals can also be evaluated for error messages. Via PLC MD 6042 evaluation as operational messages can be set.  
The function blocks required for the scan are contained in FB Package 0.

### 6.4.4 Axis-specific signals (DB 32)

Signals from axis								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL K		Position control active		Reference point reached	Traversing command +	Traversing command -	Position reached with exact stop fine   coarse	
DR K								

Signals to axis								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL K+1	Mirroring	Follow-up operation		*Delay ref. pt. approach	Parking axis	Controller enable	2nd software limit switch +   -	
DR K+1	+   Jog	-	Rapid traverse override	Feedrate 1:100	Axis disable		Handwheel active 2   1	
DL K+2							- End limit +   -	
DR K+2								
DL K+3	Feedrate disable							
	n+7	n+6	n+5	n+4	n+3	n+2	n+1	n+0
DR K+3	Feedrate disable							
	n+15	n+14	n+13	n+12	n+11	n+10	n+9	n+8

Axis	Address K	Message text address n	PLC MD for processing
1	0	8200	6016.0
2	4	8220	6016.1
3	8	8240	6016.2
4	12	8260	6016.3
5	16	8280	6016.4
6	20	8300	6016.5
7	24	8320	6016.6
8	28	8340	6016.7
9	32	8360	6017.0
10	36	8380	6017.1
11	40	8400	6017.2
12	44	8420	6017.3

**Notes:**

- 1) A maximum of 12 axes (real and fictitious) are possible.
- 2) The message text address n is required for error or operational messages. Via PLC MD 6035 the signals FEED DISABLE can also be evaluated for error messages. Via PLC MD 6043 evaluation as operational messages can be set. The function blocks required for the scan are contained in FB Package 0.

## 6.4.5 Data transfer PLC/NC (DB 36)

Status data transfer									
Number interface byte	Byte No.	15	14	13	12	11	10	9	8
		Bit No.							
		7	6	5	4	3	2	1	0
1	DL 0	Value 1- Value 3	Error Number format	Access disabled	Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested
2	DR 0	Value 1- Value 3	Error Number format	Access disabled	Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested
3	DL 1	Value 1- Value 3	Error Number format	Access disabled	Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested
4	DR 1	Value 1- Value 3	Error Number format	Access disabled	Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested
5	DL 2	Value 1- Value 3	Error Number format	Access disabled	Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested
62	DR 30	Value 1- Value 3	Error Number format	Access disabled	Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested
63	DL 31	Value 1- Value 3	Error Number format	Access disabled	Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested
64	DR 31	Value 1- Value 3	Error Number format	Access disabled	Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested
Data transfer alarm-controlled									
Number interface byte	Byte No.	15	14	13	12	11	10	9	8
		Bit No.							
		7	6	5	4	3	2	1	0
65	DL 32	Value 1- Value 3	Error Number format	Access disabled	Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested

## Notes:

- 1) If the PLC goes into stop on account of a parameter error, the number of the interface byte is stored in the High byte of ACCU 2.
- 2) If several jobs are entered in the buffer for data transfer, a job with the number 65 is processed before the others.
- 3) Data transfer is via function macro FB61 (Read) or FB62 (Write).

6.4.6 Serial interface (DB 37)

Interface signals								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 0							V.24 running	
DR 0							2	1

Signals for data transfer initiative PLC								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 1						V.24 abort	Data Start output	Data Start input
DR 1							Error on data transfer	Data transfer ended
DW 2	Data type for data output							
DW 3	Data type for data output							
DW 4	Start number							
DW 5	End number							
DL 6	Channel number							





















Data type for data output (DB37;DW2,3) (KC)	Significance	Start number (DB37;DW4) (KH)	End number (DB37;DW5) (KH)	Definition of channel (DB37;DL6) (KH)
MPF	Part program	0 - 9999	0 - 9999	-
SPF	Subroutine	1 - 999	1 - 999	-
TOA	Tool offsets	1 - 409	1 - 409	1 - 4
RPA	R parameters			
	- channel-specific	0 - 499	0 - 499	1 - 4
	- central	900 - 999	900 - 999	-
TEA1	NC machine data	0 - 20375	0 - 20375	-
TEA2	PLC machine data	0 - 8199	0 - 8199	-
ZOA	Zero offsets (G54 - G57)	-	-	-
SEA1	NC setting data	0 - 5799	0 - 5799	-
TEA4	Cycles - MD			
	- channel-specific	0	949	1 - 4
	- central	1000	8049	-
SEA4	Cycles - SD	0	949	1 - 4

**Notes:**  
 Set number of interface with NC-MD 200.  
 Enable with PLC-MD 6026, bit 7.



### 6.4.7 Operator panel signals/PLC (DB 40)

#### 6.4.7.1 Key signals from operator panel (DB 40)

Key signals from operator panel								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 0	Group A softkeys (dynamic signals)							
		Softkey 7	Softkey 6	Softkey 5	Softkey 4	Softkey 3	Softkey 2	Softkey 1
DR 0	GroupA softkeys (static signals)							
		Softkey 7	Softkey 6	Softkey 5	Softkey 4	Softkey 3	Softkey 2	Softkey 1
DW 1								
DW 2								
DL 3	Group F selection cursor keys (dynamic signals)							
								
DL 4	Group A (dyn.) Range changeover		Change mode grp.		Group E control keypad (dynamic signals)		Search	
								
DL 5	Group D correction keys (dynamic signals)							
								
DL 6	Group E Help	Group A (dyn.) Recall	ETC					
								

**The static signals are stored in the DR.**

**Mode groups (DB 40)**

Mode groups								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 7								
DR 7	Mode group number							

**Softkey function signals (DB 40)**

Softkey function signals								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 8	Dynamic function signals							
DR 8	Static function signals							
DL 9	Dynamic function signals							
DR 9	Static function signals							
DL 39	Dynamic function signals							
DR 39	Static function signals							
DL 40								
DR 40								Changed function number
DL 41	Bit 15	Softkey function number						Bit 8
DR 41	Bit 7	Softkey function number						Bit 0
DL 42					Status PLC			
DR 42								

6.4.7.2 Display dialog line (DB 40)

Display dialog line								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 43								
DR 43								
DW 44	Allocated by internal signals							
DW 45								
DW 46								
DW 47								
DW 48								
DL 49	Acknowl. Fct. result valid	Strobe Fct. No. valid						
DR 49	Softkey function number							
DL 50	Function result							
DR 50	Dialog text number							

**6.4.7.3 Menu selection (DB 40)**

Menu selection									
Byte No.	15	14	13	12	11	10	9	8	
	Bit No.								
	7	6	5	4	3	2	1	0	
DL 51								Start signal from user	
DR 51		Own insertion active				Acknowledgements			
						Insertion already act.	Error	Insertion executed	
DL 52	Job number (function ident. No.)							1 - 15	
DR 52									
DL 53	Menu number							1 - 65535	
DR 53									
DL 54	Mode group number							1 - 2	
DR 54	Channel number							1 - 4	
DL 55	Request for key inhibit					Key disable to NC			
						INPUT	EDIT	CANCEL	
DR 55	Unassigned								
DL 56								Special recall	
DR 56	Displayed channel from NC							1 - 4	

## 6.4.7.4 Cursor data (DB 40)

Cursor									
Byte No.	15	14	13	12	11	10	9	8	
	Bit No.								
	7	6	5	4	3	2	1	0	
DL 57	Data group base								
DR 57	Data type base								
DL 58	DB/DX number base				0 - 255				
DR 58	Unassigned								
DL 59	DW number base								
DR 59	DW number base				0 - 65535				
DL 60	Data group pointer								
DR 60	Data type pointer								
DL 61	DB/DX number pointer				0 - 255				
DR 61	Unassigned								
DL 62	DW number pointer								
DR 62	DW number pointer				0 - 65535				
DL 63	Block number								
DR 63	Block number				0 - 65535				

### 6.4.7.5 User key signals (DB 40)

User key signals								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DW 64 ⋮								
	Reserved							
⋮ DW 99								
DL 100	User-assignable keys (dynamic signals)							
	Key 1	Key 2	Key 3	Key 4	Key 5	Key 6	Key 7	Key 8
DR 100	User-assignable keys (static signals)							
	Key 1	Key 2	Key 3	Key 4	Key 5	Key 6	Key 7	Key 8
DL 101	User-assignable keys (dynamic signals)							
	Key 9	Key 10	Key 11	Key 12	Key 13	Key 14	Key 15	Key 16
DR 101	User-assignable keys (static signals)							
	Key 9	Key 10	Key 11	Key 12	Key 13	Key 14	Key 15	Key 16
DL 102	LEDs							
	LED 1	LED 2	LED 3	LED 4	LED 5	LED 6	LED 7	LED 8
DR 102	LEDs							
	LED 9	LED 10	LED 11	LED 12	LED 13	LED 14	LED 15	LED 16
DW 103	Key hexadecimal code							
DL 104								
DR 104	Monitor dark to the user	from the user		Area <sup>1)</sup>	Selected PLC status display	Installa- tion menu	Modifica- tion menu number	User menu
DW 105	Menu number							

1) 0 ... Data area  
 1 ... Machine area

User key signals (Kap. 9.6)								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
<b>DL 106</b>	User-assignable keys 2nd customer key submodule (dynamic signals)							
	Key 1	Key 2	Key 3	Key 4	Key 5	Key 6	Key 7	Key 8
<b>DR 106</b>	User-assignable keys 2nd customer key submodule (static signals)							
	Key 1	Key 2	Key 3	Key 4	Key 5	Key 6	Key 7	Key 8
<b>DL 107</b>	User-assignable keys 2nd customer key submodule (dynamic signals)							
	Key 9	Key 10	Key 11	Key 12	Key 13	Key 14	Key 15	
<b>DR 107</b>	User-assignable keys 2nd customer key submodule (static signals)							
	Key 9	Key 10	Key 11	Key 12	Key 13	Key 14	Key 15	
<b>DL 108</b>	LEDs 2nd customer key submodule							
	LED 1	LED 2	LED 3	LED 4	LED 5	LED 6	LED 7	LED 8
<b>DR 108</b>	LEDs 2nd customer key submodule							
	LED 9	LED 10	LED 11	LED 12	LED 13	LED 14	LED 15	
<b>DW 109</b>								
⋮								
⋮								
<b>DW 149</b>								

### 6.4.8 Interface command channel (DB 41)

Command channel (DB 41)								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 0	Reserved							
DR 0	8th UI	7th UI	6th UI	Request bits		3rd UI	2nd UI	1st UI
DL 1	Reserved							
DR 1	8th UI	7th UI	6th UI	Error bits		3rd UI	2nd UI	1st UI
DL 2	Reserved							
DR 2	Reserved							
DL 3	Reserved							
DR 3	Reserved							
DL 4	Reserved							
DR 4	Reserved							
DL 5	Reserved							
DR 5	Reserved							

**Note:**

Set number of user interfaces (UI) with PLC-MD 33.



Interface command channel								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL m	(High)							
DR m	Function number							
	(Low)							
DL m + 1	(High)							
DR m + 1	Error number							
	(Low)							
DL m + 2	DB = 0 DX = 1							
DR m + 2	Source - DB/DX number							
DL m + 3	(High)							
DR m + 3	Data word number							
	(Low)							
DW m + 4	Reserved							
:								
:								
DW m + 6								

**Note:**

m = 6  
m = 13  
m = 20  
m = 27  
m = 34  
m = 41  
m = 48  
m = 55

1st UI  
2nd UI  
3rd UI  
4th UI  
5th UI  
6th UI  
7th UI  
8th UI

**Possible function numbers:**

1 = Static path dimension  
2 = Division increment  
3 = S external  
4 = Dynamic path dimension  
5 = M19 during several revolutions  
6 = Transformation  
7 = Coupled motion

**6.4.9 General interface NC/PLC (DB 48)**

Signals to NC								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 0	Status write disable	Keyswitch	Screen display dark	Operator panel disable	Cycle disable	Control w/o oper. panel (as from SW2)		Warm restart
DR 0								

Signals from NC								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 1								
DR 1								Warm restart ended

## 6.4.10 PLC messages (DB 58)

Control signals								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 0	Acknowledge NC Emergency Stop		Display in message line Error messages	Operational messages	Paging		Acknowledge PLC error message	

Statuses								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DR 0	NC in Emergency Stop state					PLC Emergency Stop message	PLC error message	PLC operational message

Emergency Stop to NC								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 1	Message							
	9007	9006	9005	9004	9003	9002	9001	9000
DR 1	Message							
	9015	9014	9013	9012	9011	9010	9009	9008
DL 2	Message							
	9023	9022	9021	9020	9019	9018	9017	9016
DR 2	Message							
	9031	9030	9029	9028	9027	9026	9025	9024

<b>Messages</b>								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
<b>DL 3</b>	Message							
	9039	9038	9037	9036	9035	9034	9033	9032
<b>DR 3</b>	Message							
	9047	9046	9045	9044	9043	9042	9041	9040
<b>DL 4</b>	Message							
	9055	9054	9053	9052	9051	9050	9049	9048
<b>DR 4</b>	Message							
	9064	9062	9061	9060	9059	9058	9057	9056
<b>DL 5</b>	Message							
	9071	9070	9069	9068	9067	9066	9065	9064
<b>DR 5</b>	Message							
	9079	9078	9077	9076	9075	9074	9073	9072
<b>DL 6</b>	Message							
	9087	9086	9085	9084	9083	9082	9081	9080
<b>DR 6</b>	Message							
	9095	9094	9093	9092	9091	9090	9089	9088
<b>DL 7</b>	Message							
	9103	9102	9101	9100	9099	9098	9097	9096
<b>DR 7</b>	Message							
	9111	9110	9109	9108	9107	9106	9105	9104

**Notes:**

- 1) Whether the message is to be treated as error or operational message is defined in PLC machine data.
- 2) The function blocks for the scan and display of messages are contained in FB package 0.

Messages								
Byte No.	15	14	13	12	11	10	9	8
PLC- MD No.	Bit No.							
	7	6	5	4	3	2	1	0
<b>DL 8</b>	Message							
	9119	9118	9117	9116	9115	9114	9113	9112
<b>DR 8</b>	Message							
	9127	9126	9125	9124	9123	9122	9121	9120
<b>DL 9</b>	Message							
	9135	9134	9133	132	9131	9130	9129	9128
<b>DR 9</b>	Message							
	9143	9142	9141	9140	9139	9138	9137	9136
<b>DL 10</b>	Message							
	9151	9150	9149	9148	9147	9146	9145	9144
<b>DR 10</b>	Message							
	9159	9158	9157	9156	9155	9154	9153	9152
<b>DL 11</b>	Message							
	9167	9166	9165	9164	9163	9162	9161	9160
<b>DR 11</b>	Message							
	9175	9174	9173	9172	9171	9170	9169	9168
<b>DL 12</b>	Message							
	9183	9182	9181	9180	9179	9178	9177	9176
<b>DR 12</b>	Message							
	9191	9190	9189	9188	9187	9186	9185	9184
<b>DL 13</b>	Message							
	9199	9198	9197	9196	9195	9194	9193	9192
<b>DR 13</b>	Message							
	9207	9206	9205	9204	9203	9202	9201	9200
<b>DL 14</b>	Message							
	9215	9214	9213	9212	9211	9210	9209	9208
<b>DR 14</b>	Message							
	9223	9222	9221	9220	9219	9218	9217	9216
<b>DL 15</b>	Message							
	9231	9230	9229	9228	9227	9226	9225	9224
<b>DR 15</b>	Message							
	9239	9238	9237	9236	9235	9234	9233	9232

**Notes:**

- 1) Whether the message is to be treated as error or operational message is defined in PLC machine data (see Installation Guide).
- 2) The function blocks for scan and display of messages are contained in FB package 0.

Messages (Section 12.4)								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 16	Message							
	9247	9246	9245	9244	9243	9242	9241	9240
DR 16	Reserved							
DL 17	Message							
	9257	9256	9255	9254	9253	9252	9251	9250
DR 17	Message							
	9265	9264	9263	9262	9261	9260	9259	9258
DL 18	Message							
	9273	9272	9271	9270	9269	9268	9267	9266
DR 18	Message							
	9281	9280	9279	9278	9277	9276	9275	9274
DL 19	Message							
	9289	9288	9287	9286	9285	9284	9283	9282
DR 19	Message							
	9297	9296	9295	9294	9293	9292	9291	9290
DL 20	Message							
	9305	9304	9303	9302	9301	9300	9299	9298
DR 20	Message							
	9313	9312	9311	9310	9309	9308	9307	9306
DL 21	Message							
	9321	9320	9319	9318	9317	9316	9315	9314
DR 21	Message							
	9329	9328	9327	9326	9325	9324	9323	9322
DL 22	Message							
	9337	9336	9335	9334	9333	9332	9331	9330
DR 22	Message							
	9345	9344	9343	9342	9341	9340	9339	9338
DL 23	Message							
	9353	9352	9351	9350	9349	9348	9347	9346
DR 23	Message							
	9361	9360	9359	9358	9357	9356	9355	9354
DL 24	Message							
	9369	9368	9367	9366	9365	9364	9363	9362
DR 24	Message							
	9377	9376	9375	9374	9373	9372	9371	9370
DL 25	Message							
	9385	9384	9383	9382	9381	9380	9379	9378
DR 25	Message							
	9393	9392	9391	9390	9389	9388	9387	9386

Messages (Section 12.4)								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 26	Message							
	9401	9400	9399	9398	9397	9396	9395	9394
DR 26	Message							
	9409	9408	9407	9406	9405	9404	9403	9402
DR 27	Message							
	9417	9416	9415	9414	9413	9412	9411	9410
DR 26	Message							
	9425	9424	9423	9422	9421	9420	9419	9418
DL 28	Message							
DR 28	Message							
	9441	9440	9439	9438	9437	9436	9435	9434
DL 29	Message							
	9449	9448	9447	9446	9445	9444	9443	9442
DR 29	Message							
	9457	9456	9455	9454	9453	9452	9451	9450
DL 30	Message							
	9465	9464	9463	9462	9461	9460	9459	9458
DR 30	Message							
	9473	9472	9471	9470	9469	9468	9467	9466
DL 31	Message							
	9481	9480	9479	9478	9477	9476	9475	9474
DR 31	Message							
	9489	9488	9487	9486	9485	9484	9483	9482
DL 32	Message							
	9497	9496	9495	9494	9493	9492	9491	9490
DR 32	Reserved							

### 6.4.11 DBs for PLC machine data (DB 60-65)

DB	DW	Significance
DB60	0 to 129	Words for operating system
DB61	0 to 99	Words for function blocks
DB62	0 to 49	Words for user
DB63	0 to 33	Bits for operating system
DB64	0 to 24	Bits for function blocks
DB65	0 to 24	Bits for user

For significance of words and bits see Section 3.

### 6.4.12 DBs set-up for user (DB 68, 71)

#### DB 68 for words

DW No. PLC	High byte (DL)	Low byte (DR)
DW 0 . . . DW63	Extended address M word 1 (binary)	

#### DB71 for bits

Byte No. PLC	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 0 . . . DR15								



### 6.4.13 Decoding lists for M signals (DB 80...DB 83)

Decoding lists for M signals		
DW No. PLC MD No.	High byte (DL)	Low byte (DR)
DW m + 0	Extended address	
DW m + 1	M address	
DW m + 2	Bit address, DW no.	Bit address, bit no.

#### Notes:

- Address m is obtained from the following number of the M function definition:




M function	m
1	0
2	3
3	6
⋮	⋮
64	189

- The table is to be completed consecutively from the first entry, gaps between entries are not allowed. If less than 64 M functions are defined, unassigned entries are preset with 0. All unassigned entries are located at the end of the table.
- The decoding lists are channel-specific, i. e. decoding list DB 80 is provided for NC channel 1 and, accordingly, DB 83 is allocated to NC channel 4.
- M decoding according to the decoding list is activated channel-specific via MDs.

## 7 NC Alarms

### Alarms overview:

Alarm number	Designation	Alarm is cleared
1-10	General alarms	Acknowledgement/Power on
16-36	V.24 alarms	V.24 (RS232C) Stop
43-96	General alarms	Power on
100*-196*	Axis-specific alarms	Reset/Power on/Acknowledgement
2000-2191	General alarms	Reset
225*-228*	Spindle-specific alarms	Reset/Power on
3000-3220	General alarms	Acknowledgement/Reset
1000*-1204*	Axis-specific alarms	Reset/Power on
20000-20319	Spindle-specific alarms	Power on

Alarm is cancelled	
POWER ON	Switch on control
Reset	Reset key 
Acknowledgement	Acknowledge key 
V.24 Stop	Data area Data I/O softkey Stop softkey 

General alarms							
Alarm No.	Designation	Block/ order related	Inhibit of				Clear alarms
			Process- ing	NC Start	Mode group ready	NC RDY	
1	Battery alarm-power supply	O					Acknowledge
4	Incorrect unit system	O	X	X	X	X	Power on
8	Wrong axis/spindle assignment		X	X	X	X	Power on
9	Memory too small for UMS	O					Power on
10	UMS error	O		X			Power on

O: The error is not program-specific and therefore only receives an ORD number. (ORD 10 signifies that this is the 10th error to occur since the control was switched on).

B: As these errors occur in the program, the channel number and block number are displayed after the error number.

#### Example:

3000 1 N0010           → Alarm number 3000  
                           → in channel 1  
                           → in block N10

NC start inhibit:           If an error occurs, starting of a new program is prevented or the NC START signal is prevented from being effective in the NC.

Mode group ready inhibit:   If an error occurs, the MODE GROUP READY interface signal is removed and after the times in the respective MDs have elapsed, the controller enables are removed (controller enables on the measuring circuit are removed).

V.24 (RS 232) alarms							
Alarm No.	Designation	Block/ order related	Inhibit of				Clear alarms
			Process- ing	NC Start	Mode group ready	NC RDY	
16	Parity error V.24	B					V.24 Stop
17	Overflow error V.24	B					V.24 Stop
18	Frame error V.24	B					V.24 Stop
19	I/O device not ready V.24	B					V.24 Stop
22	Time monitoring V.24	B					V.24 Stop
23	Character parity error V.24	B					V.24 Stop
24	Invalid EIA character V.24	B					V.24 Stop
26	Part program block > 120 characters V.24	B					V.24 Stop
27	Data input disabled V.24	B					V.24 Stop
28	Circulating buffer overflow V.24	B					V.24 Stop
29	Block > 254 characters V.24	B					V.24 Stop
30	Part program memory overflow V.24	B					V.24 Stop
31	No free part program number V.24	B					V.24 Stop
32	Data format error V.24	B					V.24 Stop
33	Stored program different from punched tape program V.24	B					V.24 Stop
34	Operational error V.24 interface	B					V.24 Stop
36	UMS memory full V.24	B					V.24 Stop

General alarms							
Alarm No.	Designation	Block/ order related	Inhibit of				Clear alarms
			Pro- cess- ing	NC Start	Mode group ready	NC RDY	
43	PLC-CPU failure	B	X	X	X	X	Power on
44	Part progr. mem. incorr. activated	O	X	X	X	X	Power on
46	TO parameter number	O					Power on
47	Incorrect TO assignment lists	O		X			Power on
48	PLC-CPU not ready	O		X			Power on
52	CPU interface not ready	O	X	X			Power on
65	Incorrect module slot	B		X	X	X	Power on
67	1st computer link not ready	B					Power on
68	2nd computer link not ready	B					Power on
70	Define at least 1 channel	O		X	X	X	Power on
73	Axis defaulted in wrong mode grp.	B	X	X	X	X	Power on
75	More than max. no. meas. ccts.	O		X			Power on
76	Incorrect meas. circuit assign.	B	X	X	X	X	Power on
77	Axis mode group not valid	B	X	X	X	X	Power on
78	Spindle mode group no. invalid	B	X	X	X	X	Power on
79	Channel mode group no. invalid	B	X	X	X	X	Power on
81	More than two 2D interpolations	B	X	X	X	X	Power on
84	Coupl. axis grping.incorr. defined	O	X	X	X	X	Power on
85	Coupl. motion combination wrong	O	X	X	X	X	Power on
87	Illegal software limit switch	B	X	X	X	X	Power on
88	Interpol. default greater than 3D	B	X	X	X	X	Power on
89	More than two 3D interpolations	B	X	X	X	X	Power on
90	User UMS invalid	O		X			Power on
91	Ident number in UMS incorrect	O		X			Power on
92	UMS card in wrong slot	O		X			Power on
93	Incorrect UMS sector	O		X			Power on
94	Incorrect UMS identifier	O		X			Power on
95	Wrong number in GSB (UMS)	O		X			Power on
96	Language not available in UMS	O					Power on

Axis-specific alarms (max. 9 axes)							
Alarm No.	Designation	Block/ order related	Inhibit of				Clear alarms
			Process- ing	NC Start	Mode group ready	NC ready	
100*	Grid spacing illegal (leadscrew error compensation)			X			Reset
104*	Set speed warn limit activated	O	X	X			Acknowledge
112*	Standstill monitoring (clamping tolerance)	O	X	X	X		Reset
116*	Contour monitoring	O	X	X	X		Reset
120*	Axis specification illegal	O	X	X	X		Reset
128*	Measuring circuit not available	O	X	X	X		Power on
132*	Control loop hardware (axis)	O	X	X	X		Power on
136*	Measuring system dirty (axis)	O	X	X	X		Power on
140*	Encoder monitoring	O	X	X	X		Reset
144*	Zero mark monitoring has responded	O					Reset
148*	Software limit switch plus	O	X	X			Acknowledge
152*	Software limit switch minus	O	X	X			Acknowledge
156*	Set speed alarm limit activated	O	X	X	X		Reset
160*	Drift too high	O		X			Reset
164*	Following axis programmed	O	X	X			Reset
168*	Servo enable refused for travelling axis	O	X	X			Reset
172*	Working area limit plus	O	X	X			Reset
176*	Working area limit minus	O	X	X			Reset
180*	Axis activated in several channels	B	X	X			Reset
188*	Hardware overtravel switch plus	O	X	X			Reset
192*	Hardware overtravel switch minus	O	X	X			Reset
196*	Following axis assigned twice	O	X	X			Reset

\* = 0 - 1st axis  
 : - :  
 : - :  
 8 - 9th axis

General alarms							
Alarm No.	Designation	Block/ order related	Inhibit of				Clear alarms
			Process- ing	NC Start	Mode group ready	NC ready	
2000	Emergency Stop	O	X	X			Reset 1)
2031	Weighting factor too high (MD 388*)	O	X	X			Reset
2036	G35 thread pitch decrease error	B	X				Reset
2037	Programmed S value too high	O					Reset
2038	Path feedrate too high	B	X				Reset
2039	Reference point not reached	O					Reset
2041	Program not available in memory	B	X	X			Reset
2042	Parity error in memory	B	X	X			Reset
2043	Program error on transformation	B	X	X			Reset
2044	External processing error	O	X				Reset
2046	Block with more than 120 characters	B	X	X			Reset
2047	Option not available	B	X	X			Reset
2048	Circle end point error (circle center point error)	B	X	X			Reset
2056	Travel through transformation center	B	X	X			Reset
2057	Thread/rotational feed not available	B	X	X			Reset
2058	3D interpolation option not available	B	X	X			Reset
2059	G92 program error	B	X	X			Reset
2060	TO, ZO program error	B	X	X			Reset
2061	General program error	B	X	X			Reset
2062	Feed not available	B	X	X			Reset
2063	Thread pitch change too great	B	X	X			Reset
2064	Programming error in rounding axis	B	X	X			Reset
2065	Programmed position behind software limit switch	B	X	X			Reset
2066	Thread pitch increase/decrease too great	B	X	X			Reset

1) Alarm is cleared by the PLC via DB58 DL0 bit 7

General alarms							
Alarm No.	Designation	Block/ order related	Inhibit of				Clear alarms
			Process- ing	NC Start	Mode group ready	NC ready	
2068	Programmed position beyond working area limit	B	X	X			Reset
2069	5D tool length compensation not possible	B	X	X			Reset
2070	5D interpolation missing	B	X	X			Reset
2072	Incorrect input value (contour definition)	B	X	X			Reset
2073	No intersection point (contour definition)	B	X	X			Reset
2074	Incorrect angle value (contour definition)	B	X	X			Reset
2075	Incorrect radius value (contour definition)	B	X	X			Reset
2076	Incorrect G02/G03 (contour definition)	B	X	X			Reset
2077	Incorrect block sequence (contour definition)	B	X	X			Reset
2078	Incorrect input parameters (contour definition)	B	X	X			Reset
2081	Block not allowed with TNRC/CRC	B	X	X			Reset
2082	CRC plane not determinable	B	X	X			Reset
2083	Contour violation in TNRC/CRC	B	X				Reset
2087	Coordinate rotation not allowed	B	X	X			Reset
2160	Illegal scale factor	B	X	X			Reset
2161	Illegal scale modification	B	X	X			Reset
2171	Approach not possible	B	X				Reset
2172	Retraction not possible	B	X				Reset
2173	Wrong approach/retraction plane	B	X				Reset
2189	Transformation not defined	B		X			Reset
2190	Transformation axes assigned	B		X			Reset
2191	Transformation in zero point	B		X			Reset



General alarms							
Alarm No.	Designation	Block/ order related	Process- ing	Inhibit of			Clear alarms
				NC Start	Mode group ready	NC ready	
<b>2192</b>	Following error compensation not possible	O	X	X			Reset
<b>2194</b>	FIFO not available	O		X			Reset
<b>2195</b>	Too many FIFO channels defined	O	X	X			Reset
<b>2500</b>	Program being edited	O	X				Reset
<b>2501</b>	Program being read in	O		X			Reset
<b>2502</b>	Program already exists	O		X			Reset
<b>2503</b>	Memory not large enough	O		X			Reset

NC alarms, acknowledgable							
Alarm No.	Designation	Block/ order related	Inhibit of				Clear alarms
			Pro- cess- ing	NC Start	Mode group ready	NC ready	
3000	General program error	B	X				Acknowledge
3001	More than 5 geometry parameters programmed	B	X				Acknowledge
3002	Polar/radius programming error	B	X				Acknowledge
3003	Invalid address	B	X				Acknowledge
3004	Error in CL800 language	B	X				Acknowledge
3005	Contour definition error	B	X				Acknowledge
3006	Wrong block structure	B	X				Acknowledge
3007	Setting data programming error	B	X				Acknowledge
3008	Subroutine error (M17 not available, ...)	B	X				Acknowledge
3009	Program disabled	B	X				Acknowledge
3010	Intersection error	B	X				Acknowledge
3011	Axis programmed twice or too many axes	B	X				Acknowledge
3012	Block not available in memory	B	X				Acknowledge
3014	Axis in channel inhibited	B	X				Acknowledge
3015	Main block not available in memory	B	X				Acknowledge
3016	External data input error	O	X				Acknowledge
3017	Part program no. occurs twice	O		X			Acknowledge
3018	Distance from contour too great (NC-MD 9)	B	X	X			Acknowledge
3019	V.24 (RS232C) option not available	B					Acknowledge
3020	Option not available	B					Acknowledge
3021	Contour violation in CRC/TNRC	B	X				1)
3022	Too many spindles programmed						Acknowledge
3024	Display description not available	O					Acknowledge
3025	Display description error	O					Acknowledge
3026	Fixed text portion too large	O					Acknowledge

1) Clear with Reset or Acknowledgement dependent on NC MD 5024 bit 0

NC alarms, acknowledged							
Alarm No.	Designation	Block/ order related	Inhibit of				Clear alarms
			Pro- cess- ing	NC Start	Mode group ready	NC ready	
3027	Graphics part too large	O					Acknowledge
3029	Window outside config. area	O					Acknowledge
3030	Cursor memory not available	O					Acknowledge
3032	Variable apart too large	O					Acknowledge
3033	Display text not available	O					Acknowledge
3034	Special text not available	O					Acknowledge
3035	Ind. addressing incorrect	O					Acknowledge
3036	Variable status incorrect	O					Acknowledge
3037	User window incorrect	O					Acknowledge
3038	Display called twice	O					Acknowledge
3039	Multi-channel display option not available	O					Acknowledge
3040	Fields/variable not displayable	O					Acknowledge
3041	Too many fields/variables	O					Acknowledge
3043	Error in fixed display layout	O					Acknowledge
3044	Error in variable display layout	O					Acknowledge
3045	Error in graphics display layout	O					Acknowledge
3046	Variable incorrect	O					Acknowledge
3048	Error in connection to keyboard	O					Acknowledge
3072	Alarm text not available	O					Acknowledge
3081	CRC not selected for approach	B					Acknowledge
3084	Illegal working area limit						Acknowledge
3085	NC-CPU time monitoring						Acknowledge
3086	Illegal transformation selection	O		X			Acknowledge
3087	Error in transformation data	B					Acknowledge
3088	Feed collapse on block change	O					Acknowledge
3091	Delay at software prelimit switch	B					Acknowledge
3092	Set speed too high	B	X				Acknowledge
3093	G171 illegal	O	X	X			Acknowledge

NC alarms, acknowledgable							
Alarm No.	Designation	Block/ order related	Inhibit of				Clear alarms
			Pro- cess- ing	NC Start	Mode group ready	NC ready	
3100	Transfer buffer busy, (CL)						Acknowledge
3101	Program not in memory, (CL)						Acknowledge
3157	Stop during threading	B		X			Acknowledge
3158	PLC No. not allowed	O					Acknowledge
3159	Data block not available	O					Acknowledge
3162	Not all programs deleted, V.24 (RS232C)	B					Acknowledge
3166	Wrong program coordination	O	X				Acknowledge
3167	T/H word acknowledgement	O					Acknowledge
3200	Progr. coordination syntax error	O	X				Acknowledge
3201	Program coordination, too many parameters	O	X				Acknowledge
3202	Program coord. area violated	O	X				Acknowledge
3203	Program coord., illegal character	O	X				Acknowledge
3204	Program coordination, command not complete	O	X				Acknowledge
3205	Program coord., R param. error	O	X				Acknowledge
3206	Program coord., symbolic parameter not allowed	O	X				Acknowledge
3220	Change from G176 to G175						Acknowledge
3233	Reference point approach not allowed		X				Acknowledge
3234	Target block						Acknowledge
3235	Program end not available		X				Acknowledge
3236	Illegal pole specification		X				Acknowledge
3237	Program being edited V.24 (RS232C)						Acknowledge
3238	Program being read in V.24 (RS232C)						Acknowledge
3239	EPROM cycle is overwritten by SPF						Acknowledge
3240	Subroutine not read in						Acknowledge

Axis-specific alarms (max. 9 axes)							
Alarm No.	Designation	Block/ order related	Inhibit of				Clear alarms
			Process- ing	NC Start	Mode group ready	NC ready	
1000*	Connection assigned several times	O	X	X	X		Power on
1008*	Speed controller limit	O	X	X	X		Power on
1012*	Servo parameterization error	O	X	X	X		Power on
1024*	Illegal pulse multiplication	O	X	X	X		Power on
1036*	Actuator not ready						Power on
1040*	Absolute encoder fault		X	X	X		Power on
1044*	Battery fault absolute submodule						
1056*	Actual speed value too high		X	X	X		Power on
1200*	Division increment incorrect	O	X	X			Power on
1204*	Traversing range limit	O	X	X			Reset

\*= 0 - 1st axis

. .  
. .  
. .

x= 8 - 9th axis

Spindle-specific alarms (max. 4 spindles)							
Alarm No.	Designation	Block/ order related	Process- ing	Inhibit of			Clear alarms
				NC Start	Mode group ready	NC ready	
2000*	Grid spacing illegal (leadscrew error compensation)			X			Reset
2001*	Set speed warn limit activated	O	X	X	X		Power on
2003*	Standstill monitoring			X	X		Power on
2007*	Measuring circuit not available		X	X	X		Power on
2008*	Control loop hardware spindle			X	X		Power on
2009*	Measuring system dirty, spindle		X	X	X		Power on
2010*	Encoder monitoring		X	X	X		Power on
2011*	Zero mark monitoring has responded						Power on
2014*	Set speed alarm limit activated			X	X		Power on
2016*	Connection assigned several times		X	X	X		Power on
2018*	Speed controller limit		X	X	X	X	Power on
2019*	Parameterization error drive MD		X	X	X		Power on
2028*	MD M19 not selected						Power on
2029*	Fault in drive		X	X	X	X	Power on
2030*	Spindle speed too high		X	X	X		Power on

\*= 1 - 1st spindle  
 2 - 2nd spindle  
 3 - 3rd spindle  
 4 - 4th spindle

## 8 Error List for PLC 135WB on System Stop

### 8.1 Error numbers (ACCU 3 high byte, DB1 DW160)

The stated error numbers and supplementary error information are in hexadecimal code.

They conform to the representation used with the PG 685/750 function:

OUTPUT ADR:AG, F0000 (135WB)

If no error occurs: Error No. "00"

Supplementary error information is available for all errors marked with \*) (see Section 8.2).

#### Detailed error code in the diagnostics DB (DB 1)

To display the PLC detailed error code on the NC screen, the error number FEHLCOD and the supplementary error information are stored in the diagnostics DB (DB1) in data words 160 to 163 (equivalent to the PG function OUTPUT ADR: AG, F0000).

	Diagnostics DB DB 1		Equivalent to the address with OUTPUT ADR: AG
DW 160		Error number	F0000
DW 161	Suppl. error information	1st word	F0001
DW 162	Suppl. error information	2nd word	F0002
DW 163	Suppl. error information	3rd word	F0003

• Error messages of the interpreter

Error messages of the interpreter	
01	Non-interpretable command *)
02	Illegal parameter *)
03	Data transfer into non-existent data (DB) *)
04	Substitution error *)
05	Call for a block that has not been loaded *)
06	Call for a non-existent data block *)
07	Segment not permitted with LIR/TIR *)
08	Segment error in a block transfer command *)
09	Overflow in BSTACK *)
0A	Overflow in ISTACK *)
0B	Immediate system stop due to "STS" command *)
0C	Stop request by user ("STP" command) *)
0D	Processing delay *)
0E	Call for an illegal OB (OB No. 0...39) *)
0F	Call for a non-existent page

• Error messages at system start-up

Cold restart	
2C	MD17: Impermissible quantity of wait cycles for enabling the computer link user interface
2D	MD18: Impermissible user interface number for outputting a message to the process control computer on synchronization
2E	MD19: Impermissible quantity of function numbers for core sequence triggering
2F	
30	MD20-29: Impermissible quantity for core sequences
31	MD128: Address 1st machine control panel too high (max. 120)
32	MD129: Address 2nd machine control panel too high (max. 120)
33	Synchronization error between PLCs in the I/O configuration with 16-bit link
34	MD error with DMP assignment lists (overlapping)
35	DMP CPU incorrectly started (system start)
36	Synchronization error between PLCs: Global address routing of the EUs cannot be carried out
37	Synchronization error between PLCs: I/O configuration not possible because not all PLCs have signalled their central I/O configuration INT EU/MPC module does not exist, but MD interrupt address is on "available"



<b>Cold restart</b>
---------------------

38	Number of interrupt byte already exists (double addressing)
39	Number for interrupt byte has been assigned more than once
3A	Impermissible input value for number of the interrupt byte
3B	EU interface does not exist, but EUs declared for interface via MD
3C	Double addressing of an input module in the I/O assignment lists (machine data) *)
3D	Double addressing of an output module in the I/O assignment lists (machine data) *)
3E	Output module in I/O assignment lists assigned to several PLCs *)
3F	Process alarm byte area not defined
40	RAM user memory: Memory configuration too small for inserted EPROM submodules
41	Reserved
42	RAM user memory: Memory configuration user program memory is different from MD setting
43	RAM user memory: Memory configuration too small for user data according to MD
44	RAM user memory: Memory configuration user data memory is different from MD setting via MD
45	Reserved
46	I/O configuration: More than three EU interfaces inserted
47	I/O configuration: Multiple addressing for inputs *)
48	I/O configuration: Multiple addressing for outputs *)
49	Failure of I/O modules
4A	Unassigned
4B	System parameters: Incorrect ms time frame
4C	System parameters: Incorrect 10 ms time frame
4D	System parameters: Incorrect 100 ms time frame
4E	System parameters: Incorrect STEP 5 time
4F	Unassigned
50	Illegal input value for byte number of alarm byte
51	Inputs for process alarm processing, byte number assigned several times
52	Inputs for process alarm processing: Alarm bytes specified (different from 0), but not available
53	Irregular block type: PLM block not allowed in user program memory
54	Irregular block type: C block not allowed in user program memory
55	Synchronization error in EPROM basic program memory *)
56	Synchronization error in EPROM user program memory *)
57	Synchronization error in RAM user program memory *)
58	Synchronization error in RAM user data memory *)
59	Irregular block type in EPROM basic program memory *)
5A	Irregular block type in EPROM user program memory *)
5B	Irregular block type in RAM user program memory *)
5C	Irregular block type in RAM data program memory *)
5D	Summation error with RAM for OB, FB, DB, FX, SB, PB *)
5E	Summation error with EPROM for OB, FB, DB, FX, SB, PB *)

<b>Warm restart</b>	
5F	Impermissible warm restart (no request in ISTACK or power supply failure not only reason for interruption, or change of address situation of I/O devices or module failure) *)
60	Summation error in RAM for OB, FB, DB, FX, SB, PB *)
61	Summation error in EPROM for OB, FB, DB, FX, SB, PB *)

<b>Cold and/or warm restart</b>	
62	RAM user program memory not available
63	User data memory not available
64	Operator panel input byte in impermissible area
65	Operator panel output byte in impermissible area
66	No synchronization pattern from COM CPU in cold restart
67	No synchronization pattern from COM CPU in warm restart
68	Process image of the inputs: impermissible value for delete limit
69	Input is in retentive area of the process image
6A	Process image of the outputs: impermissible value for delete limit
6B	Output is in retentive area of the process image
6C	Function URLADE not executed, submodule does not exist or empty
6D	Configuring error machine control panel to IFC
6E	MD error *)
6F	EUs not switched on or incorrectly jumpered (rotary switch)

• **Operating and user errors**

<b>Dynamic system monitoring</b>	
70	Summation error in RAM for OB, FB, DB, FX, SB, PB *)
71	Summation error in EPROM for OB, FB, DB, FX, SB, PB *)
72	RAM error in user data memory
73	RAM error in system data memory

<b>Cyclic system monitoring</b>	
74	Communication CPU in system failed
75	One PLC CPU in system failed
76	One or several PLC CPUs failed
77	One or several servo CPUs failed
78	PLC STOP due to request from PG
79	PLC STOP by mode switch
7A	Failure of machine control panel at interface CPU
7B	Reserved
7C	DMP interface no ready signal

- Error messages from interrupt routines

<b>System errors</b>	
80	Division error
81	Overflow error
82	"Array Bounds" error
83	Incorrect OP Code
84	Error in ESC-OP code
85	Non-interpretable interrupt (NII)
86	Error in the save routine (SAVE-UP)
87	STACK overflow
88	Semaphore buffer overflow
89	Semaphore buffer not reached
8A	Addressing error by access to an input/output not existing in the process image

<b>Timeouts</b>	
90	Unassigned
91	Unassigned
92	Timeout with buffered access to link-/local bus *)
93	Timeout with system program processing *)
94	Timeout with LIR/TIR commands *)
95	Timeout with TNB/TNW commands *)
96	Timeout with LPY/LPW/TPY/TPW commands *)
97	Timeout with a substitution command *)
98	Timeout with transfer in/out (see errors B0 and B1)
99	Timeout cannot be interpreted with active interpreter *)
9A	Timeout when processing a function macro (Type FB) *)
9B	Timeout when processing a function macro (Typ FX) *)
9C	Timeout on access to page commands LY CB, LY CW, LY CD, TY CB, TY CW, TY CD, TSC *)

<b>Error messages of distributed I/Os</b>	
A0	Transfer error to an expansion unit
A1	Overtemperature in an expansion unit or bouncing enable input with SIMATIC I/O devices
A2	DMP CPU outputs command output disable during operation
B0	Input module failed or changed and STOP set for PLC for this module via MD *)
B1	Output module failed or changed and STOP set for PLC for this module via MD *)

<b>Cycle time monitoring</b>	
C0	Cycle time exceeded
C1	Cycle time exceeded; FB12 called more than twice per cycle

• Error messages when using the PLM and C high-level languages

**HLL call in the interpreter**

D0	Unknown type identifier in parameter declaration of the FB called
D1	Illegal type identifier block
D2	Unknown code in the input parameter block of the FB called
D3	Unknown code in the output parameter block of the FB called

**HLL\_HLL function**

D4	Unknown pseudo parameter in STACK
D5	Block not available
D6	HLL block not in line with paragraph
D7	Block called is not a HLL block

**HLL\_ADB function**

D8	DB to be opened in HLL: wrong pseudo parameter
D9	DB to be opened not available
DA	DB to be opened not in line with paragraph

**HLL\_MACRO function**

DC	Core to be called not available or cannot be called by HLL
----	--

**HLL\_STOP function**

DD	System STOP by HLL user *)
----	----------------------------

**HLL\_S5 function**

DE	Unknown pseudo parameter in STACK
DF	S5 block called not available
E0	S5 block not in line with paragraph
E1	Block called is not a S5 block

<b>Other operational and user errors</b>	
--	--

F7	M decoding: byte number for DB30 > 63
F8	PROTES system error: error with P link *)
F9	Interrupts from interrupt-generating I/O devices not acknowledged by OB2

<b>Errors in addressing decoding data blocks</b>	
--	--

FA	Decoding data block not available
FB	Data block-word length without header not divisible by 3
FC	Wrong number of decoding units
FD	Decoding data block too short
FE	Assignment list DB99 not available or too short

<b>Error message with function macros</b>	
---	--

FF	Group error with function macros
	Display of individual errors with function macros is via ACCU1 and ACCU2. The ACCUs can be read out at the programmer via OUTPUT ISTACK. For more details on errors see FB descriptions.

## 8.2 Supplementary error information (ACCU 3 low byte, DB1 DW161 to 163)

All errors marked with an \*) in the above list give further information on the type of error in the additional fields. These additional fields can be read out with the PG using addresses F0001 to F0003 or can be obtained from DW161 to 163 in the diagnostics DB (DB1).

An overview of this information follows:

Error No.	Address	Contents/Designation
01	F0000 F0001 F0002 F0003	01: Error number incorrect MC5 operation code OB number where incorrect operation code occurred -- --
02, 03, 04, 05, 06, 07, 08, 09, 0E, 0F	F0000 F0001 F0001 F0002  F0003	Error number of interpreter Highbyte: Identifier for preceding command Lowbyte: OB number where the error occurred Operation code of the MC5 command where the error occurred Parameter of MC5 command in BCD code Identifier for preceding command: 0: No command modification 1: Preceding command was B FW, B DW, B BS or substitution command
0A	F0000 F0001 F0002 F0003	0A: Overflow in interruption stack OB number where overflow occurred -- --
0B	F0000 F0001 F0002 F0003	0B: Stop caused by STS command OB number where STS occurred -- --
0D	F0000 F0001 F0002 F0003	0D: Error number processing time delay OB number where processing time delay occurred -- --
3C	F0000 F0001 F0002 F0003	3C: Error number MD double addressing inputs Group number -- --
3D	F0000 F0001 F0002 F0003	3D: Error number MD double addressing outputs Group number -- --
3E	F0000 F0001 F0002 F0003	3E: Error number output group per MD for several PLCs Group number -- --

Error No.	Address	Contents/Designation
45	F0000 F0001 F0002 F0003	45: Error number illegal addition of interface DMP firmware Number of interface module Illegal (fitted) firmware DMP interface Required firmware DMP interface
47	F0000 F0001 F0002 F0003	47: Error number double addressing inputs Byte number -- --
48	F0000 F0001 F0002 F0003	48: Error number double addressing outputs Byte number -- --
49	F0000 F0001  F0002 F0003	49: Error number modification of I/O modules 3C: Changed address of I/O byte 00: I/O failure 0E or 0A identifier input/output Byte number (BCD format)
55, 56, 57, 58, 59, 5A, 5B, 5C, 5D, 5E, 60, 61, 70, 71	F0000 F0001 F0002  F0003	Respective error number Segment address of faulty block Offset address (byte-oriented) of faulty block (segment and offset point to the synchronisation pattern) --
5F	F0000 F0001       F0002 F0003	5F: Error number illegal warm restart 00: No request in ISTACK or power supply failure not only reason for interruption or PLC MD 6049.1 (cold restart bit) set and warm restart initiated by PG or PLC mode selector switch 3C: Changed address of I/O byte 01: Centralized I/Os, TPx, LPx 02: MPC (Int EU/MPC) 03: 16bit link 04: DMP 0E or 0A identifier input/output Byte number (BCD format)
66	F0000 F0001   F0002 F0003	0: Cold restart: NC CPU synchronization error 1: NC CPU 2: NC CPU and IFC -- --

\*) Type identifier of timeout:  
0001 = Internal timeout  
0002 = Link bus timeout  
0003 = Local bus timeout

## 8.2 Supplementary error information (ACCU 3 low byte, DB1 DW161 to 163)

Error No.	Address	Contents/Designation
67	F000 F001  F002 F003	0: Cold restart: synchronization error NC CPU 1: NC CPU 2: NC CPU and IFC -- --
6D	F000 F001  F002 F003	Error number for machine control panel to IFC 1: 1st machine control panel missing on IFC 2: 1st machine control panel does not belong to IFC 3: 2nd machine control panel missing on IFC 4: 2nd machine control panel does not belong to IFC -- --
6E	F000 F001	6E: Group error number 0 to 6: Reserved for 880 7: PLC MD set for error and operational messages (channel-specific) 8: PLC MD set for error and operational messages (spindle-specific) 9: PLC MD set for error and operational messages (axis-specific) 10: PLC MD set for M decoding with extended addresses. At least one decoding list missing. 11: DMP inputs of 1st machine control panel not available 12: DMP inputs of 2nd machine control panel not available 13: Reserved for 880 14: Reserved for 880 15: DMP outputs of 1st machine control panel not available 16: DMP outputs of 2nd machine control panel not available 19: PLC MD for error and operational messages (DB58) set
6F	F000 F001  F002 F003 F004	6F: Error number I/O device faults on starting Type of link: 02: MPC, 03: 16 bits, 04: DMP Number of EU interface EU number or DMP submodule number Line (C) number with DMP
7A	F000 F001	7A: Failure machine control panel to CPU interface 1: Failure 1st machine control panel 2: Failure 2nd machine control panel



Error No.	Address	Contents/Designation
93	F000 F001 F002 F003	93: Error number timeout with system progr. processing CS when timeout occurs IP when timeout occurs Type identifier of the timeout **)
94	F000 F001 F002 F003	94: Error number timeout with LIR/TIR OPCODE command Offset address Segment number
95	F000 F001 F002 F003	95: Error number timeout with TNB/TNW OPCODE command Offset address Segment number
96	F000 F001 F002 F003	96: Error number timeout with LPB/LPW/TPB/TPW OPCODE command Specification of input or output Byte No.
97	F000 F001 F002 F003	97: Error number timeout with substitution command Substitution command Substituted command --
99	F000  F001 F002 F003	99: Error number timeout not interpretable when interpreter active CS when timeout occurs IP when timeout occurs Type identifier of the timeout **)
9A	F000 F001 F002 F003	9A: Error number timeout when processing FB OPCODE command Command parameter (with FX only, otherwise 000) Type identifier of the timeout
9B	F000  F001 F002 F003 F004	9B: Error number timeout when processing high-level language CS when timeout occurs IP when timeout occurs Type identifier of the timeout Identifier indicating whether DB has been opened 0000: DB opened 0001: No DB opened (in this case timeout is initiated on access to DB)
B0/B1	F000 F001   F002 F003	Error number B0/B1 Identifier of type of I/O devices 01: Centralized I/O devices, TPx, LPx 02: MPC (int EU/MPC) 03: 16-bit link 04: DMP 0E or 0A identifier inputs/outputs Byte number Group number

Error No.	Address	Contents/Designation
DD	F000 F001 F002 F003	DD: Error number system STOP by HLL user User STOP number HLL call address (offset) HLL call address (segment)
F8	F000 F001	F8: Error with PG link 0100: Error on fetching an RMB 0200: Error on delivering an empty RMB 0300: Error on reserving a SMB 0400: Error on sending an RMB
FF	F000 F001 F002 F003	FF: Group error with function macro Current OB No. (No. of processing level) -- --

**8.3 LED error display with 135WB**

LED	Signification
Steady light (green only)	Cyclic operation
Steady light (red only)	Stop status
Steady light (red and green)	OVERALL RESET required (initial start-up or data loss)
Flashing	<p>Once Error with cross-checksum test via the system program</p> <p>Twice Error with CPU RAM test</p> <p>3 times Error timer 0 (process-internal timer) or error watchdog</p> <p>4 times Error with monitoring test for timeout</p> <p>5 times Access to link RAM not possible. This may also occur, e. g., as a result of mains failure during comprehensive part program manipulations (copying of long files)</p> <p>6 times Error on test access to a link RAM</p> <p>7 times Error in system initialization program</p> <p>9 times <i>SINUMERIK 840</i>: synchronization error with PG link</p> <p>10 times Error of internal coprocessor (COP) registers or with step address counter (SAZ) generation</p> <p>11 times Command delegation to the word processor (WOP)</p> <p>12 times Processing of binary commands</p> <p>13 times Processing of OR, bracket, NOP or BLD commands</p> <p>14 times Processing of block call and jump commands</p> <p>15 times Processing of timer and counter operations</p> <p>16 times Addressing in the data memory</p> <p>17 times Command execution mode</p> <p>18 times Test address comparator machine code (MC5) and interrupt processing from coprocessor</p> <p>19 times Monitoring test for timeout on access of the coprocessor to the user memory</p> <p>20 times ACOP Redesign not inserted</p>

### 8.4 Errors with function macros

ACCU 1 (FB No.)	ACCU 2 (Error No.)	Error occurred during	Error description
11	1 2 3 4  5 6 7 8	Setting up data blocks	DB No. impermissible DB No. > 255 Specified DW No. < 0 Length of DB to be set up is not the same as the length of the DB already in the PLC Memory space in the PLC no longer sufficient Existing DW No. > 255 DB No. = 0 DB type different from DB or DX
12	1	Retriggering of cycle time monitoring	PLC Stop with error detection 0C1H on 3rd call of FB12 within one PLC cycle
52	1 2 3 4  5 6 7 8  9	Block transfer	Illegal mode Number of DWs to be transferred > 127 Number of DWs to be transferred < 0 Segment No. of 8-bit memory < 1 or > 13 Segment No. of 16-bit memory < 1 or > 13 Offset of 1st DW in 8-bit memory > 7FFFH Offset of 1st DW in 16-bit memory > 7FFFH Selected 8-bit memory area exceeds lower segment limit (not with segment Nos. 6, 10, 11,12) Selected 16-bit memory area exceeds lower segment limit (not with segment Nos. 6, 10, 11,12)
60	1 2 3 4 5 6 7 8 9	Block transfer	Number of DWs to be transferred > 2043 Number of DWs to be transferred = 0 Target DB No. = 0 Target or source DB not available Target DB too short Target DB in EPROM Source DB too short Incorrect TYQU parameter Incorrect TYZI parameter

v: High byte of ACCU 2 contains the job number leading to the error

ACCU1 (FB No.)	ACCU2 (Error No.)	Error occurred during	Error description
61	v0 v1 v2 v3 v4 v5 v6  v7  v8	Read NC data	ANC > 1 not permitted NSBY not permitted DB missing or DB No. not permitted or FW not permitted Data type not permitted *ANC = 0 or > 128 Reading/ writing not permitted Number format not permitted Value 3 for ZOA or ZOFA not equal or 1 Type data target/data source in PLC not permitted
62		Write NC data	See FB 61 (reading NC data)
65	1	Transfer flags → flag stack	Stackpoint overflow
66	1	Transfer flagstack → flags	Stackpoint not reached
67	1 2	Transfer machine control panel signals → DB axes	Parameter axis No. > 12 PLC machine data not set for signals from/to axis
68	1	Aperiodic user program call	Parameter tool < 0
69	1 2 3	G decoding	Channel number not permitted G group incorrect PLC MD: signals from/to NC channel or signals from NC channel not set

v: High byte of ACCU 2 contains the job number leading to the error

ACCU1 (FB No.)	ACCU2 (Error No.)	Error occurred during	Error description
70	1 2 3 4 5 6 7	Transfer interface DB to I/Q/F	Source or target type incorrect (illegal ASCII character) Source DB does not exist in PLC Parameter limits of source or target parameter not reached or exceeded Source or target DB too short Parameter limit of flag area exceeded PII or PIQ limits exceeded Illegal source or target parameter type (not I, Q, F)
71		Transfer interface DB to I/Q/F (see FB 70)	
72	1	Transfer NC channel to DB channel-specific signals	Channel address not permitted
73	1	Transfer DB channel-specific signals to NC channel	Channel address not permitted
74	1	Transfer spindle to DB spindle-specific signals	Spindle address not permitted
75	1	Transfer DB spindle-specific signals to spindle	Spindle address not permitted
76	1	Transfer axis to DB axis- specific signals	Axis address not permitted
77	1	Transfer DB axis-specific signals to axis	Axis address not permitted
78	1 2 3	Transfer machine control panel signals → channels/spindles	PLC machine data not set for signals from/to channel PLC machine data not set for signals from/to spindle Parameterized channel No. or spindle No. too large

v: High byte of ACCU 2 contains the job number leading to the error

ACCU1 (FB No.)	ACCU2 (Error No.)	Error occurred during	Error description
79	1 2	Transfer machine control panel signals → DB axes	PLC machine data not set for signals from/to axis Number of parameterized axes > 12
88	1 2	Mode lamp	PLC MD signals from/to channel not set Parameterized channel No. > 4
89	1 2 3	Read block start address	Block type not permitted Address list does not exist Address list insufficient
113		Symmetric tool search	No messages

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**Suggestions**

**Corrections**

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