SIEMENS

SINUMERIK 880 GA2
Software Version 1
Installation Lists

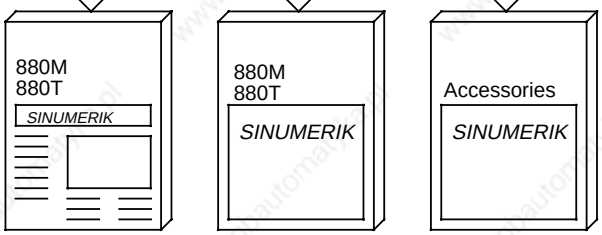
Installation Guide

01.93 Edition

Service Documentation

SINUMERIK 880

General Documentation

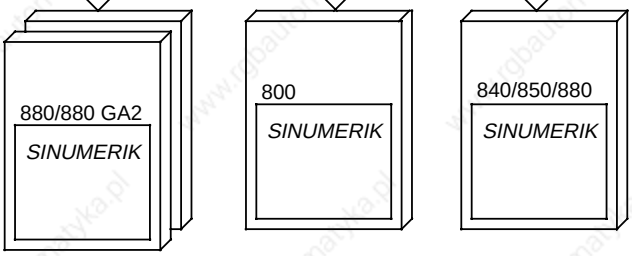


Technical data

Catalog NC 28

Catalog NC 90

User Documentation

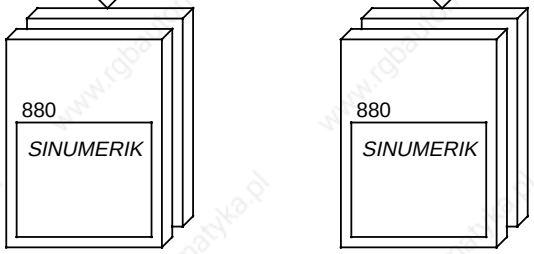


Operator's Guide
Programming Guide

Programming Guide
Cycles, ASM 4

Measuring Cycles
Version 20

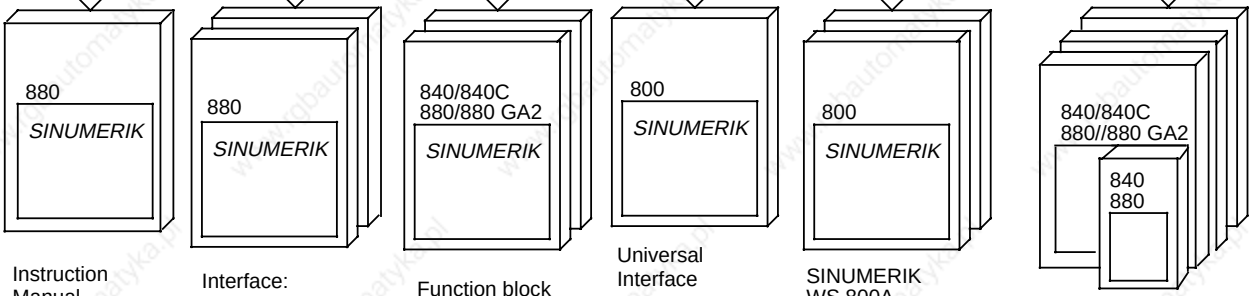
User/Manufacturer/Service Documentation



Function Manual:
- Electronic Gearbox
- Integrated Drive Control

Function Manual:
- Extended Functions for Spindles
- VT340 Terminal Emulator

Manufacturer Documentation



Instruction Manual

Interface:
- Signals
- Cables and Connections

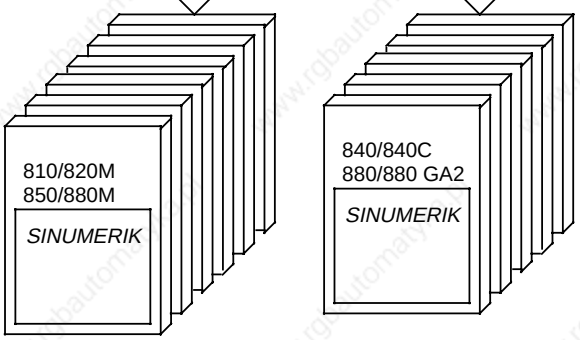
Function block Packages
Function Macros

Universal Interface

SINUMERIK WS 800A
CL 800 Cycle Language

PLC 135 WB
- Quick Reference
- Configuring
- S5-HLL
- PLC S5-155U Diff. Description

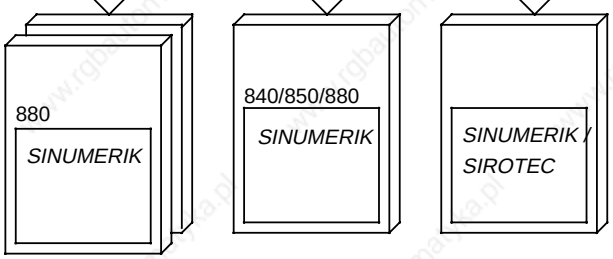
Manufacturer Documentation



Workshop UMS

Computer link

Service Documentation



Installation Guide
- Instructions
- Lists

Measuring Cycles
Version 20

Spare parts list

SINUMERIK 880 GA2
Software Version 1
Installation Lists

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Installation Guide

Valid for:

Control	*Software Version*
SINUMERIK 880 GA2 T/M	1

January 1993 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
01.93	6ZB5 410-0HH02-0AA0	**A**

Contents

1 Module Overview

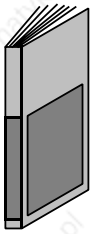
COM area	Module number
COM CPU	6FX1147-4BB00
0.5 MB system EPROM submodule for COM CPU	6FX1124-1CC00
INT/MEM submodule with interfaces and RAM for part programs etc.	6FX1147-5BA01
Memory/page (1-3 memory submodules UMS etc.)	6FX1126-7BA01
256 KB EPROM submodule (standard UMS)	6FX1128-4BC00
128 KB EPROM submodule (for UMS)	6FX1128-4BD00
256 KB EPROM submodule (for UMS)	6FX1128-4BC00
128 KB RAM submodule (for UMS)	6FX1126-6BA00
256 KB RAM submodule (for UMS)	6FX1135-3BA00
Memory/dual port with clock (single tier)	6FX1124-0BA03
Memory/multi port with clock (two tier)	6FX1136-8BA01
INT/SINEC H1 CP231 A	6FX1123-1BC02
MEM submodule	6FX1122-6CB00
INT/ACTIVE RS232C (V.24) (CP 315)	6FX1131-5BA01
MEM submodule	6FX1128-4BA00
INT/ACTIVE RS232C (V.24) 3*RS232C/TTY	6FX1137-3BA01
MAP 3.0 CP1476 ETHERNET H1	6FX1147-6MA00
NC range	
NC CPU	6FX1147-4BB00
0.5 MB system EPROM submodule for NC CPU	6FX1124-1CC00
Servo area	
SERVO CPU	6FX1136-3BB01
0.5 MB system EPROM submodule for SERVO CPU	6FX1124-1CB00
SERVO interface for 3 measuring circuits	6FX1121-4BA02
SERVO interface for 3 measuring circuits (for EXE installation)	6FX1121-4BB02
EXE 5/10-fold	6FX1151-5BA00
HMS interface with 3 inputs	6FX1145-6BB00
HMS interface with 3 inputs and 3 additional submodule slots	6FX1145-6BA00
HMS SERVO command submodule with 1 set value	6FX1135-5BA02
Absolute encoder submodule with 3 actual value inputs	6FC9320-4FH
I/U hybrid for linear scale	6FC3988-7CN
Mixed I/O	6FX1138-4BA01

PLC area

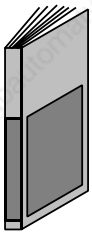
PLC CPU (ACOP 2)	6FX1138-6BL01
256 KB system EPROM submodule for PLC CPU	6FX1145-8BA00
64 KB EPROM submodule (user memory)	6FX1130-5BB00
256 KB EPROM submodule (user memory)	6FX1145-8BA00
INT/DMP(for EUs, DMP)	6FX1144-2BA00
DMP terminal block	6FX1142-1BA01
DMP module 16 inputs/16 outputs	6FX1142-4BA04
DMP module 32 inputs	6FX1142-2BA02
DMP terminating connector	6FX1145-2BA00
DMP IP65 terminal block [1)]	6FX1152-7BA01
DMP module IP65 8 inputs+(8 inputs or 8 outputs) [1)]	6FX1152-8BA02
DMP compact terminal block [1)]	6FX1153-2BA00
DMP compact module 8 outputs, 24V/2.0A, floating [1)]	6FX1153-0BA0
DMP compact module 16 outputs, 24V/0.5A, floating [1)]	6FX1153-3BA0
DMP compact module 16 inputs, floating [1)]	6FX1153-1BA0
INT/CU 16 bit (for PLC 155U)	6FX1137-7BA02
INT/EU 16 bit (for EU 185U)	6FX1137-8BB02

Operator panel area

Power supply unit 230V AC	6EW1861-3AD
Operator panel CPU	6FX1120-4BD03
MEM/EPROM RAM	6FX1128-1BB01
EPROM submodule (for op. system or op. panel SW)	6FX1128-4BC00
INT/KEYBOARD	6FX1148-7BA01
INT/OPI	6FX1138-8BC04
INTERFACE	6FX1121-2BA03



Modules other than those listed here can also be used in the SINUMERIK 880 GA2. Further information is given in the document SINUMERIK 880 GA2, Interface Description Part 2, Connection Conditions.



1) Available soon.

2 NC Machine Data

2.1 General values

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
0					
1	Speed after SW prelimit switch	500	100000	IS	1000 units/min
2					
3	Corner deceleration speed	500	100000	IS	1000 units/min
4	Input buffer parameters for standard cycles	450	500	--	
5	Input buffer parameters for user	200	500	--	
6	Threshold for CRC insertion blocks	0	2000	IS	units
7	Circle endpoint monitoring	5	32000	IS	units
9	Error window on reapproach 1)	200	32000	IS	units
10	Feedrate after block search	1000	100000	IS	1000 units/min
11				--	
12					
13	Number of TO parameters	10	32	--	
14	Measuring cycle MD	0	999	--	
15	Measuring cycle MD	0	999	--	
16	Measuring cycle SD	0	999	--	
17	Measuring cycle SD	0	999	--	
18	Zero offset group (L960)	1	10	--	
19	Subsequent cutting edge/P No. in TO buffer	0	10		
20	Basic angle for nutating head	0	±180000		10^{-3} degrees
21	Spindle power	0	9999	--	kW

1) MD 9 active after NC START

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
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	--	--
30	Sector display main store	10	2500	--	Sector
31	Timeout computer link	10	9999	--	Seconds
32	Subroutine number for ISDN call number	0	999		BCD format

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
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	--	%

MD No.	Designation		Standard value	Maximum input value	Reference system	Input unit
125	- // -	27th position	0	150	--	%
126	- // -	28th position	0	150	--	%
127	- // -	29th position	0	150	--	%
128	- // -	30th position	0	150	--	%
129	- // -	31st position	0	150	--	%
130	- // -	32nd position	0	150	--	%
131	Spindle override	1st position	50	130	--	%
132	- // -	2nd position	55	130	--	%
133	- // -	3rd position	60	130	--	%
134	- // -	4th position	65	130	--	%
135	- // -	5th position	70	130	--	%
136	- // -	6th position	75	130	--	%
137	- // -	7th position	80	130	--	%
138	- // -	8th position	85	130	--	%
139	- // -	9th position	90	130	--	%
140	- // -	10th position	95	130	--	%
141	- // -	11th position	100	130	--	%
142	- // -	12th position	105	130	--	%
143	- // -	13th position	110	130	--	%
144	- // -	14th position	115	130	--	%
145	- // -	15th position	120	130	--	%
146	- // -	16th position	120	130	--	%
147	Rapid override	1st position	1	100	--	%
148	- // -	2nd position	10	100	--	%
149	- // -	3rd position	50	100	--	%

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
150	Rapid override 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	Interpolation time	8	4 - 30	--	ms
156					
157	Control type for standard cycles	T..9111 M..9211		--	--
158	Measuring speed for measuring in JOG	250	12000	IS	1000 units**/**min
159	Clearance path for measuring in JOG	10000	±99999999	IS	units
160	Servo cycle 1st servo CPU	2	1 ... 30	--	--
161	- **//** - 2nd servo CPU	2	1 ... 30	--	--
162	- **//** - 3rd servo CPU	2	1 ... 30	--	--
163	- **//** - 4th servo CPU	2	1 ... 30	--	--
164	Calculating dead time for EXTENDED PACKAGE FOR THREADS	36	--	--	--
165					
167					
168	Sampling time system clock	16	2, 4, 8, 16	--	0.0625 ms
169					
171					
172	Number of simulation tool parameters	8	8		

1) MD 155 ..... See input units (end of Section 2)

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
173	Number of simulation channels	M/T 1 TT 2	2		
174	Type of simulation representation for plane 1/ single view	0	7		
175	Type of simulation representation for plane 2/ single view	0	7	--	
176	Type of simulation representation for plane 3/ single view	0	7	--	
180	Tool change simul. channel 1 Address extension/coding HF	63	9975	--	
181	No. of auxiliary function	0	±99999999	--	
182	Tool change simul. channel 2 Address extension/coding HF	63	9975	--	
183	No. of auxiliary function	0	±99999999	--	
184	Tool offset selection Address extension/coding HF	64	9975	--	
185	No. of auxiliary function	0	±99999999	--	
186	Spindle rotating (1 HF) Address extension/coding HF	21	9975	--	
187	No. of auxiliary function	03	±99999999	--	
188	Spindle rotating (2 HF) Address extension/coding HF	21	9975	--	
189	No. of auxiliary function	04	±99999999	--	
190	Spindle stopped (1 HF) Address extension/coding HF	21	9975	--	
191	No. of auxiliary function	05	±99999999	--	
192	Spindle stopped (2 HF) Address extension/coding HF	21	9975	--	
193	No. of auxiliary function	19	±99999999	--	
194	Delete blank Address extension/coding HF	21	9975	--	
195	No. of auxiliary function/coding HF	100	±99999999	--	
196	Draw blank Address extension/ coding HF	21	9975	--	

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
197	No. of auxiliary function	101	± 99999999	--	
198	Synchronization mark Address extension/coding HF	21	9975	--	
199	No. of auxiliary function	46	± 99999999	--	
200	V.24 (RS232C) number from PLC	3	4	--	
201					
202					
203					
204					
205					
206					
207					
208	Max. value for tool parameter P5+P6	+999999	+ 999999 ≙9.99999mm or inch	IS	
209	Max. value for tool parameter P7	+999999	+ 999999 ≙9.99999mm or inch	IS	
210	Number of TO areas	1	16	--	
211	Start D no. for TO area 1	1		--	
212	- *II* - 2	0		--	
213	- *II* - 3	0		--	
214	- *II* - 4	0		--	
215	- *II* - 5	0		--	
216	- *II* - 6	0		--	
217	- *II* - 7	0		--	
218	- *II* - 8	0		--	
219	- *II* - 9	0		--	
220	- *II* - 10	0		--	
221	- *II* - 11	0		--	
222	- *II* - 12	0		--	
223	- *II* - 13	0		--	

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
224	- **//** - 14	0		--	
225	- **//** - 15	0		--	
226	- **//** - 16	0		--	
227	User menu PRESET	0	255	--	--
228	User menu MDI-AUTO	0	255	--	--
229	User menu JOG**/**INC	0	255	--	--
230	User menu REPOS	0	255	--	--
231	User menu AUTOMATIC	0	255	--	--
232	User menu REFPOINT	0	255	--	--
233	No. of the PLC in which DB38 exists	0	1 to 2	--	--
234	Password LOW PG remote	0	9999 9999	--	--
235	Password HIGH PG remote	0	9999 9999	--	--
236 ⋮ **239**					
251	Channel for auxiliary functions of 1st simulation channel to PLC	15	16	--	--
252	Channel for auxiliary functions of 2nd simulation channel to PLC	16	16	--	--
253 ⋮ **259**					
260	M function number for selecting C axis operation	–1	9999	--	--
261	M function number for selecting C axis operation	–1	9999	--	--
271 ⋮ **273**	Cycle No. for G81**/**L81 to G83**/**L83	0	999	--	--
274	Cycle No. for G84**/**L84	841	999	--	--
275 ⋮ **279**	Cycle No. for G85**/**L85 to G89**/**L89	0	999	--	--

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
:	- // -	- // -	- // -	- // -	- // -
809	- // -	- // -	- // -	- // -	- // -

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
876	Leading axis No. 1	0	24	--	--
877	Following axis No. 1	0	24	--	--
878	Leading axis No. 2	0	24	--	--
879	Following axis No. 2	0	24	--	--
880	Leading axis No. 3	0	24	---	---
881	Following axis No. 3	0	24	---	---
882	Leading axis No. 4	0	24	---	---
883	Following axis No. 4	0	24	---	---
884	Leading axis No. 5	0	24	---	---
885	Following axis No. 5	0	24	---	---
886	Leading axis No. 6	0	24	---	---
887	Following axis No. 6	0	24	---	---
888	Leading axis No. 7	0	24	---	---
889	Following axis No. 7	0	24	---	---
890	Leading axis No. 8	0	24	---	---
891	Following axis No. 8	0	24	---	---
892	Leading axis No. 9	0	24	---	---
893	Following axis No. 9	0	24	---	---
894	Leading axis No. 10	0	24	---	---
895	Following axis No. 10	0	24	---	---
896	Leading axis No. 11	0	24	---	---
897	Following axis No. 11	0	24	---	---
898	Leading axis No. 12	0	24	---	---
899	Following axis No. 12	0	24	---	---
900					
901					
902					
903					
904					

2.1.1 Machine data ELG and synchronous spindle, general

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
930	Assignment of FA 1,2,3 to NC CPU	0	222	--	Special format
931	Measurement of difference	0	2	--	--
932	Assignment of synchronous spindle pairs to NC CPU	0	222	--	Special format

2.1.2 Machine data ELG 1 (FA1) and synchronous spindle (FS1)

Machine data following axis 1 (FA1):

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
940[1)]	Global axis No. of FA1	0	24	--	--
941	Global axis No. 1st fict. LA	0	24	--	--
942	Global axis No. 2nd fict. LA	0	24	--	--
943[1)]	Global axis No. 1st real LA	0	1124	--	Special format
944	Global axis No. 2nd real LA	0	1124	--	Special format
945	Global axis No. 3rd real LA	0	1124	--	Special format
946[1)]	P component compensatory controller	0	16000	--	0.001
947[1)]	Integral-action component compensatory controller	0	16000	--	0.001
948[1)]	D component compensatory controller	0	16000	--	0.001
949					
950	Time constant parallel model	0	16000	--	0.1 ms
952[1)]	Tolerance band for coupled motion fine	40	16000	MS	units
953[1)]	Tolerance band for coupled motion coarse	100	16000	MS	units
954[1)]	Emergency retraction threshold	400	16000	MS	units
955[1)]	% Warning threshold a_{max} / n_{max}	90	100	--	%
956[1)]	Waiting time controlled follow-up motion	16000	16000	--	ms
957					
958					

1) When using a synchronous spindle, these MDs have a different (spindle-related) meaning see next page

Machine data following spindle 1 (FS1):

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
940	Global C axis number of FS 1	0	24	--	--
943	Global spindle number LS 1	0	1106	--	Special format
946	P component compensatory controller	0	16000	--	0.001
947	Integral-action component compensatory controller	0	16000	--	0.001
948	D component compensatory controller	0	16000	--	0.001
949					
950	Time constant parallel model	0	16000	--	0.01ms
951					
952	Tolerance band for coupled motion fine	40	16000	MS	units
953	Tolerance band for coupled motion coarse	100	16000	MS	units
954	Emergency retraction threshold	400	16000	MS	units
955	% Warning threshold a_{max} / n_{max}	90	100	--	%
956	Waiting time controlled follow-up motion	16000	16000	--	ms
957					
958					

2.1.3 Machine data ELG 2 (FA2) and synchronous spindle (FS2)

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
960[1)]	Global axis No. of FA2	0	24	--	--
961	Global axis No. of 1st fict. LA	0	24	--	--
962	Global axis No. of 2nd fict.LA	0	24	--	--
963[1)]	Global axis No. of 1st real LA	0	1124	--	Special format
964	Global axis No. of 2nd real LA	0	1124	--	Special format
965	Global axis No. of 3rd real LA	0	1124	--	Special format
966[1)]	P component compensatory controller	0	16000	--	0.001
967[1)]	Integral-action component compensatory controller	0	16000	--	0.001
968[1)]	D component compensatory controller	0	16000	--	0.001
969					
970	Time constant parallel model	0	16000	--	0.1 ms
972[1)]	Tolerance band for coupled motion fine	40	16000	MS	units
973[1)]	Tolerance band for coupled motion coarse	100	16000	MS	units
974[1)]	Emergency retraction threshold	400	16000	MS	units
975[1)]	% Warning threshold a_{max} / n_{max}	90	100	--	%
976[1)]	Waiting time controlled follow-up motion	16000	16000	--	ms
977					
978					

1) When using a synchronous spindle, these MDs have a different (spindle-related) meaning see next page

Machine data following spindle 2 (FS2):

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
960	Global C axis number of FS 2	0	24	--	--
963	Global spindle number LS 2	0	1106	--	Special format
966	P component compensatory controller	0	16000	--	0.001
967	Integral-action component compensatory controller	0	16000	--	0.001
968	D component compensatory controller	0	16000	--	0.001
969					
970	Time constant parallel model	0	16000	--	0.01 ms
971					
972	Tolerance band for coupled motion fine	40	16000	MS	units
973	Tolerance band for coupled motion coarse	100	16000	MS	units
974	Emergency retraction threshold	400	16000	MS	units
975	% Warning threshold a_{max} / n_{max}	90	100	--	%
976	Waiting time controlled follow-up motion	16000	16000	--	ms
977					
978					

2.1.4 Machine data ELG 3 (FA3) and synchronous spindle (FS3)

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
980[1)]	Global axis No. of FA3	0	24	--	--
981	Global axis No. 1st fict. LA	0	24	--	--
982	Global axis No. 2nd fict. LA	0	24	--	--
983[1)]	Global axis No. 1st real LA	0	1124	--	Special format
984	Global axis No. 2nd real LA	0	1124	--	Special format
985	Global axis No. 3rd real LA	0	1124	--	Special format
986[1)]	P component compensatory controller	0	16000	--	0.001
987[1)]	Integral-action component compensatory controller	0	16000	--	0.001
988[1)]	D component compensatory controller	0	16000	--	0.001
989					
990	Time constant parallel model	0	16000	--	0.1 ms
992[1)]	Tolerance band for coupled motion fine	40	16000	MS	units
993[1)]	Tolerance band for coupled motion coarse	100	16000	MS	units
994[1)]	Emergency retraction threshold	400	16000	MS	units
995[1)]	% Warning threshold a_{max} / n_{max}	90	100	--	%
996[1)]	Waiting time controlled follow-up motion	16000	16000	--	ms
997					
998					

1) When using a synchronous spindle, these MDs have another (spindle-related) meaning see next page

Machine data following spindle 3 (FS3):

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
980	Global C axis number of FS 3	0	24	--	--
983	Global spindle number LS 3	0	1106	--	Special format
986	P component compensatory controller	0	16000	--	0.001
987	Integral-action component compensatory controller	0	16000	--	0.001
988	D component compensatory controller	0	16000	--	0.001
989					
990	Time constant parallel model	0	16000	--	0.01 ms
991					
992	Tolerance band for coupled motion fine	40	16000	MS	units
993	Tolerance band for coupled motion coarse	100	16000	MS	units
994	Emergency retraction threshold	400	16000	MS	units
995	% Warning threshold a_{max} / n_{max}	90	100	--	%
996	Waiting time controlled follow-up motion	16000	16000	--	ms
997					
998					

2.2 Channel-specific values (max. 8 channels)

MD No.	Description	Standard value	Maximum input value	Reference system	Input unit
100*	Channel valid in mode group	1	8	--	
102*	No. of relevant NC-CPU	1	2	--	
104*	TO area for channel	1	16	--	
106*	No. of enabled program	0	±9999	+ %, – L, 0 all	
108*	Delete position 1st G group	01	999		--
110*	Delete position 3rd G group	880M :17 880T :18	999	--	--
112*	Delete position 6th G group	54	999	--	--
114*	Delete position 8th G group	880M :60 880T :64	999	--	--
116*	Delete position 9th G group	0	999	--	--
118*	Delete position 12th G group	880M :94 880T :95	999	--	--
120*	Delete position 15th G group	150	999	--	--
122*	Delete position 19th G group	0	16000		
122*					
124*					
126*					
128*					
130*	SST when executing from external	3	4		

* .... *0 1st channel*
1 2nd channel
2 3rd channel
3 4th channel
4 5th channel
5 6th channel
:
15 16th channel

2.3 Axis-specific values (max. 24 axes)

MD No.	Description	Standard value	Maximum input value	Reference system	Input unit
2000 **2001** **2002** ⋮ **200***	Assignment of act. value input 1st axis Assignment of act. value input 2nd axis Assignment of act. value input 3rd axis 880T Assignment of act. value input 3rd axis 880M	01 01 01 00 01 02 01 00 00 00 00 00 01 03 01 00	1)	--	
204*	Exact stop limit coarse	40	16000	MS	units
208*	Exact stop limit fine	10	16000	MS	units
212*	Clamping tolerance	100	16000	MS	units
216*					
220*	Backlash compensation	0	± 16000	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	± 99999999	MS	units
248*	Tool reference value	0	± 99999999	MS	units
252*	Servo gain factor	1666	10000		0.01 s^{-1}
256*	Maximum load speed	10000	99999999	--	$\frac{mm}{min}$ or $\frac{deg.}{min}$
260*	Multgain	8000	99999999	--	mV
264*	Threshhold for drive fault	9600	15000	--	VELO
268*	Max. set speed (DAC)	8192	8192	--	VELO
272*	Drift compensation	0	± 500	--	VELO
276*	Acceleration	50	16000	--	$\frac{10mm}{s^2}$

1) See Section 2.13 for possible input values

MD No.	Description	Standard value	Maximum input value	Reference system	Input unit
280*)	Max. speed	10000	10720000	IS	1000 units/min
284*	Ref. point creep speed	300	10720000	IS	1000 units/min
288*	Jog speed	2000	10720000	IS	1000 units/min
292*	Jog rapid	5000	10720000	IS	1000 units/min
296*	Ref. point approach speed	10000	10720000	IS	1000 units/min
300*	Incremental speed	500	10720000	IS	1000 units/min
304*	Interpolation parameter name	880T: 1,3 880M:1,2,3	3	1=I; 2=J; 3=K	
308*	Limiting frequency C axis encoder	500	16000		kHz
312*	P component feedforward factor	0	1000	--	0.1 %
316*	Pointer compensation +	0	249	--	MD offset
320*	Pointer compensation -	0	249	--	MD offset
324*	Distance between 2 leadscrew error compensation values	0	99999999	MS	units
328*	Compensation value with lead-screw error compensation	0	100	MS	units
332*	Tolerance band contour monitoring	1000	99999999	MS	units
336*	Threshold speed contour	5	16000	IS	1000 units/min
340*	Tool change position	0	± 99999999	MS	units
344*	Modulo value rotary axis for leadscrew error compensation and in-process synchronisation of C axis	360000	92160000	MS	units
348*	Min. working area for simulation	- 5000	- 32000	IS	mm or inch
352*	Max. working area for simulation	+ 5000	+ 32000	IS	mm or inch
356*	Monitoring for max. IKA compensation value	500	99999999	MS	units
360*	Axis valid in mode group	1	8		

MD No.	Description	Standard value	Maximum input value	Reference system	Input unit
364*	Pulses for variable increment weighting [1]	1	65000		4* encoder pulses
368*	Traverse path for variable increment weighting [1]	1	65000	MS	1/2 units/ MD 364*
372*	Time delay standstill monitoring	200	1000		ms
376*					
380*					units/min
3840 **3841** **3842** **3842** ⋮ **384***	Assignment set value output 1st axis Assignment set value output 2nd axis Assignment set value output 3rd axis 880M Assignment set value output 3rd axis 880T	01040000 01050000 01060000 0	[2]		
388*	Weighting factor	0	99999999	--	--
392*	Time constant for dynamic feedforward control	0	1000		0.1ms
396*	Absolute encoder offset	0	±99999999	MS	units

1) MD 364 / MD 368*.... see input resolutions (end of Section 2)*

2) See Section 2.13 for possible input values.

MD No.	Description	Standard value	Maximum input value	Reference system	Input unit
1100*	Prelimit switch	20000	±99999999	MS	units
1104*	Number of divisions	0	999	--	--
1108*	Division absolute dimension	0	99999999	MS	units
1112*	Division increment offset	0	±99999999	MS	units
1116*	Pulse multiplication HMS	1	128	--	--
1120*					
1124*	D component feedforward	0	1000		0.1%
1200*	Time delay contour monitoring	0	16000	--	ms
1204*	Pulse multiplication HMS 2nd measuring system	1	128	--	--
1208*	Pulses for variable increment weighting 2nd measuring system	1	65000	--	--
1212*	Traversing path for variable increment weighting 2nd measuring system	1	65000	--	--
1216*	Switchover tolerance 2nd measuring system	1000	16000	MS	units
1224*	Cut-out delay for servo enable	400	1000	--	ms
1228*	Backlash compensation 2nd measuring system	0	±16000	MS	units
1260*	P feedforward factor for tapping without compensation chuck	0	1000	--	0.001
1272*	Time constant for setpoint smoothing	0	1000	--	0.1 ms
1300*	Basic distance, distance-coded reference marks	1000	16000	--	--
1304*	External pulse multiplication	1	100	--	--
1320*	Servo gain factor for tapping without compensating chuck	1666	10000	--	0.01 s^{-1}
1324*	Time constant for dynamic feedforward control for tapping without compensating chuck	0	1000	--	0.1 ms
1388*	Axis assignment 2nd measuring system	0	1003 0000	--	--
1396*	Ratio of position control clock to servo clock	1	64	--	--

2.4 Spindle-specific values (max. 6 spindles)

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit	
4000 **: :** **4005**	Assignment actual value input - // - 1st spindle : - // - 6th spindle	01 03 01 00	2)	-- -- --		
401*	Drift compensation (spindle)	0	± 500	--	VELO	
402*		--	--	--	--	
403*	Max. speed for 1st gearbox	500	99999	--	rpm or 0.1 rpm	1)
404*	- // - 2nd gearbox	1000	99999	--	rpm or 0.1 rpm	1)
405*	- // - 3rd gearbox	4000	99999	--	rpm or 0.1 rpm	1)
406*	- // - 4th gearbox	4000	99999	--	rpm or 0.1 rpm	1)
407*	- // - 5th gearbox	4000	99999	--	rpm or 0.1 rpm	1)
408*	- // - 6th gearbox	4000	99999	--	rpm or 0.1 rpm	1)
409*	- // - 7th gearbox	4000	99999	--	rpm or 0.1 rpm	1)
410*	- // - 8th gearbox	4000	99999	--	rpm or 0.1 rpm	1)
411*	Min. speed for 1st gearbox	50	99999	--	rpm or 0.1 rpm	
412*	- // - 2nd gearbox	500	99999	--	rpm or 0.1 rpm	
413*	- // - 3rd gearbox	1000	99999	--	rpm or 0.1 rpm	
414*	- // - 4th gearbox	2000	99999	--	rpm or 0.1 rpm	
415*	- // - 5th gearbox	2000	99999	--	rpm or 0.1 rpm	
416*	- // - 6th gearbox	2000	99999	--	rpm or 0.1 rpm	
417*	- // - 7th gearbox	2000	99999	--	rpm or 0.1 rpm	
418*	- // - 8th gearbox	2000	99999	--	rpm or 0.1 rpm	

1) Max. speeds for the various gearboxes must be specified in ascending order.
Max. speed spindle speed with DAC = 10 volts
16 rpm is the minimum speed value

2) See Section 2.13 for possible input values

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
419*	Acceleration time constant for 1st gearbox	1000	50000	--	1 ms
420*	- // - 2nd gearbox	1000	50000	--	1 ms
421*	- // - 3rd gearbox	1000	50000	--	1 ms
422*	- // - 4th gearbox	1000	50000	--	1 ms
423*	- // - 5th gearbox	1000	50000	--	1 ms
424*	- // - 6th gearbox	1000	50000	--	1 ms
425*	- // - 7th gearbox	1000	50000	--	1 ms
426*	- // - 8th gearbox	1000	50000	--	1 ms
427*	Creep speed for M19 1st gearbox	100	16000	--	rpm or 0.1 rpm
428*	- // - 2nd gearbox	100	16000	--	rpm or 0.1 rpm
429*	- // - 3rd gearbox	100	16000	--	rpm or 0.1 rpm
430*	- // - 4th gearbox	100	16000		rpm or 0.1 rpm
431*	- // - 5th gearbox	100	16000	--	rpm or 0.1 rpm
432*	- // - 6th gearbox	100	16000	--	rpm or 0.1 rpm
433*	- // - 7th gearbox	100	16000	--	rpm or 0.1 rpm
434*	- // - 8th gearbox	100	16000	--	rpm or 0.1 rpm
435*	Gain factor for M19 1st gearbox	833	16000	--	0.01 1/s
436*	- // - 2nd gearbox	833	16000	--	0.01 1/s
437*	- // - 3rd gearbox	833	16000	--	0.01 1/s
438*	- // - 4th gearbox	833	16000	--	0.01 1/s
439*	- // - 5th gearbox	833	16000	--	0.01 1/s
440*	- // - 6th gearbox	833	16000	--	0.01 1/s
441*	- // - 7th gearbox	833	16000	--	0.01 1/s
442*	- // - 8th gearbox	833	16000	--	0.01 1/s

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
443*	Position limit for M19	2000	16000	MS	units
444*	Tolerance of the spindle speed	10	100	--	%
445*	Tolerance max. spindle speed	10	100	--	%
446*	Tolerance standstill speed	10	10000	--	0.01 % 1)
447*	Waiting time for controller enable	1000	16000	--	ms
448*	Lowest set motor speed	50	16000	--	rpm
449*	Desired speed	50	99999	--	rpm or 0.1 rpm
450*	Oscillation speed	20	10000	--	0.01%
451*	Max. spindle speed	4000	99999	--	rpm or 0.1 rpm
452*	Spindle position with ext. M19	0	35999	--	0.1 degree 0.01 degree
453*	Spindle valid in mode group	1	8	--	
454*					
455*	Pulses for variable increment weighting	32	65000	--	--
456*	Traversing path for variable increment weighting	5625	65000	--	--
458*	Pulse multiplication HMS	1	128		--
459*	Zero mark offset		±36000		0.01 degree
4600 **4601** **:** **4605**	Assignment set value output 1st spindle - //- : - //- 6th spindle	0 : : 0	2)		
461*	Global axis number C axis	0	24	--	--
462*	Limiting freq. spindle encoder	500	16000	--	kHz

Observe the "Spindle speed limitation" setting data when programming.

1) 0.01 % of the max. gear speed

2) See section 2.13 for possible input values

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
463*	Offset of synchronous position	0	±18000	--	0.01 degree
464*	Reserved	--	--	--	--
465*	Precontrol factor	0	1000	--	0.1%
466*	Ratio of position control clock to servo clock	1	64	--	
467*	Time constant for precontrol	0	16000	--	0.1ms
468*	Multgain factor	9000	32000	--	--
469*	Factor for gain switchover	100	16000	--	%
470* : 477*					
478*	Acceleration time constant 1st gear (with controller)	3000	50000	--	1 ms
479*	Acceleration time constant 2nd gear (with controller)	3000	50000	--	1 ms
480*	Acceleration time constant 3rd gear (with controller)	3000	50000	--	1 ms
481*	Acceleration time constant 4th gear (with controller)	3000	50000	--	1 ms
482*	Acceleration time constant 5th gear (with controller)	3000	50000	--	1 ms
483*	Acceleration time constant 6th gear (with controller)	3000	50000	--	1 ms
484*	Acceleration time constant 7th gear (with controller)	3000	50000	--	1 ms
485*	Acceleration time constant 8th gear (with controller)	3000	50000	--	1 ms
486*	Time constant for setpoint smoothing	0	16000	--	0.1 ms

2.5 General bits

MD No.	Bit No. 7	6	5	4	3	2	1	0
5000	Name of radius and chamfer ("B" for 880T, "U" for 880M) (same code as for axis definition)							
5001	Name of angle ("A" for 880T and 880M) (same code as for axis definition)							
5002	Input resolution							
5003	No delay at limit switch	Working area limitation effective with JOG	Interpolation parameters dependent on G90/G91	Polar coordinate angle dependent on G90/G91	PRESET offset not deleted on Power on	Aux. fct. output before traversing	Overstore over channel	
5004		Mode group-specific single block type B	type A	Own rapid override switch	NC start without ref. point	3rd handwheel available	2nd	1st
5005	Keyswitch group (configurable) 7	6	5	ZO fine	Keyswitch effective with ZO coarse R parameter angle of rotat.	TO wear	TO geometry, base	Reserved
5006	Keyswitch effective with Teleservice	Axis converter	Select over. reset mode	Teach in/ playback	PP handling	Dry run feedrate	DRF	Overstore
5007	TO in diameter	TO wear not calculated	Mixed programming G90/G91 in block		TO basic dimension active	No output of M17	G53 like @706	Trav. length comp. in non-prog axis (only 880T)
5008	Path dimension from PLC without NC stop	REPOS in inching mode	INC and REF in inching mode	TO type 0 like type 20	TO value monitoring			
5009	Dual slide operator interface simulation	Tool editor	Erase graphics	Data enable simulation	Blank optimization			
5010						5D tool length compensation for Nutating head	Twist and Nod	Gimbal Head
5011	@ read and write in diameter	Act.value display in diameter	Diameter prog. with G91	Diameter prog. G 90; TO in diam.	Tool length (P2) Type 1 - 9 in diam.	Inc.handwheel DRF in diam.	Settable ext. prog. ZO in diam.	
5012				Softkey green inverse		Writing machine data disabled via @		
5013	Circle radius programming			Feed not related to contour		M & S address ext. lead screw	Tapping without sensor	G63 without delay
5014	TNRC/ CRC		Reference conditioning cycles					
5015		User memory submodule			Speed-optimized text output	Graphics		
5016								

5002 Bits 4, 5, 6 *Valid after RESET*

5007 Bit 7 *Is only effective with milling cutters. Wear of turning tool radius (P7) always in radius.*

5004 Bits 2, 1, 0 *These bits can only be set if the handwheel submodule is connected.*

MD No.	Bit No. 7	6	5	4	3	2	1	0
5021				Following axis 1/following spindle 1: Coupled motion div.-related	Suppression of acceleration limitation	Block change with coupled motion fine	Sensitivity attenuation	Following error compensation on
5022				Following axis 1/following spindle 1: Coupled motion div.-related	Suppression of acceleration limitation	Block change with coupled motion fine	Sensitivity attenuation	Following error compensation on
5023				Following axis 1/following spindle 1: Coupled motion div.-related	Suppression of acceleration limitation	Block change with coupled motion fine	Sensitivity attenuation	Following error compensation on
5024								Abort on contour violation Alarm 3021
5030	Declaration of the operator panel CPU					Op. pan. 3	Op. pan. 2	Op. pan. 1
5031	Configuration display of the operator panel CPU					Op. pan. 3	Op. pan. 2	Op. pan. 1
5032	Declaration of the COM CPU							COM 1
5033	Configuration display of the COM CPU							COM 1
5034	Declaration of the NC CPUs						NC 2	NC 1
5035	Configuration display of the NC CPUs						NC 2	NC 1
5036	Declaration of the servo processor submodule				Servo 4	Servo 3	Servo 2	Servo 1
5037	Config. display of the servo processor submodule				Servo 4	Servo 3	Servo 2	Servo 1
5038	Declaration of the PLC CPUs						PLC 2	PLC 1
5039	Configuration display of the PLC CPUs						PLC 2	PLC 1
5040	User option bits for menu selection (WS800)							
5041	User option bits for menu selection (WS800)							
5042	User option bits for menu selection (WS800)							

MD No.	Bit No. 7	6	5	4	3	2	1	0
5043	User option bits for menu selection (WS800)							
5044	User option bits for menu selection (WS800)							
5045				Simulation tool paths (line graphics) Settable ZO	Progr. ZO	Length compens.		
5046				Simulation actual value (line graphics) Settable ZO	Progr. ZO	Length compens.	CRC	
5047				Simulation tool paths (animated graphics) Settable ZO	Progr. ZO	Length compens.	CRC	
5048				Simulation actual values (animated graphics) Settable ZO	Progr. ZO	Length compens.	CRC	
5049							Service control	
5050								
5051				Keyswitch effective with:				Cycles SD ELG interface
5052								
5053								
5054								
5056								
5057								
5058								
5059								

MD No.	Bit No. 7	6	5	4	3	2	1	0
5060	Channel number of the transformation							
5061	G functions for transformation selection							
5062	Axis name 1st fictitious axis 1st transformation							
5063	Axis name 2nd fictitious axis 1st transformation							
5064	Axis name 3rd fictitious axis 1st transformation							
5065	Axis name 1st real axis 1st transformation							
5066	Axis name 2nd real axis 1st transformation							
5067	Axis name 3rd real axis							
5068	Axis name 4th real axis							
5069	Axis name 5th real axis							
5070	Channel number of the transformation							
5071	G function for transformation selection							
5072	Axis name 1st fictitious axis 2nd transformation							
5073	Axis name 2nd fictitious axis 2nd transformation							
5074	Axis name 3rd fictitious axis 2nd transformation							

MD No.	Bit No. 7	6	5	4	3	2	1	0
5075	Axis name 1st real axis 2nd transformation							
5076	Axis name 2nd real axis 2nd transformation							
5077	Axis name 3rd real axis							
5078	Axis name 4th real axis							
5079	Axis name 5th real axis							
5080 : 5089	3rd transformation data block							
5090 : 5099	4th transformation data block							
5100 : 5109	5th transformation data block							
5110 : 5119	6th transformation data block							
5120 : 5129	7th transformation data block							
5130 : 5139	8th transformation data block							
5141 : 5146	Ethernet address byte 1 (computer link) Ethernet address byte 6 (computer link)							
5147					Modification when reading in subroutine via filetransfor.	Write-protected progr. do not erase	Acknowledge message frame at once	Position acknowledgement on end message frame

Standard assignments of the eight transformation data blocks:

0000	0000	1111	1111
0000	0000	1111	1111
1111	1111	1111	1111
1111	1111	1111	1111
1111	1111	1111	1111

MD No.	Bit No. 7	6	5	4	3	2	1	0
5148	Logical peer receiver (computer link)							
5149	Logical peer receiver (computer link)							
5150	Logical peer receiver (computer link)							
5151	Logical peer receiver (computer link)							
5152	Location receiver (computer link)							

MD No.	Bit No. 7	6	5	4	3	2	1	0
5156	G 151 Definition of the traversing movement of following axis no.							
	4 (MD883)		3 (MD881)		2 (MD879)		1 (MD877)	
5157	8 (MD891)		7 (MD889)		6 (MD887)		5 (MD885)	
5158	12 (MD899)		11 (MD897)		10 (MD895)		9 (MD893)	
5159	G 152 Definition of the traversing movement of following axis no.							
	4 (MD883)		3 (MD881)		2 (MD879)		1 (MD877)	
5160	8 (MD891)		7 (MD889)		6 (MD887)		5 (MD885)	
5161	12 (MD899)		11 (MD897)		10 (MD895)		9 (MD893)	
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							

Definition of the traversing movement:

00 : = no coupled motion
11 : = coupled motion in same direction
10 : = coupled motion in opposite direction
01 : = undefined

G151 - G159
G functions for selecting the coupled motion combination

MD No.	Bit No. 7	6	5	4	3	2	1	0
5183	2nd/3rd operator panel; transfer user keys: 8th UK	7th UK	6th UK	5th UK	4th UK	3th UK	2th UK	1th UK
5184	2nd/3rd operator panel; transfer user keys:		14th UK	13th UK	12th UK	11th UK	10th UK	9th UK
5185								Change G64 to G00 without G09 progr.

2.5.1 General bits, standard assignments

MD No.	SINUMERIK 880M 7	6	5	4	3	2	1	0		SINUMERIK 880T 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	1	0	0	0	1	1	1		0	1	0	0	0	1	1	0	

2.6 Spindle-specific bits (max. 6 spindles)

MD No.	Bit No. 7	6	5	4	3	2	1	0
520*	Spindle override effective with thread	No M19 abort on Reset	M19 with axis movement		Speed in 0.1 rev/min	Pulse encoder available	Sign change actual value	
521*	Spindle available	Spindle not brought to standstill with M30 and reset	No ramp on gear change	C axis operation is cancelled after M02/M30	Measuring circuit monitoring Off		Sign change set value	
522*								
524*					Position control resolution for spindle			

2.6.1 Spindle-specific bits, standard assignments

MD No.	SINUMERIK 880M 7 6 5 4 3 2 1 0	SINUMERIK 880T 7 6 5 4 3 2 1 0
520*	0 0 0 0 0 0 0 0	0 0 0 1 0 1 0 0
521*	0 0 0 0 0 0 0 0	1 0 0 0 0 0 0 0
522*	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0
524*	0 0 0 0 0 1 0 0	0 0 0 0 0 1 0 0

*) *0=^1st spindle*
:
5=^6th spindle

2.7 Channel-specific bits (max. 8 active channels)

MD No.	Bit No. 7	6	5	4	3	2	1	0
540*	Transformation not deselected on reset	Feed in m/min	1)	1)			G functions to PLC	Auxiliary functions to PLC
542*					Fast T function output	Fast S function output	Fast F function output	Fast D function output
544*	Output of the auxiliary functions in BCD: F	H	D	T	S	M		No F value to PLC
546*	Auxiliary functions which are output immediately on block search and not collected: F	H	D	T	S	M		No auxiliary functions on block search
548*	Abscissa (horizontal axis) for basic programming position G17/G18/G19 (coding as for axis definition)							
550*	Ordinate (perpendicular axis) for basic programming position G17/G18/G19 (coding as for axis definition)							
552*	Applicate (vertical axis) for basic programming position G17/G18/G19 (coding as for axis definition)							
554*	Axis with constant cutting speed G96 (axis no. counted from 0 to (n-1)							
556*								
558*	Thread without fine interpolator						FIFO busy	Axis addition after block search

*) 0 channel 1 *In the SINUMERIK 880 GA2, a maximum of eight active channels can be selected from*
1 channel 2 *the 16 possible.*
2 channel 3
:
15 channel 16

1) This data must have the defined value 0.

2.7.1 Channel-specific bits, standard assignments

	SINUMERIK 880M								SINUMERIK 880T							
MD No.	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
542*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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
556*	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

2.8 Axis-specific bits (max. 24 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 bef. ref. pt.	Rounding for rotary axes	Rounding whole/half degrees		No measuring circuit monitoring
564*	Axis exists[1)]	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*			No calculation of distance to go for JOG	Traversing in the rotary axis module 360°	Mirroring TO with transverse axis	Rotary axis modulo 360 degrees	Transverse axis	Auxiliary axis
576*	Axis disabled for channel 8	7	6	5	4	3	2	1
580*	Axis disabled for channel 16	15	14	13	12	11	10	9
584*								
588*								
592*								
596*								

**) 0 1st axis*
⋮
23 24th axis

1) 564 bit 7 ..... effective after POWER ON*

MD No.	Bit No. 7	6	5	4	3	2	1	0
1800*	Display resolution				Position control resolution			
1804*							Tachogen-erator com-pensation ON	
1808*			Measuring system 2 distance-coded	Measuring system 1 distance-coded	Absolute offset valid	Encoder abs. system opp. pol. mach. sys.		Absolute mode SIPOS
1820*	Contour monitoring OFF	Pulse encoder monitoring ON					Zero monitoring ON	Set value smoothing ON
1824*	Assignment of lead screw error compens-ation			Actual part position reversal 2nd measuring system			2nd measuring system available	

2.8.1 Axis-specific bits, standard assignments

	SINUMERIK 880M								SINUMERIK 880T							
MD No.	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	1	0	0	0	0	0
5603	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
5640	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
5641	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
5642	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5643	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	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5722	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5723	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1800*	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0
1804*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1808*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1820*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1824*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.9 Compensation points for leadscrew error compensation (1st SERVO-CPU)

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

– = 0
\+ = 1
no = 0
yes = 1

2.10 Compensation points for leadscrew error compensation (2nd SERVO-CPU)

MD No.	Bit No. 7	6	5	4	3	2	1	0
6250	C point 1004 yes / no	+ / –	C point 1003 yes / no	+ / –	C point 1002 yes / no	+ / –	C point 1001 yes / no	+ / –
6251	C point 1008 yes / no	+ / –	C point 1007 yes / no	+ / –	C point 1006 yes / no	+ / –	C point 1005 yes / no	+ / –
6252	C point 1012 yes / no	+ / –	C point 1011 yes / no	+ / –	C point 1010 yes / no	+ / –	C point 1009 yes / no	+ / –
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
6498	C point 1996 yes / no	+ / –	C point 1995 yes / no	+ / –	C point 1994 yes / no	+ / –	C point 1993 yes / no	+ / –
6499	C point 2000 yes / no	+ / –	C point 1999 yes / no	+ / –	C point 1998 yes / no	+ / –	C point 1997 yes / no	+ / –

– = 0
+ = 1
no = 0
yes = 1

2.11 Compensation points for leadscrew error compensation (3rd SERVO-CPU)

MD No.	Bit No. 7	6	5	4	3	2	1	0
6500	C point 2004 yes / no	+ / –	C point 2003 yes / no	+ / –	C point 2002 yes / no	+ / –	C point 2001 yes / no	+ / –
6501	C point 2008 yes / no	+ / –	C point 2007 yes / no	+ / –	C point 2006 yes / no	+ / –	C point 2005 yes / no	+ / –
6502	C point 2012 yes / no	+ / –	C point 2011 yes / no	+ / –	C point 2010 yes / no	+ / –	C point 2009 yes / no	+ / –
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
6748	C point 2996 yes / no	+ / –	C point 2995 yes / no	+ / –	C point 2994 yes / no	+ / –	C point 2993 yes / no	+ / –
6749	C point 3000 yes / no	+ / –	C point 2999 yes / no	+ / –	C point 2998 yes / no	+ / –	C point 2997 yes / no	+ / –

– = 0
+ = 1
no = 0
yes = 1

2.12 Compensation points for leadscrew error compensation (4th SERVO-CPU)

MD No.	Bit No. 7	6	5	4	3	2	1	0
6750	C point 3004		C point 3003		C point 3002		C point 3001	
	yes / no	+ / –	yes / no	+ / –	yes / no	+ / –	yes / no	+ / –
6751	C point 3008		C point 3007		C point 3006		C point 3005	
	yes / no	+ / –	yes / no	+ / –	yes / no	+ / –	yes / no	+ / –
6752	C point 3012		C point 3011		C point 3010		C point 3009	
	yes / no	+ / –	yes / no	+ / –	yes / no	+ / –	yes / no	+ / –
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
- // -								
6998	C point 3996		C point 3995		C point 3994		C point 3993	
	yes / no	+ / –	yes / no	+ / –	yes / no	+ / –	yes / no	+ / –
6999	C point 4000		C point 3999		C point 3998		C point 3997	
	yes / no	+ / –	yes / no	+ / –	yes / no	+ / –	yes / no	+ / –

– = 0
+ = 1
no = 0
yes = 1

2.13 Input units

- **Unit**

  The term "unit" is used to describe the various position control and input resolutions defined in MD 5002 and MD 1800*. The respective reference system MS (Measuring System) and IS (Input System) must be taken into account for machine data input, i.e. if the input system is subsequently changed, all machine data must be converted

  with the factor $\frac{\text{new reference system (IS)}}{\text{old reference system (IS)}}$.

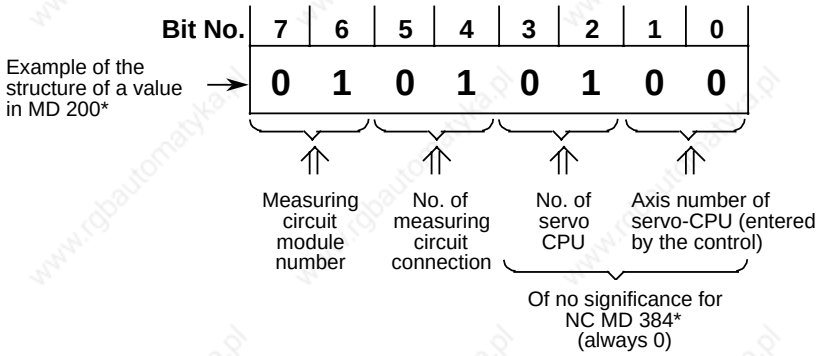
  unit = 2 position control resolutions = 1/2 µm (reference system MS)
  e.g. 1 position control resolution = 1/2 µm (MD 1800* = xxxx 0100 x.. has no significance here)
  1 unit (MS) = 1µm

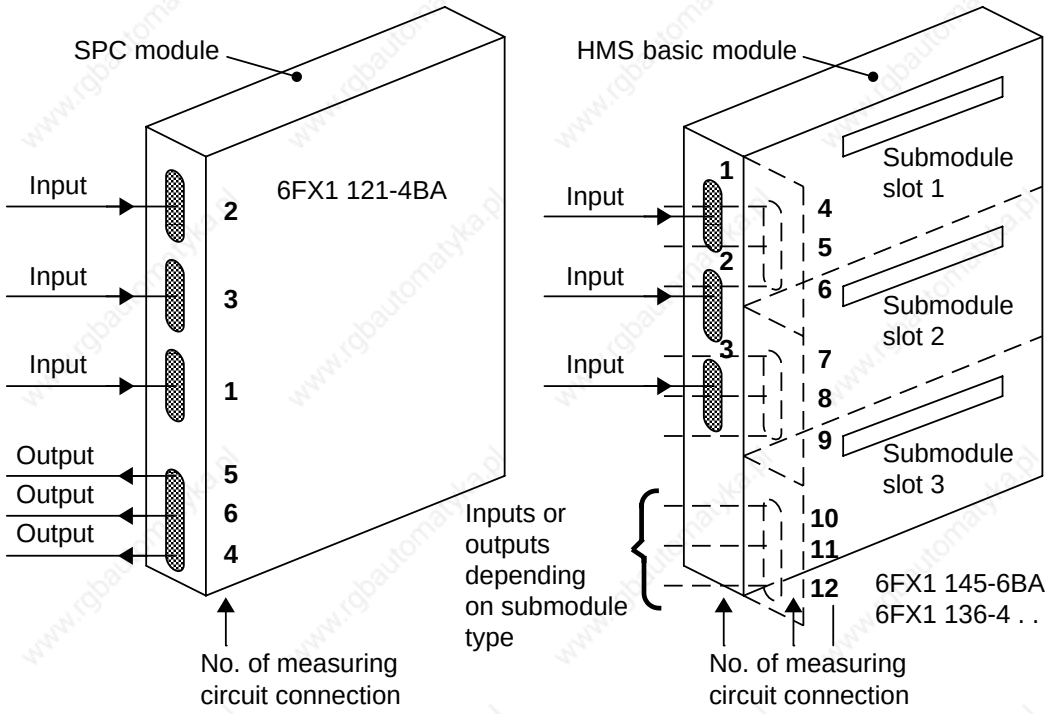
  unit = 1 input resolution (reference system IS)
  e.g. 1 input resolution = 1 µm (MD 5002 = 0100 xxxx)
  1 unit (IS) = 1 µm

- **VELO ... smallest unit of the Digital Analog Converter (DAC) for set value conversion**

  1 VELO = $\frac{10}{8192}$ = 1.22 mV is true for a 14-bit DAC

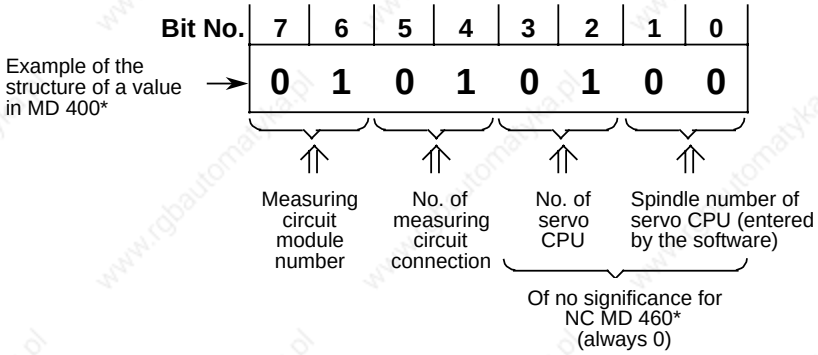
- **NC MD 200* or 1388* (assignments actual axis values)**
  NC MD 384* (assignments set axis values)

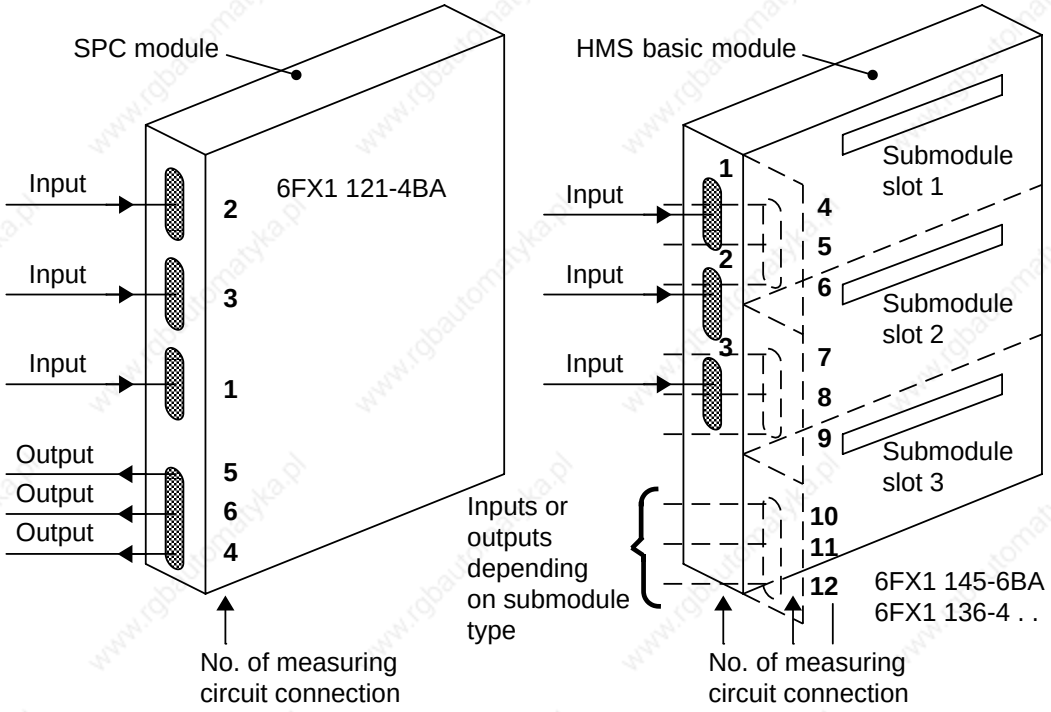




Possible values	Explanation
00 00 00 00	Axis not available at machine (only permitted with MD 564* bit 7=0)
01 01 01 00	1st meas. cct. module, 1st meas. cct. connection, 1st servo CPU
:	:
04 02 02 00	4th meas. cct. module, 2nd meas. cct. connection, 2nd servo CPU
:	:
10 12 04 00	10th meas. cct. module,12th meas. cct. connection, 4th servo CPU

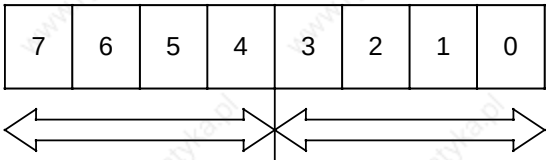
- **NC MD 400* (assignment of actual spindle values)**
  NC MD 460* (assignment of set spindle values)





Possible values	Explanation
00 00 00 00	Axis not available at machine (only permitted with MD 521* bit 7=0)
01 01 01 00	1st meas. cct. module, 1st meas. cct. connection, 1st servo CPU
:	:
04 02 02 00	4th meas. cct. module, 2nd meas. cct. connection, 2nd servo CPU
:	:
10 12 04 00	10th meas. cct. module,6th meas. cct. connection, 4th servo CPU

- **Coding of the addresses (axis names)**



Extended address (address number)

blank = 0000
1 = 0001
2 = 0010
3 = 0011
4 = 0100
5 = 0101
6 = 0110
7 = 0111
8 = 1000
9 = 1001
10 = 1010
11 = 1011
12 = 1100
13 = 1101
14 = 1110
15 = 1111

Address name

X = 0000
Y = 0001
Z = 0010
A = 0011
B = 0100
C = 0101
U = 0110
V = 0111
W = 1000
Q = 1001
E = 1010

Examples:

0000 0010=Z
0001 1001=Q1

The extended address is not permissible with angle (NC MD 5001) and radius (NC MD 5000) .

- **Possible combinations of input and position control resolutions**

Input resolution / Position control resolution	10^{-2} mm/degree	10^{-3} mm/degree	10^{-4} mm/degree	10^{-5} mm/degree	10^{-3} inch/degree	10^{-4} inch/degree	10^{-5} inch/degree	10^{-6} inch/degree
$0.5 \cdot 10^{-1}$ mm/deg.								
$0.5 \cdot 10^{-2}$ mm/deg.					X	X	X	
$0.5 \cdot 10^{-3}$ mm/deg.					X	X	X	
$0.5 \cdot 10^{-4}$ mm/deg.							X	X
$2 \cdot 10^{-4}$ mm	X	X	X	X			X	X
$0.5 \cdot 10^{-5}$ degree								
$0.5 \cdot 10^{-1}$ degree								
$0.5 \cdot 10^{-2}$ degree								
$0.5 \cdot 10^{-3}$ inch/deg.	X	X					X	
$0.5 \cdot 10^{-4}$ inch/deg.	X	X						
$0.5 \cdot 10^{-5}$ inch/deg.	X	X	X	X				
$2 \cdot 10^{-5}$ inch	X	X	X	X	X	X	X	X

Combination for : X Linear axes
Rotary axes
Linear**/**rotary axes

Note:

The display resolution must have the same unit system as the input resolution. All position control resolutions must have the same unit system. It is not absolutely necessary for the unit system of the position control resolution to conform to the unit system of the input resolution.

- **Possible combinations of display and position control resolutions**

Unit system	Position control resolutions	Display resolutions									
		mm					inch				
		10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}
mm	$0.5 \cdot 10^{-1}$ degree										
mm	$0.5 \cdot 10^{-2}$ mm/degree								X		
mm	$0.5 \cdot 10^{-3}$ mm/degree									X	
mm	$2 \cdot 10^{-4}$ mm										X
mm	$0.5 \cdot 10^{-4}$ mm/degree										X
mm	$0.5 \cdot 10^{-5}$ degree										
inch	$0.5 \cdot 10^{-1}$ degree										
inch	$0.5 \cdot 10^{-2}$ degree										
inch	$0.5 \cdot 10^{-3}$ inch/degree		X								
inch	$0.5 \cdot 10^{-4}$ inch/degree		X								
inch	$2 \cdot 10^{-5}$ inch			X							
inch	$0.5 \cdot 10^{-5}$ inch/degree			X							

Combination for: X Linear axes
Rotary axes

Note:

The display resolution must have the same unit system as the input resolution. All position control resolutions must have the same unit system. It is not absolutely necessary for the unit system of the position control resolution to conform to the unit system of the input resolution.

- **Machine data 5002, 1800***

MD 5002, input resolution

metric

Bit	7	6	5	4	mm/degree
	--	--	--	--	10^{-1}
	1	0	0	0	10^{-2}
	0	1	0	0	10^{-3}
	0	0	1	0	10^{-4}
	1	0	1	0	10^{-5}
	--	--	--	--	10^{-6}

inch

Bit	7	6	5	4	inch/degree
	--	--	--	--	10^{-1}
	--	--	--	--	10^{-2}
	0	1	0	1	10^{-3}
	1	1	0	1	10^{-4}
	1	0	1	1	10^{-5}
	0	1	1	1	10^{-6}

MD 18000, display resolution

Bit	7	6	5	4	mm/degree
	0	0	0	0	10^{-1}
	1	0	0	0	10^{-2}
	0	1	0	0	10^{-3}
	0	0	1	0	10^{-4}
	1	0	1	0	10^{-5}
	--	--	--	--	10^{-6}

Bit	7	6	5	4	inch/degree
	0	0	0	1	10^{-1}
	1	0	0	1	10^{-2}
	0	1	0	1	10^{-3}
	1	1	0	1	10^{-4}
	1	0	1	1	10^{-5}
#	--	--	--	--	10^{-6}

MD 18000, position control resolution

Bit	3	2	1	0	0.5 x mm/degree
	0	0	0	0	10^{-1}
	1	0	0	0	10^{-2}
	0	1	0	0	10^{-3}
	0	0	1	0	10^{-4}
	1	1	0	0	2×10^{-4} mm/degree
#	1	0	1	0	10^{-5}
	--	--	--	--	10^{-6}

Bit	3	2	1	0	0.5 x inch/degree
	0	0	0	1	10^{-1}
	1	0	0	1	10^{-2}
	0	1	0	1	10^{-3}
	1	1	0	1	10^{-4}
	0	0	1	1	2×10^{-5} inch/degree
#	1	0	1	1	10^{-5}
	--	--	--	--	10^{-6}

Only with rotary axes

\# Not for export version

On the SINUMERIK 880 GA2, the maximum axis speed depends on the input resolution only:

Input resolution		maximum axis speed (NC MD 540* 6=0 $^{mm}/_{min}$)		maximum axis speed (NC MD 540* 6=1 $^{m}/_{mm}$)	
0.01	mm	1072 0000	$^{mm}/_{min}$	2144 0000	$^{mm}/_{min}$
0.001	mm	1072 0000	$^{mm}/_{min}$	2144 0000	$^{mm}/_{min}$
0.000 1	mm	1072 000	$^{mm}/_{min}$	2144 000	$^{mm}/_{min}$
0.000 01	mm	1072 00	$^{mm}/_{min}$	2144 000	$^{mm}/_{min}$
0.001	inch	1072 00	$^{inch}/_{min}$		
0.000 1	inch	1072 00	$^{inch}/_{min}$		
0.000 01	inch	1072 00	$^{inch}/_{min}$		
0.000 001	inch	1072 0	$^{inch}/_{min}$		

Unit system	Position control resolution	Input resolution			
		10^{-2} [mm] [degree]	10^{-3} [mm] [degree]	10^{-4} [mm] [degree]	10^{-5} [mm] [degree]
mm	$0.5*10^{-1}$ [degree]	-- -- ±999999.9 degrees	-- -- ±999999.9 degrees	-- -- --	-- -- --
mm	$0.5*10^{-2}$ [mm] [degree]	±99999.99 mm ±3937.007 inch ±999999.99 degrees	±99999.99 mm ±3937.007 inch ±999999.99 degrees	±99999.99 mm ±3937.007 inch ±999999.99 degrees	-- -- --
mm	$0.5*10^{-3}$ [mm] [degree]	±99999.99 mm ±3937.007 inch ±99999.99 degrees	±99999.999 mm ±3937.0078 inch ±99999.999 degrees	±99999.999 mm ±3937.0078 inch ±99999.999 degrees	-- -- --
mm	$2*10^{-4}$ [mm]	±9999.99 mm ±393.700 inch --	±9999.999 mm ±393.7007 inch --	±9999.9999 mm ±393.70078 inch --	±9999.9999 mm ±393.70078 inch --
mm	$0.5*10^{-4}$ [mm] [degree]	±9999.99 mm ±393.700 inch ±9999.99 degrees	±9999.999 mm ±393.7007 inch ±9999.999 degrees	±9999.9999 mm ±393.70078 inch ±9999.9999 degrees	±9999.9999 mm ±393.70078 inch ±9999.9999 degrees
mm	$0.5*10^{-5}$ [degree]	-- -- ±999.99 degrees	-- -- ±999.999 degrees	-- -- ±999.9999 degrees	-- -- ±999.9999 degrees

Unit system	Position control resolution	Input resolution			
		10^{-3} [inch] [degree]	10^{-4} [inch] degree]	10^{-5} [inch] [degree]	10^{-6} [inch] [degree]
mm	$0.5*10^{-1}$ [degree]	-- -- --	-- -- --	-- -- --	-- -- --
mm	$0.5*10^{-2}$ [mm] [degree]	±99999.99 mm ±3937.007 inch --	±99999.99 mm ±3937.007 inch --	±99999.99 mm ±3937.007 inch --	-- -- --
mm	$0.5*10^{-3}$ [mm] [degree]	±99999.999 mm ±3937.0078 inch --	±99999.999 mm ±3937.0078 inch --	±99999.999 mm ±3937.0078 inch --	-- -- --
mm	$2*10^{-4}$ [mm]	-- -- --	-- -- --	±9999.9999 mm ±393.70078 inch --	±9999.9999 mm ±393.70078 inch --
mm	$0.5*10^{-4}$ [mm] [degree]	-- -- --	-- -- --	±9999.9999 inch ±393.70078 inch --	±9999.9999 mm ±393.70078 inch --
mm	$0.5*10^{-5}$ [degree]	-- -- --	-- -- --	-- -- --	-- -- --

± 99999.999 mm	Max. traversing range with linear axis in [mm]
± 3937.0078 inch	Max. traversing range with linear axes in [inch]
± 99999.999 degrees	Max. traversing range with rotary axes [degree] (with NC MD 572* bit 2=0)

Unit system	Position control resolution	Input resolution			
		10^{-2} [mm] [degree]	10^{-3} [mm] [degree]	10^{-4} [mm] [degree]	10^{-5} [mm] [degree]
inch	$0.5*10^{-1}$ [degree]	-- -- --	-- -- --	-- -- --	-- -- --
inch	$0.5*10^{-2}$ [degree]	-- -- --	-- -- --	-- -- --	-- -- --
inch	$0.5*10^{-3}$ [inch] [degree]	±99999.99 mm ±3937.007 inch --	±99999.999 mm ±3937.0078 inch --	-- -- --	-- -- --
inch	$0.5*10^{-4}$ [inch] [degree]	±99999.99 mm ±393.700 inch --	±9999.999 mm ±393.0078 inch --	-- -- --	-- -- --
inch	$2*10^{-5}$ [inch]	±25399.99 mm ±999.999 inch --	±25399.999 mm ±999.9999 inch --	±25399.999 mm ±999.9999 inch --	±9999.9999 mm ±421.99999 inch --
inch	$0.5*10^{-5}$ [inch] [degree]	±25399.99 mm ±999.999 inch --	±25399.999 mm ±999.9999 inch --	±25399.999 mm ±999.99999 inch --	±9999.9999 mm ±421.99999 inch --

Unit system	Position control resolution	Input resolution			
		10^{-3} [inch] [degree]	10^{-4} [inch] degree]	10^{-5} [inch] [degree]	10^{-6} [inch] [degree]
inch	$0.5*10^{-1}$ [degree]	-- -- ±99999.9 degree	-- -- --	-- -- --	-- -- --
inch	$0.5*10^{-2}$ [degree]	-- -- ±999999.9 degree	-- -- ±99999.99 degree	-- -- --	-- -- --
inch	$0.5*10^{-3}$ [inch] [degree]	±253999.99 mm ±9999.999 inch ±99999.999 degree	±253999.99 mm ±9999.999 inch ±99999.999 degree	±107374.18 mm ±9999.999 inch --	-- -- --
inch	$0.5*10^{-4}$ [inch] [degree]	±253999.99 mm ±9999.999 inch ±9999.999 degree	±253999.99 mm ±9999.9999 inch ±9999.9999 degree	±107374.18 mm ±9999.999 inch ±9999.999 degree	-- -- --
inch	$2*10^{-5}$ [inch]	±25399.99 mm ±999.999 inch --	±25399.99 mm ±999.9999 inch --	±25399.99 mm ±999.99999 inch --	±10737.418 mm ±999.99999 inch --
inch	$0.5*10^{-5}$ [inch] [degree]	±25399.99 mm ±999.999 inch ±999.999 degree	±25399.999 mm ±999.9999 inch ±999.9999 degree	±25399.999 mm ±999.99999 inch ±999.99999 degree	±10737.418 mm ±999.99999 inch ±999.99999 degree

± 99999.999 mm	Max. traversing range with linear axis in [mm]
± 3937.0078 inch	Max. traversing range with linear axes in [inch]
± 99999.999 degree	Max. traversing range with rotary axes [degree] (with NC-MD 572* bit 2=0)

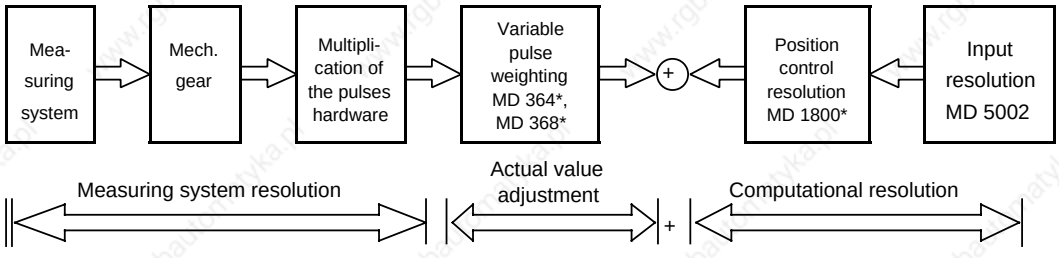
- **MD 364*, MD 368* (variable pulse weighting)**

  To generate a closed position control loop, the pulses from the digital measuring system and the accuracy of the control must be matched.

  This can be done with the following parameters:

Parameter	Symbol	Machine data	Significance
Input resolution	a	5002 Bit 4 - 7	Smallest programmable increment for axis movements and CRT displays.
Position control resolution	b	1800* Bit 0 - 3	Internal computational resolution of the control.
Spindle pitch	s		Recirculating ball screw pitch.
Pulses per rev.	p		Number of ROD encoder pulses per rev.
Mech. gear	r		Mechanical gear between motor and ROD encoder (if available).
Measuring system resolution	m		Max. resolution of the measuring system. The value serves as a basis for calcula-ting the actual value adjust-ment factors.
Grid constant	g		Period distance on a linear scale.
Multiplier for EXE	f		5-fold EXE means multiplication of the pulses arriving from the scale by 5.
Pulses for variable pulse weighting	u	364*	The fraction from MD 368* and 364* is used to adjust the measuring system resolution to the position control resolution.
Traversing path for variable pulse weighting	v	368*	

Schematic block diagram of the position control parameters:



2.14 Calculation of possible position control parameters

2.14.1 Calculation of measuring system resolution m

Case 1 The ROD encoder is mounted directly on the recirculating ball screw.

$$m = \frac{\frac{s}{P}}{4}$$

Example: s = 10 mm p = 2500 pulses/rev.

$$m = \frac{\frac{10}{2500}}{4} = 0.001 \text{ mm}$$

Case 2 The ROD encoder is mounted on the motor and there is a gear between motor and recirculating ball screw.

$$m = \frac{\frac{s}{P} \cdot r}{4}$$

Example: s = 0.2 inch p = 1000 pulses/rev.
r = 1 : 2 (2 revs. of the motors = 1 rev. of the recirculating ball screw)

$$m = \frac{\frac{0.2}{1000} \bullet \frac{1}{2}}{4} = 0.000025 \text{ inch}$$

Case 3 A linear scale with EXE is used.

$$m = \frac{\frac{g}{f}}{4}$$

Example: g = 0.02 mm f = 10

$$m = \frac{\frac{0.02}{10}}{4} = 0.001 \text{ mm}$$

Case 4 A rotary axis is used.

$$m = \frac{\frac{360}{p \cdot f}}{4}$$

Example: p = 18000 pulses/rev. f = 5

$$m = \frac{\frac{360}{18000 \cdot 5}}{4} = 0.001 \text{ degrees}$$

2.14.2 Calculation of actual value adjustment factors

The "variable pulse weighting" must be such that the measuring system resolution coincides with the position control resolution. For this it may be necessary to adapt the measuring system resolution to the position control resolution by multiplication or division.

$$\frac{m}{b} = \frac{v}{u} = \frac{\text{MD 368*}}{\text{MD 364*}}$$

The whole number values for u, v must be calculated by expanding the fraction.
The values for u, v are permitted in the range 1 to 65000.

Example: m=0.001 mm b=0.0005 mm

$$\frac{m}{b} = \frac{v}{u} = \frac{0.001}{0.0005} = 2 \rightarrow$$

MD 368* = 2
MD 364* = 1

3 PLC Machine Data

3.1 PLC machine data for operating system of PLC 1, PLC 2 (DB 60)

PLC MD No.	Designation	Standard mach. data	Max. input value	Input unit
0		0	0	
1		0	0	
2	Call time reference for timer OB5	1	1 to 3	2.5 ms
3	Call time reference for timer OB6	1	1 to 9	10 ms
4	Call time reference for timer OB7	1	1 to 255	100 ms
5	Last active Step 5 timer	64	255	
6	1st input byte for operator panel inputs	64	96	
7	1st output byte for operator panel outputs	64	112	
8	Last active channel	16	16	
9	Last active spindle	6	6	
10	Last active axis	24	24	
11	Delete threshhold input image	127	63 ... 127	
12	Delete threshhold output image	127	63 ... 127	
13				
14				
15				
16				
17	Number of wait cycles for user interface enable for computer link	1	10	
18	No. of the user interface processed on synchronization	0	31	
19	Number of function numbers	3	10	
20	Fct.no. for core sequence triggering	25	255	
21	Fct.no. for core sequence triggering	26	255	

PLC MD No.	Designation	Standard mach. data	Max. input value	Input unit
22	Fct.no. for core sequence triggering	30	255	
23	Fct.no. for core sequence triggering	0	255	
24	Fct.no. for core sequence triggering	0	255	
25	Fct.no. for core sequence triggering	0	255	
26	Fct.no. for core sequence triggering	0	255	
27	Fct.no. for core sequence triggering	0	255	
28	Fct.no. for core sequence triggering	0	255	
29	Fct.no. for core sequence triggering	0	255	
30				
31				
32				
33	Number of user interfaces for command channel (DB41)	0	8	

Assignment of PLC and PLC MD areas:

	PLC 1	PLC 2
PLC MD No.	0	200

PLC MD	DMP interface	MPC	DMP station	PLC MD standard/max. value	DMP rotary switch position
34	1	1	1	- 1/254	E
35	1	1	2	- 1/254	D
36	1	1	3	- 1/254	C
37	1	1	4	- 1/254	B
38	1	1	5	- 1/254	A
39	1	1	6	- 1/254	9
40	1	1	7	- 1/254	8
41	1	1	8	- 1/254	7
42	1	1	9	- 1/254	6
43	1	1	10	- 1/254	5
44	1	1	11	- 1/254	4
45	1	1	12	- 1/254	3
46	1	1	13	- 1/254	2
47	1	1	14	- 1/254	1
48	1	1	15	- 1/254	0
49	1	2	1	- 1/254	E
50	1	2	2	- 1/254	D
51	1	2	3	- 1/254	C
52	1	2	4	- 1/254	B
53	1	2	5	- 1/254	A
54	1	2	6	- 1/254	9
55	1	2	7	- 1/254	8
56	1	2	8	- 1/254	7
57	1	2	9	- 1/254	6
58	1	2	10	- 1/254	5
59	1	2	11	- 1/254	4
60	1	2	12	- 1/254	3
61	1	2	13	- 1/254	2
62	1	2	14	- 1/254	1
63	1	2	15	- 1/254	0
64	2	1	1	- 1/254	E
65	2	1	2	- 1/254	D
66	2	1	3	- 1/254	C
67	2	1	4	- 1/254	B
68	2	1	5	- 1/254	A
69	2	1	6	- 1/254	9
70	2	1	7	- 1/254	8
71	2	1	8	- 1/254	7
72	2	1	9	- 1/254	6
73	2	1	10	- 1/254	5
74	2	1	11	- 1/254	4
75	2	1	12	- 1/254	3
76	2	1	13	- 1/254	2
77	2	1	14	- 1/254	1
78	2	1	15	- 1/254	0

PLC MD	DMP interface	MPC	DMP station	PLC MD standard/max. value	DMP rotary switch position
79	2	2	1	- 1/254	E
80	2	2	2	- 1/254	D
81	2	2	3	- 1/254	C
82	2	2	4	- 1/254	B
83	2	2	5	- 1/254	A
84	2	2	6	- 1/254	9
85	2	2	7	- 1/254	8
86	2	2	8	- 1/254	7
87	2	2	9	- 1/254	6
88	2	2	10	- 1/254	5
89	2	2	11	- 1/254	4
90	2	2	12	- 1/254	3
91	2	2	13	- 1/254	2
92	2	2	14	- 1/254	1
93	2	2	15	- 1/254	0
94	3	1	1	- 1/254	E
95	3	1	2	- 1/254	D
96	3	1	3	- 1/254	C
97	3	1	4	- 1/254	B
98	3	1	5	- 1/254	A
99	3	1	6	- 1/254	9
100	3	1	7	- 1/254	8
101	3	1	8	- 1/254	7
102	3	1	9	- 1/254	6
103	3	1	10	- 1/254	5
104	3	1	11	- 1/254	4
105	3	1	12	- 1/254	3
106	3	1	13	- 1/254	2
107	3	1	14	- 1/254	1
108	3	1	15	- 1/254	0
109	3	2	1	- 1/254	E
110	3	2	2	- 1/254	D
111	3	2	3	- 1/254	C
112	3	2	4	- 1/254	B
113	3	2	5	- 1/254	A
114	3	2	6	- 1/254	9
115	3	2	7	- 1/254	8
116	3	2	8	- 1/254	7
117	3	2	9	- 1/254	6
118	3	2	10	- 1/254	5
119	3	2	11	- 1/254	4
120	3	2	12	- 1/254	3
121	3	2	13	- 1/254	2
122	3	2	14	- 1/254	1
123	3	2	15	- 1/254	0

PLC MD No.	Designation	Standard mach. data	Max. input value	Input unit
124	Byte number of 1st alarm byte	–1	127	
125	Byte number of 2nd alarm byte	–1	127	
126	Byte number of 3rd alarm byte	–1	127	
127	Byte number of 4th alarm byte	–1	127	
128	Reserved			
129	Reserved			
130	No. of interrupt byte of 1st int. DMP interface, 1st line	–1	254	
131	No. of interrupt byte of 1st int. DMP interface, 2nd line	–1	254	
132	No. of interrupt byte of 2nd int. DMP interface, 1st line	–1	254	
133	No. of interrupt byte of 2nd int. DMP interface, 2nd line	–1	254	
134	No. of interrupt byte of 3rd int. DMP interface, 1st line	–1	254	
135	No. of interrupt byte of 3rd int. DMP interface, 2nd line	–1	254	
136	No. of configuration block for free configuration	0	255; 1255	

3.2 General PLC machine data for function blocks of PLC 1, PLC 2 (DB 61, tool management)

PLC MD No.	Machine data words for function blocks	
	High byte (DL)	Low byte (DR)
2000 : 2077	Reserved for tool management : Reserved for tool management	
2078 : 2089	Reserved for computer link : Reserved for computer link	
2090	Reserved for loading/unloading of code carrier	
2091 : 2095	Reserved : Reserved	
2096 : 2119	Reserved for computer link : Reserved for computer link	
2120 : 2139	Reserved for tool management : Reserved for tool management	
2140 : 2149	Reserved	

Note:

Refer to the documentation on the individual FB packages for more detailed explanation

Assignment of PLC and PLC MD area:

	PLC 1	PLC 2
PLC MD No.	2000 to 2149	2250 to 2399

3.3 User PLC machine data for PLC 1, PLC 2 (DB 62)

PLC MD No.	Designation	Standard mach. data	Input limits	Input unit
4000		0	± 16383	
4001		0	- // -	
4002		0	- // -	
4003		0	- // -	
4004		0	- // -	
4005		0	- // -	
4006		0	- // -	
4007		0	- // -	
4008		0	- // -	
4009		0	- // -	
4010		0	- // -	
4011		0	- // -	
4012		0	- // -	
4013		0	- // -	
4014		0	- // -	
4015		0	- // -	
4016		0	- // -	
4017		0	- // -	
4018		0	- // -	
⋮			⋮	
4048		0	- // -	
4049		0	// -	

Assignment of PLC and PLC MD area:

	PLC 1	PLC 2
PLC MD No.	4000 to 4049	4100 to 4149

3.4 General bits (DB63)

Channel-specific processing								
PLC MD No. DW No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
6000 DL 0	Signals from/to NC channel							
	8	7	6	5	4	3	2	1
6001 DR 0	Signals from/to NC channel							
	16	15	14	13	12	11	10	9
6002 DL 1								
6003 DR 1	Signals from NC channel							
	8	7	6	5	4	3	2	1
6004 DL 2	Signals from NC channel							
	16	15	14	13	12	11	10	9
6005 DR 2								
6006 DL 3	Feed disable and read-in disable to NC channel							
	8	7	6	5	4	3	2	1
6007 DR 3	Feed disable and read-in disable to NC channel							
	16	15	14	13	12	11	10	9
6008 DL 4								
6009 DR 4	M decoding with extended address for NC channel							
	8	7	6	5	4	3	2	1
6010 DL 5	M decoding with extended address for NC channel							
	16	15	14	13	12	11	10	9
6011 DR 5								

Assignment of PLC and PLC MD area:

	PLC 1	PLC 2
PLC MD No.	6000 to 6099	6100 to 6199

Spindle-specific processing								
PLC MD No. DW No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
6012 DL 6	Signals from/to spindle							
			6	5	4	3	2	1
6013 DR 6								
6014 DL 7	Signals from spindle							
			6	5	4	3	2	1
6015 DR 7								

Assignment of PLC and PLC MD area:

	PLC 1	PLC 2
PLC MD No.	6000 to 6099	6100 to 6199

Axis-specific processing								
PLC MD No. DW No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
6016 DL 8	Signals from/to axis							
	8	7	6	5	4	3	2	1
6017 DR 8	Signals from/to axis							
	16	15	14	13	12	11	10	9
6018 DL 9	Signals from/to axis							
	24	23	22	21	20	19	18	17
6019 DR 9								
6020 DL 10								
6021 DR 10	Signals from axis							
	8	7	6	5	4	3	2	1
6022 DL 11	Signals from axis							
	16	15	14	13	12	11	10	19
6023 DR 11	Signals from axis							
	24	23	22	21	20	19	18	17
6024 DL 12								
6025 DR 12								

Assignment of PLC and PLC MD area:

	PLC 1	PLC 2
PLC MD No.	6000 to 6099	6100 to 6199

General PLC machine data for operating system								
PLC MD No. DW No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
6026 DL 13	Serial interface		Deselect aut. NC start inhibit	Operator panel switch-over	Save FY 200 - FY 255	Write to PLC data disabled via @- command	Command channel active	
6027 DR 13					Inputs from input submodule 4	3	2	1
6028 DL 14					Outputs to output submodule 4	3	2	1
6029 DR 14					Message in target channel	ELG signals to NC		T/H word routing
6030 DL 15	Error and operational messages in non-active channel no. 8	7	6	5	4	3	2	1
6031 DR 15	Error and operational messages in non-active channel no. 16	15	14	13	12	11	10	9

Assignment of PLC and PLC MD area:

	PLC 1	PLC 2
PLC MD No.	6000 to 6099	6100 to 6199

Error messages								
PLC MD No. DW No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
6032 DL 16	Error messages SIGNALS TO NC CHANNEL							
	DR 9	DL 9	DR 8	DL 8	DR 7	DL 7	DR 6	DL 6
6033 DR 16	Error messages SIGNALS TO NC CHANNEL							
					DR 11	DL 11	DR 10	DL 10
6034 DL 17	Error messages SIGNALS TO SPINDLE							
							DR K+3	DL K+3
6035 DR 17	Error messages SIGNALS TO AXIS							
							DR K+3	DL K+3
6036 DL 18	Error messages DB 58 MESSAGES							
	DR 4	DL 4	DR 3	DL 3	DR 2	DL 2	DR 1	DL 1
6037 DR 18	Error messages DB 58 MESSAGES							
	DR 8	DL 8	DR 7	DL 7	DR 6	DL 6	DR 5	DL 5
6038 DL 19	Error messages DB 58 MESSAGES							
	DR 12	DL 12	DR 11	DL 11	DR 10	DL 10	DR 9	DL 9
6039 DR 19	Error messages DB 58 MESSAGES							
		DL 16	DR 15	DL 15	DR 14	DL 14	DR 13	DL 13

Assignment of PLC and PLC MD area:

	PLC 1	PLC 2
PLC MD No.	6000 to 6099	6100 to 6199

Operational messages								
PLC MD No. DW No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
6040 DL 20	Operational messages SIGNALS TO NC CHANNEL							
	DR 9	DL 9	DR 8	DL 8	DR 7	DL 7	DR 6	DL 6
6041 DR 20	Operational messages SIGNALS TO NC CHANNEL							
					DR 11	DL 11	DR 10	DL 10
6042 DL 21	Operational messages SIGNALS TO SPINDLE							
							DR K+3	DL K+3
6043 DR 21	Operational messages SIGNALS TO AXIS							
							DR K+3	DL K+3
6044 DL 22	Operational messages DB 58 MESSAGES							
	DR 4	DL 4	DR 3	DL 3	DR 2	DL 2	DR 1	DL 1
6045 DR 22	Operational messages DB 58 MESSAGES							
	DR 8	DL 8	DR 7	DL 7	DR 6	DL 6	DR 5	DL 5
6046 DL 23	Operational messages DB 58 MESSAGES							
	DR 12	DL 12	DR 11	DL 11	DR 10	DL 10	DR 9	DL 9
6047 DR 23	Operational messages DB 58 MESSAGES							
		DL 16	DR 15	DL 15	DR 14	DL 14	DR 13	DL 13

Note: The definitions apply to all channels, axes, spindles

Assignment of PLC and PLC MD area:

	PLC 1	PLC 2
PLC MD No.	6000 to 6099	6100 to 6199

Machine data bits								
PLC MD No. DW No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
6048 DL 24	PLC STOP for processing timeout in							
	OB7	OB6	OB5	OB4	OB3	OB2		
6049 DR 24							IP/WF modules inserted	Access to PLC I/O devices
6050 DL 25	Disabling of							
	OB7	OB6	OB5	OB4	OB3	OB2		
6051 DR 25							PG mode: 0 155U 1 135WB	PLC mode
6052 DL 26								
6053 DR 26								
6054 DL 27								
6055 DR27								
6056 DL28								
6057 DR 28								
:								
6060 DL 30	PLC Stop on failure of							
					Servo CPU 4	Servo CPU 3	Servo CPU 2	Servo CPU 1
6061 DR 30	PLC Stop on failure of							
							NC CPU 2	NC CPU 1
6063							always 1	
6064								
6065								

6051	bit 0	= 0	Alarm control possible after each command
	bit 0	= 1	Alarm control only possible at block bounderies
6055 to	bit	= 0	Positive edge triggers the interrupt
6057	bit	= 1	Negative edge triggers the interrupt

Assignment of PLC and PLC MD area:

	PLC 1	PLC 2
PLC MD No.	6000 to 6099	6100 to 6199

Machine data bits								
PLC MD No. DW No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
6066 DL 33	Reserved							
6067 DR 33	Reserved							
6068 DL 34	Interrupt-triggering edge for interrupt inputs 1st interface DMP interface					1st line, bit 0...7		0≙ pos. edge 1≙ neg. edge
6069 DR 34	Interrupt-triggering edge for interrupt inputs 1st interface DMP interface					2nd line, bit 0...7		0≙ pos. edge 1≙ neg. edge
6070 DL 35	Interrupt-triggering edge for interrupt inputs 2nd interface DMP interface					1st line, bit 0...7		0≙ pos. edge 1≙ neg. edge
6071 DR 35	Interrupt-triggering edge for interrupt inputs 2nd interface DMP interface					2nd line, bit 0...7		0≙ pos. edge 1≙ neg. edge
6072 DL 36	Interrupt-triggering edge for interrupt inputs 3rd interface DMP interface					1st line, bit 0...7		0≙ pos. edge 1≙ neg. edge
6073 DR 36	Interrupt-triggering edge for interrupt inputs 3rd interface DMP interface					2nd line, bit 0...7		0≙ pos. edge 1≙ neg. edge
6074 DL 37	Enabling the interrupt inputs 1st interface DMP interface					1st line, bit 0...7		0≙ pos. edge 1≙ neg. edge
6075 DR 37	Enabling the interrupt inputs 1st interface DMP interface					2nd line, bit 0...7		0≙ pos. edge 1≙ neg. edge
6076 DL 38	Enabling the interrupt inputs 2nd interface DMP interface					1st line, bit 0...7		0≙ pos. edge 1≙ neg. edge
6077 DR 38	Enabling the interrupt inputs 2nd interface DMP interface					2nd line, bit 0...7		0≙ pos. edge 1≙ neg. edge
6078 DL 39	Enabling the interrupt inputs 3rd interface DMP interface					1st line, bit 0...7		0≙ pos. edge 1≙ neg. edge
6079 DR 39	Enabling the interrupt inputs 3rd interface DMP interface					2nd line, bit 0...7		0≙ pos. edge 1≙ neg. edge

Assignment of PLC and PLC MD area:

	PLC 1	PLC 2
PLC MD No.	6000 to 6099	6100 to 6199

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

Assignment of PLC and PLC MD area:

	PLC 1	PLC 2
PLC MD No.	6000 to 6099	6100 to 6199

The SINUMERIK 880 GA2 does not incorporate the PLC machine data 6400 to 6519, because it cannot process global I/Os.

The PLC machine data 6560 to 6583 (PLC stop on I/O module failure) are not incorporated in the SINUMERIK 880 GA2. The PLC always goes to STOP if such a fault occurs.

3.5 General PLC machine data bits for function blocks PLC 1, PLC 2 (DB64)

Machine data bits for function blocks								
PLC MD No. DW No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
m+0 DL 0	Reserved for computer link							
m+1 DR 0	See documentation on FB packages 4+5 for explanation							
:	:							
m+5 DR 2	:							
:								
:								
m+10 DL 5	Reserved for tool management							
m+11 DR 5	See documentation on FB packages 1+2 for explanation							
:								
m+43 DR 21	:							
m+44 DL 22	Reserved for FB package 0, message groups See documentation on Interface Signals Section 19.3.3 for explanation							
m+45 DR 22								
m+46 DL 23	Reserved for computer link							
m+47 DR 23	See documentation on FB packages 4+5 for explanation							
:								
m+79 DR39								

Assignment of PLC and PLC MD area:

	PLC 1	PLC 2
PLC MD No.	7000 to 7079	7250 to 7329

3.6 User PLC machine data bits for PLC 1, PLC 2 (DB 65)

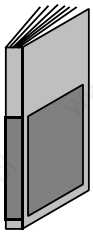
PLC MD No. DW No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
8000 DL 0								
8001 DR 0								
8002 DL 1								
8003 DR 1								
8004 DL 2								
8005 DR 2								
8006 DL 3								
8007 DR 3								
8008 DL 4								
8009 DR 4								
:								
:								
8048 DL 24								
8049 DR 24								

Assignment of PLC and PLC MD area:

	PLC 1	PLC 2
PLC MD No.	8000 to 8049	8050 to 8099

4 Cycles Machine Data

The cycles machine data are active only if you use the measuring cycles from Version 20 onwards.
For details on cycles machine data please refer to



Start-up Guide
Measuring Cycles, Version 20 and 30

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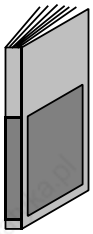
Order number: see SINUMERIK Documentation List)



5 NC Setting Data

5.1 General values

SD No.	Designation	Standard value	Max. input value	Reference system	Input unit
0	Dry run feedrate	0	24000	IS	1000 units/min
1	Dyn. smoothing time thread	0	5		2^n-1x IPO clock

5.1.1 Overview of ELG transmission parameters

Setting data No.			Transmission parameters	LA	$K_ü$
FA1	FA2	FA3			
SD10	**SD20**	**SD30**	Numerator	1	1st fict. leading axis
SD11	**SD21**	**SD31**	Denominator		
SD12	**SD22**	**SD32**	Numerator	2	2nd fict. leading axis
SD13	**SD23**	**SD33**	Denominator		
SD14	**SD24**	**SD34**	Numerator	3	1st real leading axis
SD15	**SD25**	**SD35**	Denominator		
SD16	**SD26**	**SD36**	Numerator	4	2nd real leading axis
SD17	**SD27**	**SD37**	Denominator		
SD18	**SD28**	**SD38**	Numerator	5	3rd real leading axis
SD19	**SD29**	**SD39**	Denominator		

Input unit: Floating point format with sign

Max. input value: 99 999 999 (8 digits)
- A maximum of 7 places behind the decimal point can be specified;
  e.g. 0.1234567

Max. $K_ü$ (transmission ratio) 1000

5.1.2 Transmission parameters for synchronous spindles

SD No.	Modific-ations	Designation	Standard value	Maximum input value	Input unit
14		Transmission ratio FS1, numerator	0	99 999 999	–
15		Transmission ratio FS1, denominator	1	99 999 999	–
24		Transmission ratio FS2, numerator	0	99 999 999	–
25		Transmission ratio FS2, denominator	1	99 999 999	–
34		Transmission ratio FS3, numerator	0	99 999 999	–
35		Transmission ratio FS3, denominator	1	99 999 999	–

5.1.3 Parameters for analog channels

SD No.	Analog channel	Designation	Standard value	Maximum input value	Input unit
40	1	Assignment of output cell	0	179	-
41		Factor for right shift or division	0	255	1
42		Factor for left shift or multipl.	0	- 127 to +128	1
43		Offset value	0	± 16383	1
44	2	Assignment of output cell	0	179	-
45		Factor for right shift or division	0	255	1
46		Factor for left shift or multipl.	0	- 127 to +128	1
47		Offset value	0	± 16383	1
48	3	Assignment of output cell	0	179	
49		Factor for right shift or division	0	255	1
50		Factor for left shift or multipl.	0	- 127 to +128	1
51		Offset value	0	± 16383	1
52	4	Assignment of output cell	0	179	-
53		Factor for right shift or division	0	255	1
54		Factor for left shift or multipl.	0	- 127 to +128	1
55		Offset value	0	± 16383	1

Note:

The setting data 40 - 43 are used as parameterization SDs also when starting up the ”Tapping without compensating chuck” function. See Start-up Guide, Description of Functions for more details.

5.1.4 ELG parameters for synchronization of following axis (FA) with leading axis (LA)

SD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
56	Synchronization position FA1	0	1 070 000	IS	1)
57	Synchronization position of LA for FA1	0	1 070 000	IS	1)
58	LA number for synchronization with FA1	0	5	-	-
59	Synchronization position FA2	0	1 070 000	IS	1)
60	Synchronization position of LA for FA2	0	1 070 000	IS	1)
61	LA number for synchronisation with FA2	0	5	-	-
62	Synchronization position FA3	0	1 070 000	IS	1)
63	Synchronization position of LA for FA3	0	1 070 000	IS	1)
64	LA number for synchronization with FA3	0	5	-	-

5.2 Channel-specific values

SD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
200*	Scale factor	1	99.999	-	-
204*	Thread start angle	0	359.999	-	degree

1) Input with 3 decades is possible

**) 0 Channel 1*
: : : :
7 Channel 8

5.3 Axis-specific values (max. 24 axes)

SD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
300*	Min. working area limitation	-99999.999 -99999999	±99999.999 ±99999999	IS	mm or inch
304*	Max. working area limitation	99999.999 99999999	±99999.999 ±99999999	IS	mm or inch
308*					
312*	Scale centre NC	0	±99999.999 ±99999999	IS	mm or inch
316*	Scale centre simulation	0	±99999.999 ±99999999	IS	mm or inch

**)* *0 Axis 1*
: : : :
23 Axis 24

5.4 Spindle-specific values (max. 6 spindles)

SD No.	Designation	Standard value	Maximum input value	Reference system	Input unit	
400*						
401*	Progr. spindle speed limitation	0	99999		rpm	**)
402*	Oriented spindle stop	0	35999		1/100 degree	
403*	Spindle speed limitation	100	99999		rpm	

**)* *0 Spindle 1*
: : :
5 Spindle 6

***)* *Input resolution 0.1 rpm, if NC-MD 520* is set.*

5.5 General bits

SD No.	Bit No. 7	6	5	4	3	2	1	0
5000	Calculate overtravel compensation					Function expansion for UMS3/4 L93/L95/L98	L903/L930	L81-L89
5001	Addition channel 3 on channel 4	Addition channel 1 on channel 2						Display workpiece-related act. value system
5002								
5003		Shift/ multiplication	Shift/ multiplication	Shift/ multiplication	Shift/ multiplication	D/A converter ON/OFF	Shift/ multiplication	D/A converter ON/OFF

5.5.1 Overview of ELG setting data bits

SD No.	Bit No. 7	6	5	4	3	2	1	0
FA1: 5004 **FA2: 5006** **FA3: 5008**	Calculate new $K_ü$	Acceleration limitation synchronization	Enable emergency retraction	Compensatory controller ON		FA overlay ON	Synchronization ON	LINK ON
FA1: 5005 **FA2: 5007** **FA3: 5009**	Activate new $K_ü$		Synchronization START					

5.5.2 Overview of synchronous spindle setting data bits

SD No.	Bit No. 7	6	5	4	3	2	1	0
FS1 5004 **FS2 5006** **FS3 5008**	Calculate new $K_ü$	Acceleration limitation synchronization	Enable emergency retraction	Compensatory controller On		FS overlay On		FS in synchronous operation
FS1 5005 **FS2 5007** **FS3 5009**	Activate new $K_ü$							

5.6 Bits for 1st to 4th serial interface

SD No.	Bit No. 7	6	5	4	3	2	1	0
5010 5030	Read in device identifier 1st 3rd RS232C (V.24)							
5011 5031	Number of stop bits		Read in transmission format 1st, 3rd RS232C (V.24) odd parity	with parity		Baud rate		
5012 5032	Read out device identifier 1st 3rd RS232C (V.24)							
5013 5033	Number of stop bits		Read out transmission format 1st, 3rd RS232C (V.24) odd parity	with parity		Baud rate		
5014 5034	X on start character 1st 3rd RS232C (V.24) (value e.g. 11_H)							
5015 5035	X off start character 1st 3rd RS232C (V.24) (value e.g. 13_H)							
5016 5036	Special bits 1st, 3rd RS232C (V.24) Start without Xon	Progr.start with LF	End of block with CR LF	Punching-out in EIA.Code	Stop with end of transmission character	Evaluate readiness for operation	No leader or trailer	Read in program from System 3/8
5017 5037						Output of MD 0	Erase program without reorganize	Switch off time monitoring
5018 5038	Read in device identifier 2nd 4th RS232C (V.24)							
5019 5039	Number of stop bits		Read in transmission format 2nd, 4th RS232C (V.24) odd parity	with parity		Baud rate		
5020 5040	Read in device identifier 2nd 4th RS232C (V.24)							
5021 5041	Number of stop bits		Read out transmission format 2nd, 4th RS232C (V.24) odd parity	with parity		Baud rate		
5022 5042	X on stop character 2nd 4th RS232C (V.24) (value e.g. 11_H)							
5023 5043	X off stop character 2nd 4th RS232C (V.24) (value e.g. 13_H)							

SD No.	Bit No. 7	6	5	4	3	2	1	0
5024 5044	Special bits 1st, 3rd RS232C (V.24) Start without Xon	Progr.start with LF	End of block with CR LF	Output in EIA code	Stop with end of transmission character	Evaluate readiness for operation	No leader or trailer	Read in program from system 3/8
5025 5045						Output of MD 0	Erase prog. without reorganize	Switch off time monitoring
5026 5046	1st/2nd RS232C (V.24) EIA code for "@" (value e.g. $6D_H$) 3rd/4th RS232C (V.24)							
5027 5047	1st/2nd RS232C (V.24) EIA code for":" (value e.g. 46_H) 3rd/4th RS232C (V.24)							
5028 5048	1st/2nd RS232C (V.24) End of transmission character (value e.g. 03_H) 3rd/4th RS232C (V.24)							
5029 5049	1st/2nd RS232C (V.24) EIA code for (value e.g. "= " 3rd/4th RS232C (V.24)							
5050	1st/2nd RS232C (V.24) EIA code for "["							
5051	1st/2nd RS232C (V.24) EIA code for "]"							
5052	1st/2nd RS232C (V.24) EIA code for ","							
5053 5059	Reserved DIO							
5060	3rd/4th RS232C (V.24) EIA code for "["							
5061	3rd/4th RS232C (V.24) EIA code for "]"							
5062	3rd/4th RS232C (V.24) EIA code for ","							
5063 to 5069								

Setting data 1st, 3rd RS232C (V.24) Setting data 2nd, 4thRS232C (V.24)	*10/30 *18/38	*11/31 *19/39	*12/32 *20/40	*13/33 *21/41	*14/34 *22/24	*15/35 *23/43	*16/36 *24/44

Device	Bit pattern						
PG685 with CP/M86 1200 baud	0000 0000	1100 0100	0000 0000	1100 0100	xxxx xxxx	xxxx xxxx	xx1x 1xxx
GNT reader (Option B02/B03)	0000 0000	1100 0111	xxxx xxxx	xxxx xxxx	xxxx xxxx	xxxx xxxx	0000 0000
Fanuc hand-held reader	0000 0001	1100 0110	xxxx xxxx	xxxx xxxx	0001 0001	1001 0011	0000 0000
PT80 300 baud	0000 0000	1100 0010	0000 0000	1100 0010	xxxx xxxx	xxxx xxxx	0000 0000
PT88 9600 baud V.24 RS232C	xxxx xxxx	xxxx xxxx	0000 0000	1100 0111	xxxx xxxx	xxxx xxxx	0000 0000
WS 800	0000 0000	1100 0111	0000 0000	1100 0111	xxxx xxxx	xxxx xxxx	xx1x 1xxx

Baud rate settings	
0000	110 baud
0001	150 baud
0010	300 baud
0011	600 baud
0100	1200 baud
0101	2400 baud
0110	4800 baud
0111	9600 baud
1000	19200 baud

Device identifiers	
0000 0000 . .	Line-controlled devices (RTS line)
0000 0001 . .	XON/XOFF controlled devices
0000 0010 . .	
0000 0011 . .	Siemens prog. workstation PD...PG
0000 0100 . .	PG 685 (PLC selection)
0001 0010 . .	VTE 340
0001 0011 . .	VTE-LPT

5.7 Channel-specific SD bits

SD No.	Bit No. 7	6	5	4	3	2	1	0
540*							Spindle converter 1)	Axis converter active
542*								
544*								

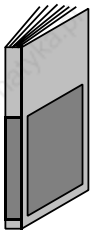
5.8 Axis-specific SD bits

SD No.	Bit No. 7	6	5	4	3	2	1	0
560*					Scale factor effective in simulation	Scale factor effective at machine	Rapid overide not effective	Feedrate override not effective

1) The spindle converter can be activated only via the PLC.

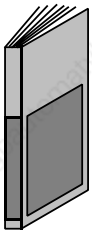
5.9 Cycles setting data

The cycles setting data are active only if you use the measuring cycles from Version 20 onwards. For details on cycles setting 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)

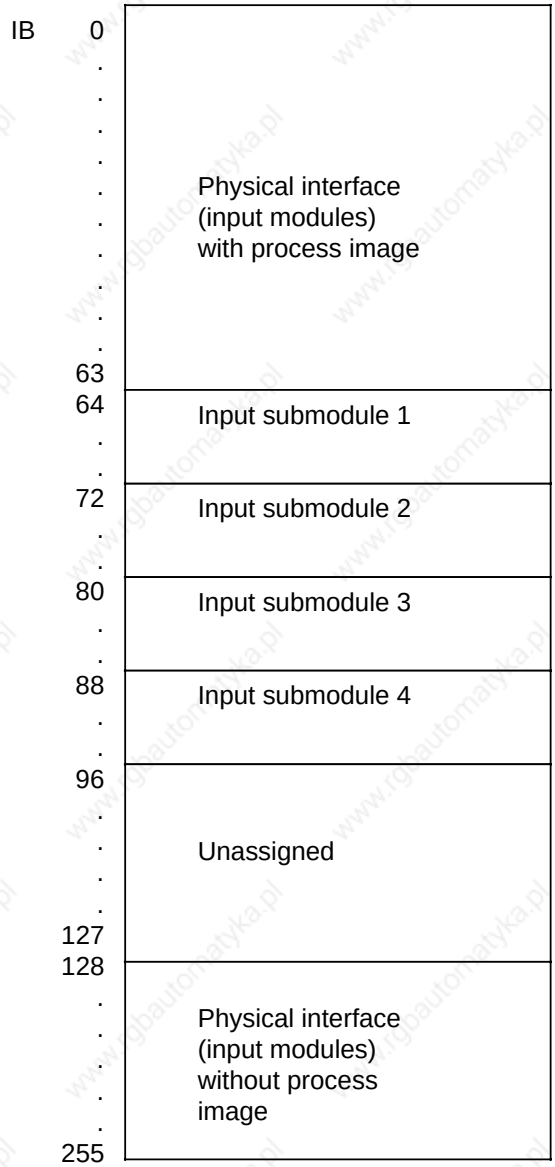


6 PLC Interface

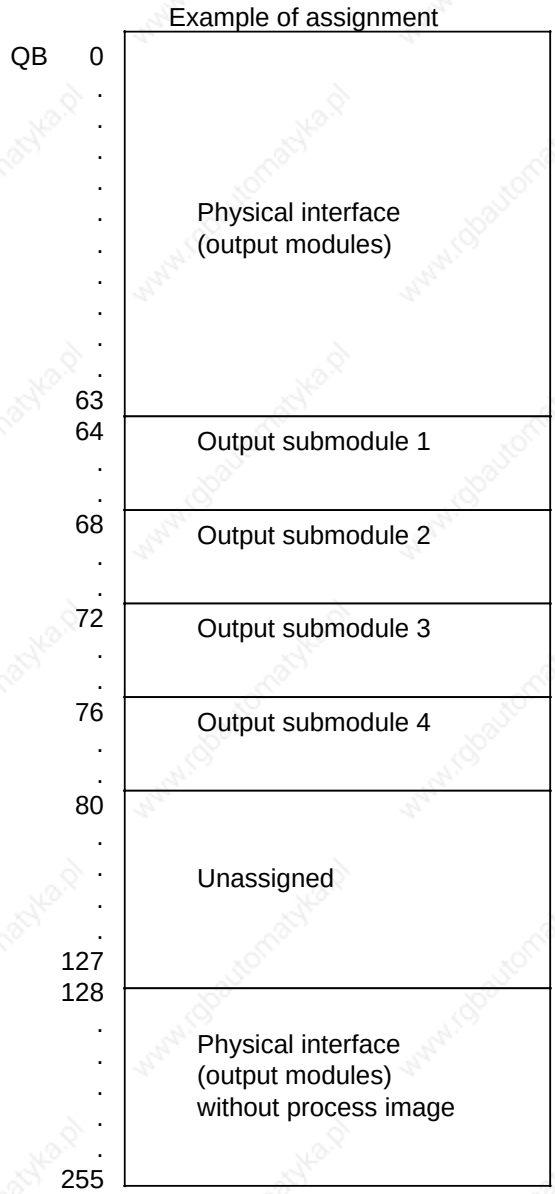
6.1 Overview PLC interface

6.1.1 Inputs

Example of assignment

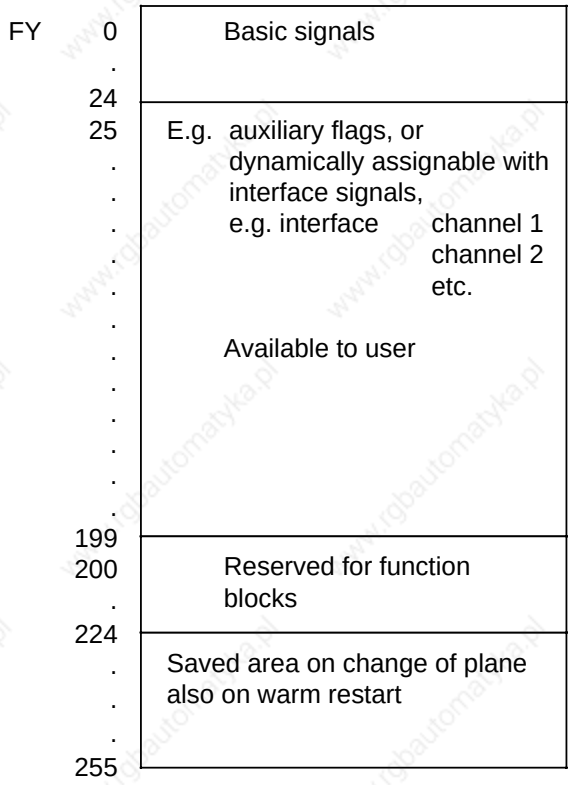


6.1.2 Outputs



Output 127.7 is assigned by internal signals!

6.1.3 Flags



6.1.4 Data blocks

6.1.4.1 Data blocks of class DB

Data blocks DB 1 to DB 189 are reserved for Siemens applications.
Data blocks DB 190 to DB 255 can be used by the user.
DB 150...DB182 are additionally used by the system, if FB package 1 is used.

DB No.	DB design.	DB name	Pack-age
0		Assigned (PLC S5-155U)	
1	DIAG-DB	Diagnostic DB (PLC135WB)	OS
2	STATUS-DB	PLC status channel	OS
3	DATKAN-DB	PLC data channel	OS
4	FM/BM-DB	Error and operational messages	OS
5		Assigned S5-155U	OS
6		Assigned S5-155U	OS
7			
8			
9			
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
14 *	NS KN 5	Interface NC channel 5	OS
15 *	NS KN 6	Interface NC channel 6	OS
16 *	NS KN 7	Interface NC channel 7	OS
17 *	NS KN 8	Interface NC channel 8	OS
18 *	NS KN 9	Interface NC channel 9	OS
19 *	NS KN 10	Interface NC channel 10	OS
20 *	NS KN 11	Interface NC channel 11	OS
21 *	NS KN 12	Interface NC channel 12	OS
22 *	NS KN 13	Interface NC channel 13	OS
23 *	NS KN 14	Interface NC channel 14	OS
24 *	NS KN 15	Interface NC channel 15	OS
25 *	NS KN 16	Interface NC channel 16	OS
26			
27			
28			
29	NS ELG	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 for 880 N (tool management)	
34	E-PU	Input buffer, computer link	CL
35	A-PU	Output buffer, computer link	CL
36 *	DUE NC	Interface for data transfer NC, COM PLC	OS
37 *	SER SCH.	Interface for serial interface	OS
38	RK:ZU-DB	Status DB computer link	CL
39			
40 *	NS BEDT.	Interface operator panel	OS
41 *	WS KOMK	Command channel	OS

Abbreviations:

BS Operating system
RK Computer link

Note:

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

DB No.		DB design.	DB name	Pack-age
42				
43		DB-ZYKLEN	DB for calculation and measurement	CP
44				
45				
46			Assigned S5-155U	
47			Assigned S5-155U	
48	*	NS COM	Interface to communications area	OS
49			Assigned S5-155U	OS
50	*	E : PLC I	Input signals from PLC I	OS
51	*	A : PLC I	Output signals to PLC I	OS
52	*	E : PLC II	Input signals from PLC II	OS
53	*	A : PLC II	Output signals to PLC II	OS
54				OS
55				OS
56			Assigned S5-155U	
57			Assigned S5-155U	
58	*	MELD	Interface for general messages	OS
59		DB-Zentral	Central DB in link RAM	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				OS
68	*	SEA WO	Set-up user DB words	
69				
70				
71	*	SEA BI	Set-up user DB bits	OS
72			Assigned S5-155U	
73			Assigned S5-155U	
74			Assigned S5-155U	
75			Assigned S5-155U	
76		QUIT FM	Acknowledgement bytes error messages	0
77		DB FM/BM	DB status words FM/BM	0
78		QUIT BM	Acknowledgement bytes operational messages	0
79		FLANK FM	Signal edge bytes error messages	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
84		LMDKN 5	List for M decoding NC channel 5	UR
85		LMDKN 6	List for M decoding NC channel 6	UR
86		LMDKN 7	List for M decoding NC channel 7	UR
87		LMDKN 8	List for M decoding NC channel 8	UR
88		LMDKN 9	List for M decoding NC channel 9	UR
89		LMDKN 10	List for M decoding NC channel 10	UR
90		LMDKN 11	List for M decoding NC channel 11	UR
91		LMDKN 12	List for M decoding NC channel 12	UR
92		LMDKN 13	List for M decoding NC channel 13	UR
93		LMDKN 14	List for M decoding NC channel 14	UR
94		LMDKN 15	List for M decoding NC channel 15	UR
95		LMDKN 16	List for M decoding NC channel 16	UR

Abbreviations:

UR User block
OS Operating system
0 FB Package 0
CL Computer link
CP Cycle package

Note:

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

DB No.	DB design.	DB name	Package
96			
97			
98			
99	Log-Part	Assignment UI/logic partner destination 2)	CL
100		Reserved	
101	EIN ASS	Input user interface	OS
102	AUS ASS	Output user interface	OS
103	ZWSP-WZD	Buffer memory tool data	5
104	ZU-WZ-KA	Buffer memory tool cassette dialogs	5
105		Reserved	
106		Reserved	
107		Reserved	
108		Reserved	
109		Reserved	
110		Reserved	
111	E-PU 1	COM input-/PLC output buffer 1 in MPR	OS
112	E-PU 2	COM input-/PLC output buffer 2 "	OS
113	E-PU 3	COM input-/PLC output buffer 3 "	OS
114	E-PU 4	COM input-/PLC output buffer 4 "	OS
115	E-PU 5	COM input-/PLC output buffer 5 "	OS
116	E-PU 6	COM input-/PLC output buffer 6 "	OS
117	A-PU 1	COM output-/PLC input buffer 1 in MPR	OS
118	A-PU 2	COM output-/PLC input buffer 2 "	OS
119	A-PU 3	COM output-/PLC input buffer 3 "	OS
120	A-PU 4	COM output-/PLC input buffer 4 "	OS
121	A-PU 5	COM output-/PLC input buffer 5 "	OS
122	A-PU 6	COM output-/PLC input buffer 6 "	OS
123		Reserved	
124		Reserved	
125	S-SIGNAL	Standard signals	OS
126	FORM-DB	Format list	6/7
127	ZUSTDB	Status DB	6/7
128	E-PUFFER	User interface input useful data DB	6/7
129	A-PUFFER	User interface output useful data DB	6/7
130		Reserved	
131		Reserved	
132		Reserved	
133	SCH-KASS	Cassette handling interface	1/2
134	ZW-STAZ	Status DB for tool live, number of parts	1
135	ZW-LS	Status values DB for tape input	1
136	DYNPUFF1	Dynamic buffer memory	1
137	DYNPUFF2	Dynamic buffer memory	1
138	DYNPUFF3	Dynamic buffer memory	1
139	DYNPUFF4	Dynamic buffer memory	1
140	DYNPUFF5	Dynamic buffer memory	1
141	DYNPUFF6	Dynamic buffer memory	1
142	DYNPUFF7	Dynamic buffer memory	1
143	DYNPUFF8	Dynamic buffer memory	1
144	ZW-DATVT	Status words DB data distributor 1)	1
145	ZW-BT	Status words DB for operator panel 1)	1
146	ZW-ANZBT	Display parameters	1
147	ZW-MESS	Measure interface	1
148	TO-DATVT	TO memory distributor	1
149	TO-DATLS	Buffer memory for read/write TO data (FB 61/FB 62)	1

Abbreviations:

OS Operating system
0 FB Package 0
CL Computer link
4 FB Package 4 of the computer link

Note:

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

1) Data blocks are set up consecutively without a gap, depending on the configuration of the tool management.
2) Is set up by the user. Can be stored in EPROM or RAM.

DB No.	DB design.	DB name	Pack-age
150	ZW-WZV	Status values tool management	1
151	KENN1	Identifiers	1
152	KENN2	Identifiers	1
153	KENN3	Identifiers	1
154	IDENT1	Identity number	1
155	IDENT2	Identity number	1
156	DUPLO	Duplo number	1
157	ANWEND1	User data 1)	1
158	ANWEND2	User data 1)	1
159	ANWEND3	User data 1)	1
160	ANWEND4	User data 1)	1
161	ANWEND5	User data 1)	1
162	ANWEND6	User data 1)	1
163	ANWEND7	User data 1)	1
164	D-Nr. 1	Reference list 1)	1
165	D-Nr. 2	Reference list 1)	1
166	D-Nr. 3	Reference list 1)	1
167	D-Nr. 4	Reference list 1)	1
168	D-Nr. 5	Reference list 1)	1
169	D-Nr. 6	Reference list 1)	1
170	D-Nr. 7	Reference list 1)	1
171	D-Nr. 8	Reference list 1)	1
172	D-Nr. 9	Reference list 1)	1
173	ERSATZPL	Spare location number 1)	1
174	WZAUF1L1	Tool holder L1 1)	1
175	WZAUF2L1	Tool holder L1 1)	1
176	WZAUF1L2	Tool holder L2 1)	1
177	WZAUF2L2	Tool holder L2 1)	1
178	ADAGE1L1	Adapter geometry L1 1)	1
179	ADAGE2L1	Adapter geometry L1 1)	1
180	ADAGE1L2	Adapter geometry L2 1)	1
181	ADAGE2L2	Adapter geometry L2 1)	1
182	ADALAGE	Adapter position 1)	1
183	PL/MAG	Location No./magazine No. 2)	1
184	WZ-GR	Tool size 2)	1
185	WZ-KENN	Tool identifier 2)	1
186	RUEST-D	Loading/unloading data 2)	1
187	T-HIGH	Ident No. (decades 4-7) 2)	1
188	T-LOW	Ident No. (decades 0-3) 2)	1
189	DUPLO	Duplo number 2)	1
190			
191			
192			
193			
194			
195			
196			

If FB Package 1 is installed, DB 150 ... DB 182 are used additionally by the system.

1) *Data blocks are set up consecutively without a gap, depending on the configuration of the tool management.*

2) *The data blocks are assigned by the operating example supplied with Package 1, 2. Otherwise these data blocks are available to the user.*

DB No.	DB design.	DB name	Package
197			
198			
199			
200			
201			
202			
203			
204			
205			
206			
207			
208			
209			
210			
211			
212			
213			
214			
215			
216			
217			
218			
219			
220			
221			
222			
223			
224			
225			
226			
227			
228			
229			
230			
231			
232			
233			
234			
235			
236			
237			
238			
239			
240			
241			
242			
243			
244			
245			
246			
247			
248			
249			
250			
251			
252			
253			
254			
255			

6.1.4.2 Class DX data blocks

Data blocks DX 0...DX 105 are reserved for Siemens applications.
Data blocks DX 106...DX 255 can be employed by the user.

DX No.	DX design.	DX name	Pack-age
0		Assigned S5-155U	
1		Assigned S5-155U	
2			
3			
4			
5			
6			
7			
8			
9			
10	DB-T-PRO	DB for part program	8
11	DB-Hilfs	Auxiliary DB	8
12	DB-Nutz	DB for useful data	8
13			
14			
15			
16			
17			
18			
19			
20			
21	DB M 1	Screen form list for overview display	0
22	DB M 2	Screen form list for fault display part 1	0
23	DB M 3	Screen form list for fault display part 2	0
24			
25			
26	DAT-AUS 1	Logging data input/data output	8
27	DAT-AUS 2	Logging data input/data output	8
28	DAT-DAV	Logging data input/data output	8
29	DAT-EIN 1	Logging data input/data output	8
30	DAT-EIN 2	Logging data input/data output	8
31	DAT-EIN 3	Logging data input/data output	8
32	DAT-EIN 4	Logging data input/data output	8
33	UHR-HILFS	Date/time auxiliary DB	8
34			
.			
.			
.			
39			
40		Reserved for PG functions	
.			
.			
.			
46		Reserved for PG functions	
47			
.			
.			
.			
.			
102			
103			
104			
105	SCH-RKWV	Interfaces DB CL/TO	

Abbreviations:

8 FB Package 8

6.1.5 Function blocks

6.1.5.1 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 used by the user.

FB No.	FB design.	FB name	Package
0		Assigned S5-155U	
1		Assigned S5-155U	
2		Assigned S5-155U	
3		Assigned S5-155U	
4		Assigned S5-155U	
5		Assigned S5-155U	
6		Assigned S5-155U	
7		Assigned S5-155U	
8		Assigned S5-155U	
9		Assigned S5-155U	
10		Assigned S5-155U	
11 *	EINR-DB	Setting up data blocks	OS
12 *	WDTRG	Retrigger cycle time	OS
13		Assigned S5-155U	
14		Assigned S5-155U	
15		Assigned S5-155U	
16		Assigned S5-155U	
17	STATUS	PLC status channel	0
18		Assigned S5-155U	
19		Assigned S5-155U	
20		Assigned S5-155U	
21		Assigned S5-155U	
22		Assigned S5-155U	
23		Assigned S5-155U	
24		Assigned S5-155U	
25		Assigned S5-155U	
26		Assigned S5-155U	
27		Assigned S5-155U	
28		Assigned S5-155U	
29		Assigned S5-155U	
30	MUL:16	Multiplication of two binary coded numbers of 16 bits each	0
31		Assigned S5-155U	
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		Assigned S5-155U	
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		Reserved	
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	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		Reserved	

Abbreviations:

OS Operating system
0 FB Package 0

Note:

The blocks marked with an * are function macros which are integrated in the PLC operating system with PLC 135 BW (see Function Macro Description).

FB No.		FB design.	FB name	Pack-age
45		GST-FMBM	Basic setting error messages/operational messages	0
46		UP:54/55	Subroutine FB 54, FB 55	0
47		PSP:FMBM	Buffer memory error/operational messages	0
48		FMBM:HSG	Auxiliary signals for EM/OM	0
49		UP:57/58	Subroutine FB 57, FB 58	0
50		UP:FB49	Subroutine FB 49	0
51		UP:FB45	Subroutine FB 45	0
52		BTR 816	Block transfer 8 bit 16 bit memory	OS
53			Reserved	
54		FM-ANZ	Display error messages	0
55		BM-ANZ	Display operational messages	0
56		MG-ANZ	Display message groups	0
57		FM-ABFR	Scan error messages	0
58		BM-ABFR	Scan operational messages	0
59		MG-ABFR	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 I/PLC II	OS
64	*	PCD-SCHR	Write PLC data to PLC I/PLC II	OS
65	*	M->STACK	Transfer flags flag stack	OS
66	*	STACK->M	Flag stack transfer flags	OS
67	*	T:MS->ACH	Transfer direction keys (880T) to axes	OS
68	*	AP-RUF	Aperiodic program call	OS
69	*	G-DEKOD	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 (880M)	OS
80			Assigned S5-155U	
81			Assigned S5-155U	
82			Assigned S5-155U	
83			Assigned S5-155U	
84			Assigned S5-155U	
85			Assigned S5-155U	
86			Assigned S5-155U	
87			Assigned S5-155U	
88			Assigned S5-155U	
89	*	BAA-LESE	Reading block start address	OS
90			Assigned S5-155U	
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

Abbreviations:

OS Operating system
0 FB Package 0

Note:

The data blocks marked with an * are function macros which are integrated in the system program with PLC 135 WB (see Function Macros Description).

FB No.	FB design.	FB name	Pack-age
95	RK:S880	Computer link FB	4
96	WZDIALOG	Function distributor for tool dialogs	5
97		Reserved	
98		Reserved	
99		Reserved	
100	RK:GLOBA	Global functions	4
101	RK:MELDG	Messages	4
102	RK:NCDAT	File transfer (operator request)	4
103		Reserved	
104		Reserved for SIN 805 L2 SEND	
105		Reserved for SIN 805 L2 RECEIVE	
106		Reserved for SIN 805 L2 CONTROL	
107	UP:FB101	Subroutine for FB 101	4
108	UP:RK880	Subroutine	4
109		Reserved for SINUMERIK 810	
110	SUCH	Search for word	0
111	SUCHROUT	Search routine	1
112	LEERPL 1	Empty location search without presetting	1
113 *	SUCH:WZ	Tool search symmetrical	OS
114	SUCH-VOR	Search direction forwards	1
115	SUCH-RWS	Search direction backwards	1
116	WZV-INIT	Initialize tool management	1
117	EINR-MAG	Setting up magazine table	1
118	WZ-GR:ST	Tool size standard	1
119	UP:MAG L	Delete subroutine magazine	1
120	LOCHSTAG	Unload via punched tape	1
121	MESSEN	Measure	1
122	LEERPL 2	Empty location search with presetting	1
123	WZ-BS	Prepare tool	1
124	UP:T=ID	Subroutine tool search T = ident	1
125	UP:T=PL	Subroutine tool search T = location	1
126	UP:T=IDZ	Alternative search direction	1
127	UP:ZW-SP	Subroutine	1
128	TRANSFER	Transfer CRB data	1
129		Reserved	1
130	TOS-VER	Subroutine	1
131	TOS:MD-B	Subroutine MD bits	1
132	TOS:MD-W	Subroutine MD words	1
133	RI-AUSW	Selection of direction	1
134	TO DAT-W	Subroutine	1
135	D-NR:WZW	Provide D No. after tool change	1
136	WZ DAT-LS	Read tool data	1
137		Reserved	1
138	DYN-PUFF	Data management I/O buffer memory	1
139	DAT-VER	Data management I/O buffer memory	1
140	UP:FB 139	Assignment subroutine of FB 139	1
141	UP:KC 0	Assignment subroutine of FB 139	1
142	UP:KC 1-4	Assignment subroutine of FB 139	1
143	UP:KC 5-7	Assignment subroutine of FB 139	1
144	UP:KC 8+9	Assignment subroutine of FB 139	1

Abbreviations:

OS	Operating system
0	FB Package 0
1	FB Package 1
4	FB Package 4
5	FB Package 5
CL	Computer link

Note:

The blocks marked with an * are function macros which are integrated in the PLC operating system with PLC 135 WB (see Function Macro Description).

FB No.	FB design.	FB name	Package
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	1
149		Reserved	1
150		Reserved	1
151		Reserved	1
152	NP-SIF	Subroutine	1
153	AD-AD	Subroutine	1
154	RK:AW-SS	User interface for CL**/**machining	1
155	LOCHSTEG	Tape input	1
156	STAZ**/**VWG	Tool live monitoring**/**prewarning limit	1
157	STVE**/**VWG	Workpiece count**/**prewarning limit	1
158	WZ-SPER	Inhibit tool	1
159	BCD-DUAL	BCD/BINARY conversion	1
160	FB 160	Central call block	1
161	FB 161	Subroutine check	1
162		Reserved	1
163		Reserved	1
164	FB 164	Transfer tool selection	1
165		Reserved	1
166	FB 166	Signal: Load spindle	1
167	FB 167	Signal: Unload spindle	1
168	FB 168	Acknowledgement spindle	1
169		Reserved	1
170	FB 170	Assignment buffer memory	1
171	FB 171	Magazine assignment	1
172	FB 172	Tool selection according to T No.	1
173	FB 173	Loading**/**unloading magazine from preselection**/**spindle	1
174		Reserved	1
175	FB 175	Displays tool data from assignment buffer memory	1
176	FB 176	Modification tool data from assignment buffer memory	1
177	FB 177	Displays tool data from magazine assignment	1
178	FB 178	Modification tool data from magazine assignment	1
179	FB 179	Tool selection acc. to cursor position from mag. assignment	1
180	FB 180	Further cutting edge from buffer memory and magazine	1
181	FB 181	Further cutting edge from loading	1
182	FB 182	Loading	1
183	FB 183	Unloading	1
184		Reserved	1
185	FB 185	Acknowledgement manual	1
186	FB 186	Abort manual magazine**/**spindle	1
187	FB 187	Display next cutting edge	1
188	FB 188	Re-activate tool	1
189	FB 189	Cancel last cutting edge	1
190	FB 190	Selection loading display tape	1
191	FB 191	Acknowledgement tape positive/negative	1
192	FB 192	Abort tape	1
193		Reserved	1
194		Reserved	1
195		Reserved	1
196		Reserved	1
197	WZ-LISTE	Create tool list	1
198	TAUSCHL	Create replacement list	1
199	FIFO	Buffer memory processing	1

Abbreviations:

1 FB Package 1
6 FB Package 6

6.1.5.2 Function blocks of class FX

Function blocks FX 0 to FX 99 are reserved for Siemens applications.

FX No.	FX design.	FX name	Package
1	SI	Self-installation	OS
2		Assigned S5-155U	
3		Assigned S5-155U	
4		Assigned S5-155U	
5		Assigned S5-155U	
6		Assigned S5-155U	
7	SIMULAT	Simulation of a part program	1
8	WZ-GRIEP	Tool size default via EPROM	1
9		Reserved	1
10		Reserved	1
11		Reserved	1
12		Reserved	1
13		Reserved	
14	BEL-CDTR	Load code carrier	7
15	ENT-CDTR	Unload code carrier	7
16	UP-CDTR	Subroutine code carrier	7
17		Reserved	CL
18		Reserved	CL
19		Reserved	CL
20		Reserved	CL
21		Reserved	CL
22		Assigned S5-155U	
23		Assigned S5-155U	
24	BALKEN	Bar charts	0
25		Reserved	
26	DAT-EIN	PLC-controlled data input	8
27	DAT-AUS	PLC-controlled data output	8
28	DAT-UHR	Date/time	8
29		Reserved	CL
30		Reserved	CL
31	GRAYDUAL	Code converter GRAY/BINARY	0
32	DUALGRAY	Code converter BINARY/GRAY	0
33	RECHNEN	Contour and technology calculation	CP
34	MESSEN	Measuring in JOG mode	CP
35		Reserved	CL
36		Reserved	CL
37		Reserved	CL
38	PRO-K01	Program coordination	0
39	PRO-K02	FX 38 subroutine	0
40	RK:WZABF	Computer link, scan tool	5
41	RK:WZM	Computer link, report tool	5
42	RK:WZBEL	Computer link, load tool	5
43	RK:WZENT	Computer link, unload tool	5
44	RK:WZBGB	Computer link, load magazine assignment data	5
45	RK:KASSE	Tool cassette processing	5
46		Reserved	
47		Reserved	
48	UPWZKASS	Subroutine tool cassette processing	5
49	E/A-TRAN	Data transfer I/O buffer TO	5
50	UPWZDIAL	Subroutine TOOL DIALOG	5
51		Reserved	
52		Reserved	
53		Reserved	
54		Reserved	

Abbreviations:

0	FB Package 0
4	FB Package 4
5	FB Package 5
7	FB Package 7
8	FB Package 8
OS	Operating system
CP	Cycle package
CL	Computer link

FX No.	FX design.	FX name	Pack-age
55	DIAGNOSE	Diagnostics main submodule	
56	ALLFUNK 1	General functions 1	
57	ALLFUNK 2	General functions 2	
58	SINFUNKT	Sinumerik-related functions	
59	PLCFUNKT	PLC-related functions	
60		Reserved	
61	GRA-SERV	FB package Gracis-Server	
62	FEH-SERV	FB package Gracis-Server	
63	PAR-SERV	FB package Gracis-Server	
64	GRA-CLNT	FB package Gracis-Client	
65	FEH-CLNT	FB package Gracis-Client	
66	PAR-CLNT	FB package Gracis-Client	
67		Reserved	
68	PRO-MESS	Logging measured data	8
69	TP-UEB	Transfer part program	8
70	TP-BEARB	Process part program	8
71	DRU-AUSG	Program output	8
72	PRO-UP1	Subroutine	8
73		Reserved	
74		Reserved	
75		Reserved	
76		Reserved	
77		Reserved address calculation flag area	
78		Reserved FB package 880G	
79		Reserved FB package 880G	
80		Reserved	
81		Reserved PG functions	
82		Reserved PG functions	
83		Reserved PG functions	
84		Reserved PG functions	
85		Reserved PG functions	
86		Reserved PG functions	
87		Reserved PG functions	
88		Reserved PG functions	
89		Reserved	
90		Reserved	
91		Reserved	
92		Reserved	
93		Reserved	
94		Reserved	
95		Reserved	
96		Reserved	
97		Reserved	
98		Reserved	
99		Reserved	

Abbreviations:

8 FB Package 8

Note:

1. Please make sure that SINUMERIK blocks cannot be confused. The user must not assign SINUMERIK block names or SINUMERIK library numbers to his user blocks.
2. Within the range of FB 0 to FB 199 and
   FX 0 to FX 79, SINUMERIK blocks have absolute priority.
   If subsequent use of SINUMERIK blocks should be necessary and the numbers of these blocks should coincide with user block numbers, the latter must be changed.
3. The SINUMERIK 880 with PLC 135 WB has no basic program implemented in STEP 5 as does the SINUMERIK 850. The relevant functions are implemented in the PLC operating system.

6.2 Assignment of input/output submodules

6.2.1 Assignment of inputs

No. of input signal								
Byte No.	Bit No. 7	6	5	4	3	2	1	0
IB m	Connector X02404 pin No. 10	9	8	7	6	5	4	3
IB m+1	Connector X02404 pin No. 18	17	16	15	14	13	12	11
IB m+2	Connector X02404 pin No. 26	25	24	23	22	21	20	19
IB m+3	Connector X02404 pin No. 34	33	32	31	30	29	28	27
IB m+4	Connector X02405 pin No. 10	9	8	7	6	5	4	3
IB m+5	Connector X02405 pin No. 18	17	16	15	14	13	12	11
IB m+6	Connector X02405 pin No. 26	25	24	23	22	21	20	19
IB m+7	Connector X02405 pin No. 34	33	32	31	30	29	28	27

Address m is derived from the position of the selector switch S1 on the input/output submodule and from the PLC MD start of operator panel inputs (PLC = 0006, PLC = 0106).

Selector switch position S 1	Address m m=64 - 96	PLC MD for inputs to PLC	PLC
0	m	6027.0	6127.0
1	m+8	.1	.1
2	m+16	.2	.2
3	m+24	.3	.3

The PLC MD can be set for PLC , PLC .

IB m	X02404
IB m+4	X02405/X02406
IB m+5	X02405
IB m+6	
IB m+7	X02405

Notes:

1) The input bytes (m + 4), (m + 5, bit 0, bit 1) may only be assigned by connector X02405 **or** X02406. If expansion blocks for the machine control panel are used, assignment is via X02406.

2) If the CPU fails (F24.4 = 1), the inputs of the input/output submodules are cleared.

6.2.2 Assignment of outputs

No. of output signals								
Byte No.	Bit No. 7	6	5	4	3	2	1	0
QB m	Connector X02402 pin No. 10	9	8	7	6	5	4	3
QB m+1	Connector X02402 pin No. 18	17	16	15	14	13	12	11
QB m+2	Connector X02402 pin No. 26	25	24	23	22	21	20	19
QB m+3	Connector X02402 pin No. 34	33	32	31	30	29	28	27

Address m is derived from the position of the selector switch on the input/output submodule and from the PLC MD start of operator panel outputs (PLC = 0007, PLC = 0107).

Selector switch position S 2	Address m m=64 - 112	PLC MD for outputs to PLC	PLC
0	m	6028.0	6128.0
1	m+4	.1	.1
2	m+8	.2	.2
3	m+12	.3	.3

Notes:

1) The PLC MD may **only** be set for PLC **or** PLC .

2) If the CPU fails (F24.4=1), the outputs to the input/output submodules are no longer transferred.

6.2.3 Assignment of inputs via machine control panel

6.2.3.1 SINUMERIK 880T

Machine control panel basic module (Connector X 02404 on input/output submodule)								
Byte No.	Bit No. 7	6	5	4	3	2	1	0
IB m	Spindle override switch D Pin No. 10	C Pin No. 9	B Pin No. 8	A Pin No. 7	Mode selector switch D Pin No. 6	C Pin No. 5	B Pin No. 4	A Pin No. 3
IB m+1	Direction keys X+ Pin No. 18	X- Pin No. 17	Rapid traverse Pin No. 16	Direction keys C+ Pin No. 15	C- Pin No. 14	Pin No. 13	00 Handwheel X 01 Handwheel C 10 Handwheel Z Pin No. 12	Pin No. 11
IB m+2	Direction keys Z+ Pin No. 26	Z- Pin No. 25	Spindle On Pin No. 24	*Off Pin No. 23	Feed On Pin No. 22	*Off Pin No. 21	NC Start Pin No. 20	*NC Stop Pin No. 19
IB m+3	Reset Pin No. 34	Key-switch Pin No. 33	Single block Pin No. 32	Feedrate override switch E Pin No. 31	D Pin No. 30	C Pin No. 29	B Pin No. 28	A Pin No. 27

6.2.3.2 SINUMERIK 880M

Machine control panel basic module (Connector X 02404 on input/output submodule)								
Byte No.	Bit No. 7	6	5	4	3	2	1	0
IB m	Spindle override switch D Pin No. 10	C Pin No. 9	B Pin No. 8	A Pin No. 7	Mode selector switch D Pin No. 6	C Pin No. 5	B Pin No. 4	A Pin No. 3
IB m+1	Direction keys + Pin No. 18	- Pin No. 17	Rapid traverse Pin No. 16	E Pin No. 15	Axis selector switch 1 D Pin No. 14	C Pin No. 13	B Pin No. 12	A Pin No. 11
IB m+2	Pin No. 26	Pin No. 25	Spindle On Pin No. 24	*Off Pin No. 23	Feedrate On Pin No. 22	*Off Pin No. 21	NC Start Pin No. 20	*NC Stop Pin No. 19
IB m+3	Reset Pin No. 34	Key-switch Pin No. 33	Single block Pin No. 32	Feedrate override switch E Pin No. 31	D Pin No. 30	C Pin No. 29	B Pin No. 28	A Pin No. 27

Address m is derived from the selector switch position on the input/output submodule and from the PLC MD start of operator panel inputs (PLC = 0006, PLC = 0106).

Selector switch position S1	Address m m=64 - 96
0	m
1	m+8
2	m+16
3	m+24

Notes:

The machine control panel signals are not transferred automatically by the system program to the NC/PLC interface. However, the following function macros are available for this:

- FB 78 for transfer of spindle override and mode to the NC channel
- FB 79 for transfer of direction keys (880M) to the axes
- FB 67 for transfer of direction keys (880T) to the axes.

6.2.3.3 Machine control panel expansion modules

Dual slide module
(SINUMERIK 880T, connector X 02406 on input/output submodule)

Byte No.	Bit No. 7	6	5	4	3	2	1	0
IB m+4	Hand-wheel 1) bit 1 Pin No. 10	Direction keys X+ Pin No. 9	Direction keys X- Pin No. 8	Direction keys Z+ Pin No. 7	Direction keys Z- Pin No. 6	Rapid traverse Pin No. 5	Direction keys C+ Pin No. 4	Direction keys C- Pin No. 3
IB m+5	Available to user via connector X 02405 pin No. 18	17	16	15	14	13	12	Hand-wheel 1) bit 2 Pin No. 11

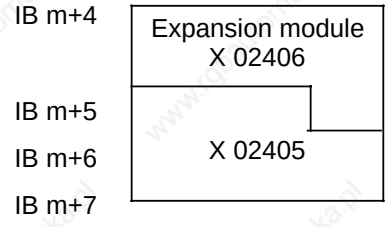
Auxiliary axis module
(SINUMERIK 880T/880M, connector X 02406 on input/output submodule)

Byte No.	Bit No. 7	6	5	4	3	2	1	0
IB m+4	Direction keys + Pin No. 10	Direction keys - Pin No. 9	Rapid traverse Pin No. 8	Axis selector switch E Pin No. 7	D Pin No. 6	C Pin No. 5	B Pin No. 4	A Pin No. 3
IB m+5	Available to user via connector X 02405 pin No. 18	17	16	15	14	13	Reserved for auxiliary axis module Pin No. 12	Pin No. 11

1):

Selector switch position S1	Address m m=64 - 112
0	m
1	m+4
2	m+8
3	m+12

Axis	Bit 1	Bit 2
X	0	0
C	0	1
Z	1	0



Rapid traverse override module
(SINUMERIK 880T, connector X02406 on input/output submodule)

Byte No.	Bit No. 7	6	5	4	3	2	1	0
IB m+4	Available to user via connector X 024505 pin No. 10	9	8	7	6	Rapid traverse override C Pin No. 5	B Pin No. 4	A Pin No. 3
IB m+5	Available to user via connector X 024505 pin No. 18	17	16	15	14	13	12	11

Spindle override module
(SINUMERIK 880T, connector X 02406 on I/O submodule)

Byte No.	Bit No. 7	6	5	4	3	2	1	0
IB m+4	Spindle ON Pin No. 10	OFF Pin No. 9	Pin No. 8	Pin No. 7	Pin No. 6	Spindle override swtich C Pin No. 5	B Pin No. 4	A Pin No. 3
IB m+5	Available to user via connector X 02405, Pin No. 18	17	16	15	14	13	12	11

Address m is derived from the selector switch position on the input/output submodule and from the PLC MD start of operator panel inputs (PLC = 0006, PLC = 0106).

Note:

The expansion module is connected via connector X 02406. Connectors X 02405 and X02406 are ORed in the hardware from pin 3 to pin 12; i.e. the pins occupied by the expansion module must not be used by the user on X 02405.

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	Segments exceeded with blocks					PLC operation PLC	PLC
FY 6	Processing delay OB 7	OB 6	OB 5	OB 4	OB 3	OB 2	Group message LIM/SIM	I/Os not ready/ changed

PLC ready signals								
Byte No.	Bit No. 7	6	5	4	3	2	1	0
FY 7							PLC CPU ready PLC	PLC
FY 8	Interrupt inputs 1st DMP interface or 1st interrupt byte Interr.input 7	Interr.input 6	Interr.input 5	Interr.input 4	Interr.input 3	Interr.input 2	Interr.input 1	Interr.input 0
FY 9	Interrupt inputs 2nd DMP interface or 2nd interrupt byte Interr.input 7	Interr.input 6	Interr.input 5	Interr.input 4	Interr.input 3	Interr.input 2	Interr.input 1	Interr.input 0
FY 10	Interrupt inputs 3rd DMP interface or 3rd interrupt byte Interr.input 7	Interr.input 6	Interr.input 5	Interr.input 4	Interr.input 3	Interr.input 2	Interr.input 1	Interr.input 0
FY 11	4th interrupt byte (only for free configuration) Interr.input 7	Interr.input 6	Interr.input 5	Interr.input 4	Interr.input 3	Interr.input 2	Interr.input 1	Interr.input 0

Signals for alarm-controlled processing								
	Bit No.							
Byte 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								
	Bit No.							
Byte No.	7	6	5	4	3	2	1	0
FY 20						3rd operator panel ready	2nd operator panel ready	1st operator panel ready
FY 21	2nd CL interface	1st CL interface						COM CPU ready
FY 22					NC CPU ready		NC 2	NC 1
FY 23					Servo processor submodule ready			
					Servo 4	Servo 3	Servo 2	Servo 1

Individual 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 standstill	CPU failure	Installation mode for S5-155U	* Temper-ature error	Battery fault	NC alarm

6.3.1 Assignment of DB 1 (diagnostics)

Diagnostic signals		
Data word No.	Bit No. High byte (DL)	Low byte (DR)
DW 0	Current cycle time 2) (CF in ms)	
DW 1	Minimum cycle time 2) (CF in ms)	
DW 2	Maximum cycle time 2) (CF in ms)	
⋮		
DW 10	Identifier for type of I/O device 1)	
DW 11	Reserved	

1) *Centralized I/Os TPx, LPx = 1*
16 bit link = 3
DMP = 4

2) *The values are deleted each time the control ramps up (cold and warm restart). The values are corrupted when FB 12 is used at the same time.*

Diagnostic signals								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 12	Input I/Os module not ready							
	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
DL 14	Output I/Os module not ready							
	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

Diagnostic signals		
DW No. PLC	Bit No.	
	High byte (DL)	Low byte (DR)
DW 16	Number of lost requests during LIM/SIM OB 2	
DW 17	Number of lost requests during LIM/SIM OB 3	
DW 18	Number of lost requests during LIM/SIM OB 4	
DW 19	Number of lost requests during LIM/SIM OB 5	

Diagnostic signals		
DW No. PLC	Bit No.	
	High byte (DL)	Low byte (DR)
DW 20	Number of lost requests during LIM/SIM OB 6	
DW 21	Number of lost requests during LIM/SIM OB 7	
DW 22	Event counter processing time delay in OB 2	
DW 23	Event counter processing time delay in OB 3	
DW 24	Event counter processing time delay in OB 4	
DW 25	Event counter processing time delay in OB 5	
DW 26	Event counter processing time delay in OB 6	
DW 27	Event counter processing time delay in OB 7	
DW 28	Reserved	
DW 29	Reserved	
DW 30	Input I/O byte not ready ...	IB 3 | IB 2 | IB 1 | IB 0
⋮	Input I/O byte not ready	
DW 45	IB 255 | IB 254 | IB 253 | IB 252 ...	Input I/O byte not ready
DW 46	Output I/O byte not ready ...	QB 3 | QB 2 | QB 1 | QB 0
⋮	Output I/O byte not ready	
DW 61	QB 255 | QB 254 | QB 253 | QB 252 ...	Output I/O byte not ready

Diagnostic signals		
DW No. PLC	Bit No.	
	High byte (DL)	Low byte (DR)
DW 62	Reserved	
⋮	Reserved	
DW 69	Reserved	
DW 70	Status register image 1st DMP submodule 1st line 1st DMP interface	
⋮	Status register image of DMP submodules	
DW 159	Status register image 15th DMP submodule 2nd line 3rd DMP interface	
DW 160	Detailed error code in the diagnostics DB error number	
DW 161	Supplementary error information 1st word	
DW 162	Supplementary error information 2nd word	
DW 163	Supplementary error information 3rd word	
DW 164	Supplementary error information 4th word	
DW 165	Reserved	
DW 166	ACCU 1, Low word	
DW 167	ACCU 2, Low word	

Diagnostic signals			
DW No. PLC	Bit No.		
	High byte (DL)		Low byte (DR)
DW 168	Software version	PLC software	Version No.
DW 169	Reserved		
DW 170	Software version 2)	1st interface	Version No. 2)
DW 171	Module code 1)	1st interface	Slot No.
DW 172	Software version 2)	2nd interface	Version No. 2)
DW 173	Module code 1)	2nd interface	Slot No.
DW 174	Software version 2)	3rd interface	Version No. 2)
DW 175	Module code 1)	3rd interface	Slot No.
DW 176	Reserved		
DW 177	Reserved		

1) Module code
1010 01xx Interface DMP
0110 11xx INT/EU 16 bit
└── HW version
The INT/EU 16 bit is always displayed as 2nd interface

2) With interface DMP only

6.4 Interface NC/PLC

6.4.1 Channel-specific signals

6.4.1.1 Signals to NC channel (DB 10 to DB 25)

Operating modes

Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 0	DRF 1)	Reset 1)			Mode selector switch 1)			
					D	C	B	A

Submodes

Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DR 0	Skip block	Single block	DEC single block	Dry run feedrate	M01 effective			

Feedrate override

Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 1			Feedrate override effective	Feedrate override				
				E	D	C	B	A
DR 1			Rapid traverse override effective			Rapid traverse override		
					D	C	B	A

Program override

Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 2	Execution from external	Block search with calculation	Block search with calcul. from last main bl.					
DR 2					Delete distance to go	Delete number of subroutine passes	NC stop	NC start

---

1) If these signals are defaulted in the 1st channel (master channel) of a mode group, they also apply to all other channels in this mode group. Mode group-specific Reset and mode can only be defaulted in the master channel.

Program override								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 3						Spindle number		
						C	B	A
DR 3								
DL 4	Skip block							
	/8	/7	/6	/5	/4	/3	/2	/1
DR 4								
DL 5								
DR 5								

Channel	DB	PLC MD for assignment to	
		PLC	PLC
1	DB 10	6000.0	6100.0
2	DB 11	.1	.1
3	DB 12	.2	.2
4	DB 13	.3	.3
5	DB 14	.4	.4
6	DB 15	.5	.5
7	DB 16	.6	.6
8	DB 17	.7	.7
9	DB 18	6001.0	6101.0
10	DB 19	.1	.1
11	DB 20	.2	.2
12	DB 21	.3	.3
13	DB 22	.4	.4
14	DB 23	.5	.5
15	DB 24	.6	.6
16	DB 25	.7	.7

Feedrate disable total								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 6	Feedrate disable total							
	m+7	m+6	m+5	m+4	m+3	m+2	m+1	m+0
DR 6	Feedrate disable total							
	m+15	m+14	m+13	m+12	m+11	m+10	m+9	m+8

Feedrate disable total and read in disable								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 7	Feedrate disable total and read in disable							
	m+23	m+22	m+21	m+20	m+19	m+18	m+17	m+16
DR 7	Feedrate disable total and read in disable							
	m+31	m+30	m+29	m+28	m+27	m+26	m+25	m+24
DL 8	Feedrate disable total and read in disable							
	m+39	m+38	m+37	m+36	m+35	m+34	m+33	m+32
DR 8	Feedrate disable total and read in disable							
	m+47	m+46	45	m+44	m+43	m+42	m+41	m+40

Read-in disable								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
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

Disable NC start								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
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

The variable m in the preceding tables indicates the start addresses for the message texts assigned to the signals. This variable is channel-specific. Its value can be seen from the table below.

Channel	DB	m	Channel	DB	m	Channel	DB	m	Channel	NS DB	m
1	DB 10	6000	5	DB 14	6400	9	DB 18	6800	13	DB 22	7200
2	DB 11	6100	6	DB 15	6500	10	DB 19	6900	14	DB 23	7300
3	DB 12	6200	7	DB 16	6600	11	DB 20	7000	15	DB 24	7400
4	DB 13	6300	8	DB 17	6700	12	DB 21	7100	16	DB 25	7500

The messages belonging to the signals are enabled by machine data byte by byte separately for operational end error messages:

Error messages: MD 6032 ... MD 6047 PLC I
MD 6132 ... MD 6147 PLC II

Status word for user								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 12								
DR 12								

6.4.1.2 Signals from the NC channel (DB 10 to DB 25)

Program commands								
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	G33 / G63	G00	G96	Block search active	Program interrup-ted	Program running
DR 13	Trans-formation active			Tapping without compensating chuck active				Coupled motion active

Select softkey								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 14	Skip block selected	Reserved	DEC single block selected	Dry run feedrate selected	M 01 selected	Feedrate override se-lected for rapid traverse	DRF selected	TEACH IN/ PLAY-BACK
DR 14	Execution from external selected	Block search with calculation	Block search with calcul. from last main bl.					

Acknowledgements								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 15		Block search with calculation without errors	Block search with calcul. from last main block without errors					
DR 15		Error on block search with calcul.	Error in block search with calcul. from last main bl.					

Ready signals								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 16	Disable NC Start		NC alarm with processing standstill	NC Start possible	NC channel in Reset status		Mode group ready	NC alarm present
DR 16								

Channel	NS DB
1	DB 10
2	DB 11
3	DB 12
4	DB 13

Channel	NS DB
5	DB 14
6	DB 15
7	DB 16
8	DB 17

Channel	NS DB
9	DB 18
10	DB 19
11	DB 20
12	DB 21

Channel	NS DB
13	DB 22
14	DB 23
15	DB 24
16	DB 25

6.4.1.3 Auxiliary functions from NC channel (DB 10 to DB 25)

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							
	M 7	M 6	M 5	M 4	M 3	M 2	M 1	M 0
DR 18	Static M signals							
	M 7	M 6	M 5	M 4	M 3	M 2	M 1	M 0
DL 19	Dynamic M signals							
	M 15	M 14	M 13	M 12	M 11	M 10	M 9	M 8
DR 19	Static M signals							
	M 15	M 14	M 13	M 12	M 11	M 10	M 9	M 8
DL 20	Dynamic M signals							
	M 23	M 22	M 21	M 20	M 19	M 18	M 17	M 16
DR 20	Static M signals							
	M 23	M 22	M 21	M 20	M 19	M 18	M 17	M 16
DL 21	Dynamic M signals							
	M 31	M 30	M 29	M 28	M 27	M 26	M 25	M 24
DR 21	Static M signals							
	M 31	M 30	M 29	M 28	M 27	M 26	M 25	M 24

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

Channel	NS DB
1	DB 10
2	DB 11
3	DB 12
4	DB 13

Channel	NS DB
5	DB 14
6	DB 15
7	DB 16
8	DB 17

Channel	NS DB
9	DB 18
10	DB 19
11	DB 20
12	DB 21

Channel	NS DB
13	DB 22
14	DB 23
15	DB 24
16	DB 25

Stored words of the block information

Data word No.	High byte (DL)	Low byte (DR)
DW 31	Extended address M word 1 (binary)	
	Bit 15	Bit 0
DW 32	M word 1 (binary)	
	Bit 15	Bit 0
DW 33	Extended address M word 2 (binary)	
	Bit 15	Bit 0
DW 34	M word 2 (binary)	
	Bit 15	Bit 0
DW 35	Extended address M word 3 (binary)	
	Bit 15	Bit 0
DW 36	M word 3 (binary)	
	Bit 15	Bit 0
DW 37	Extended S address (binary or BCD)	
	Bit 15 10^1	10^0 Bit 0
DW 38	S word (binary or BCD)	
	Bit 31 10^7 10^6 10^5	10^4 Bit 16
DW 39	S Word (binary or BCD)	
	Bit 15 10^3 10^2 10^1	10^0 Bit 0

Channel	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
5	DB 14	5444.3	-.4	-.5	-.6	-.7
6	DB 15	5445.3	-.4	-.5	-.6	-.7
7	DB 16	5446.3	-.4	-.5	-.6	-.7
8	DB 17	5447.3	-.4	-.5	-.6	-.7

Channel	NS DB	NC MD for BCD output S	T	D	H	F
9	DB 18	5448.3	-.4	-.5	-.6	-.7
10	DB 19	5449.3	-.4	-.5	-.6	-.7
11	DB 20	5450.3	-.4	-.5	-.6	-.7
12	DB 21	5451.3	-.4	-.5	-.6	-.7
13	DB 22	5452.3	-.4	-.5	-.6	-.7
15	DB 23	5453.3	-.4	-.5	-.6	-.7
15	DB 24	5454.3	-.4	-.5	-.6	-.7
16	DB 25	5455.3	-.4	-.5	-.6	-.7

Stored words of the block information		
Data word No.	**High byte (DL)**	**Low byte (DR)**
DW 40	Extended T address (binary or BCD)	Bit 15 … 10^1 … 10^0 Bit 0
DW 41	T word (binary or BCD)	Bit 31 10^7 … 10^6 … 10^5 … 10^4 Bit 16
DW 42	T word (binary or BCD)	Bit 15 10^3 … 10^2 … 10^1 … 10^0 Bit 0
DW 43	Extended H address (binary or BCD)	Bit 15 … 10^1 … 10^0 Bit 0
DW 44	H word (binary or BCD)	Bit 31 10^7 … 10^6 … 10^5 … 10^4 Bit 16
DW 45	H word (binary or BCD)	Bit 15 10^3 … 10^2 … 10^1 … 10^0 Bit 0
DW 46	D word (binary or BCD)	Bit 15 … 10^2 … 10^1 … 10^0 Bit 0
DW 47	Extended F address	Bit 15 … 10^1 … 10^0 Bit 0
DW 48	F word	Bit 31 10^5 … 10^4 … 10^3 … 10^2 Bit 16
DW 49	F word	Bit 15 10^1 … 10^0 … 10^{-1} … 10^{-2} Bit 0
DW 50	Reserved	
DL 51	Skip block selected with softkey	*/* 8 … */* 7 … */* 6 … */* 5 … */* 4 … */* 3 … */* 2 … */* 1
DR 51	Reserved	

Channel	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
5	DB 14	5444.3	-.4	-.5	-.6	-.7
6	DB 15	5445.3	-.4	-.5	-.6	-.7
7	DB 16	5446.3	-.4	-.5	-.6	-.7
8	DB 17	5447.3	-.4	-.5	-.6	-.7

Channel	NS DB	NC MD for BCD output S	T	D	H	F
9	DB 18	5448.3	-.4	-.5	-.6	-.7
10	DB 19	5449.3	-.4	-.5	-.6	-.7
11	DB 20	5450.3	-.4	-.5	-.6	-.7
12	DB 21	5451.3	-.4	-.5	-.6	-.7
13	DB 22	5452.3	-.4	-.5	-.6	-.7
14	DB 23	5453.3	-.4	-.5	-.6	-.7
15	DB 24	5454.3	-.4	-.5	-.6	-.7
16	DB 25	5455.3	-.4	-.5	-.6	-.7

Signals from program coordination

Byte No.	Bit No. 15	14	13	12	11	10	9	8
	7	6	5	4	3	2	1	0
DL 52								Programm coord. change
DR 52	Command code							
DL 53	Mark/program number (BCD) 10^7					10^6		
DR 53	Mark/program number (BCD) 10^5					10^4		
DL 54	Mark/program number (BCD) 10^3					10^2		
DR 54	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
⋮	Reserved							
DR 62	Reserved							

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	Reserved						
DR 63	Coordination error	Routing suppressed					H word valid	T word valid
DW 64	Number of source channel (BINARY)							
DW 65	Routed T word 10^3					10^2		
DW 66	Routed T word 10^1					10^0		
DW 67	Routed H word 10^1					10^0		
DW 68	Routed H word 10^3					10^2		
DW 69	Routed H word 10^1					10^0		

6.4.1.4 PLC user interface for electronic gear, ELG (DB 29)

Signals from PLC

Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL K	New $K_ü$ has been calculated	Accel. limitation synchron. active	Emergency retraction is enabled	Compensatory controller active	Reserved	FA overlay active	Synchronisation enabled	LINK AKTIVE
DR K	Error in new $K_ü$	FA is corrected under autom. control	Maximum acceleration	Maximum velocity	Accel. warning threshold reached	Velocity warning threshold reached	Synchronism fine	Synchronism coarse
DL K+1		Synchronization reached	Emergency retraction active		Center position reached	2nd flank is stored	1st flank is stored	SAC is active
DR K+1								

Signals to PLC

Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL K+2	Calculate new $K_ü$	Activate accel. limitation synchronous	Enable emergency retraction	Compensatory controller ON/OFF	Reserved	FA overlay on	Synchronization ON	LINK ON
DR K+2	Activate new $K_ü$		Synchronization START		Reserved	FA overlay off	Synchronization OFF	LINK OFF
DL K+2	Reserved					2nd flank has been approached	1st flank has been approached	SAC ON/ OFF
DR K+2								

The K addresses of the following axes are:

1st	***FA***	***K = 0***
2nd	***FA***	***K = 4***
3rd	***FA***	***K = 8***

6.4.1.5 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 PLC	PLC
1	DB 80	6009.0	6109.0
2	DB 81	.1	.1
3	DB 82	.2	.2
4	DB 83	.3	.3
5	DB 84	.4	.4
6	DB 85	.5	.5
7	DB 86	.6	.6
8	DB 87	.7	.7
9	DB 88	6010.0	6110.0
10	DB 89	.1	.1
11	DB 90	.2	.2
12	DB 91	.3	.3
13	DB 92	.4	.4
14	DB 93	.5	.5
15	DB 94	.6	.6
16	DB 95	.7	.7

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

6.4.2 Spindle-specific signals (DB 31)

6.4.2.1 Basic spindle functions

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. of rotation clockwise	Progr. speed too high	Spindle in set range	Spindle position reached	Spindle at standstill	Spindle synchron-ized	Spindle positioning running	Speed limit exceeded
DR K	Switch over 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	Switch-over gain factor	Controller enable	Default 0 as set speed	Spindle override effective	Spindle override D	C	B	A
DR K+1	Resynchro-nize spindle	Acknow-ledge M19	Reset spindle	Invert M03/M04	Initiate C axis oper-ation	Act. gear stage C	B	A
DL K+2				Channel number E	D	C	B	A
DR K+2	Set direc-tion of rotation clockwise	Oscillation speed	Basic speed	Position spindle			Reserved	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 PLC I	PLC II
1	0	8000	6012.0	6112.0
2	4	8020	.1	.1
3	8	8040	.2	.2
4	12	8060	.3	.3
5	16	8080	.4	.4
6	20	8100	.5	.5

Notes:

- A maximum of 30 measuring circuits are possible (axes and spindles).
- Message text address n is required for error and operational messages. Via PLC MD 6034 (PLC I), and 6134 (PLC II) the SPINDLE DISABLE signals can also be evaluated for error messages. The evaluation can be set as operational messages via PLC MD 6042 (PLC I) and 6142 (PLC II).

6.4.2.2 Extended spindle functions

The data block DB 31 is extended upwards for the additional status and control signals of the extended spindle functions.

Status signals from synchronous spindle

Byte No.	Bit No. 15	14	13	12	11	10	9	8
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
DL L+24	Calculate new $K_{ü}$	Defined angle offset reached	Emergency retraction active				Reserved	Following spindle in synchronous operation
DR L+24	Activate new $K_{ü}$	Controlled follow-up motion	Maximum acceleration	Maximum speed	Acceleration threshold reached	Speed warning threshold reached	Synchron-ism fine	Synchron-ism coarse

Control signals to synchronous spindle

Byte No.	Bit No. 15	14	13	12	11	10	9	8
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
DL L+25	Calculate new $K_{ü}$				Disable synchr. operation			
DR L+25	Activate new $K_{ü}$							

Spindle	Address L	Message text address n	PLC MD for processing PLC I	PLC II
1	0	8000	6012.0	6112.0
2	2	8020	.1	.1
3	4	8040	.2	.2
4	6	8060	.3	.3
5	8	8080	.4	.4
6	10	8100	.5	.5

6.4.3 Axis-specific signals (DB 32)

Signals from the axis								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL K	Speed controller active	Position control active		Reference point reached	Traversing command +	Traversing command –	Position reached with exact stop fine	Position reached with exact stop coarse
DR K		IKA warning threshold		Rounding axis in position		Axis is C axis		

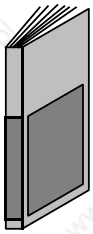
Signals to axis								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL K+1	Mirroring	Follow-up operation		*Delay ref.pt. approach	Parking axis	Controller enable	2nd software limit switch +	2nd software limit switch –
DR K+1	Jog +	Jog –	Rapid traverse override	Feedrate 1:100	Axis disable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

Axis	Address K	Message text address n	PLC MD for processing PLC I	PLC II
1	0	8200	6016.0	6116.0
2	4	20	.1	.1
3	8	40	.2	.2
4	12	60	.3	.3
5	16	80	.4	.4
6	20	8300	.5	.5
7	24	20	.6	.6
8	28	40	.7	.7
9	32	60	6017.0	6117.0
10	36	80	.1	.1
11	40	8400	.2	.2
12	44	20	.3	.3
13	48	40	.4	.4
14	52	60	.5	.5
15	56	80	.6	.6
16	60	8500	.7	.7
17	64	20	6018.0	6118.0
18	68	40	.1	.1
19	72	60	.2	.2
20	76	80	.3	.3
21	80	8600	.4	.4
22	84	20	.5	.5
23	88	40	.6	.6
24	92	60	.7	.7

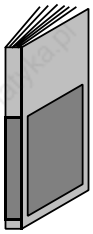
Notes:

- A maximum of 30 measuring circuits are possible (axes and spindles).
- The message text address n is required for error and operational messages. Via PLC MD 6035 (PLC I) or 6135 (PLC II) the signals FEED DISABLE can also be evaluated for error messages. The evaluation can be set as operational messages via PLC MD 6043 (PLC I) or 6143 (PLC II). The function blocks required for the scan are contained in FB Package 0.

6.4.4 Tool management 880N (DB 33)



The SINUMERIK 880N (DB33) tool management signals are described in the SINUMERIK 880N documentation, Interface Description Part 1: Signals Difference Description.



6.5 Interface data transfer

6.5.1 Data transfer PLC/NC/COM (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	Error Value 1-Value 3	Number format	Access inhibited	Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested
2	DR 0	Error Value 1-Value 3	Number format	Access inhibited	Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested
3	DL 1	Error Value 1-Value 3	Number format	Access inhibited	Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested
4	DR 1	Error Value 1-Value 3	Number format	Access inhibited	Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested
5	DL 2	Error Value 1-Value 3	Number format	Access inhibited	Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested
62	DR 30	Error Value 1-Value 3	Number format	Access inhibited	Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested
63	DL 31	Error Value 1-Value 3	Number format	Access inhibited	Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested
64	DR 31	Error Value 1-Value 3	Number format	Access inhibited	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	Error Value 1-Value 3	Number format	Access inhibited	Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested

Notes:

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

6.5.2 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	RS232C (V.24) busy							
					4	3	2	1
DR 0								

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						RS232C (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) (KF)	END NUMBER (DB37;DW5) (KF)	Definition of channel (DB37;DL6) (KF)	Setting the machine data 1. No. of the interface in NC MD 200 2. Trigger with which PLC PLC 1	PLC 2
					6026.7	6126.7
MPF	Part program	0 -9999	0 - 9999	-		
SPF	Subroutine	1 - 999	1 - 999	-		
TOA	Tool compensations	1 - 409	1 - 409	1 - 16		
RPA	R parameter					
	- channel-specific	0 - 599	0 - 599	1 - 16		
	- central	900 - 999	900 - 999	-		
TEA1	NC machine data	0 -18223	0 -18223	-		
TEA2	PLC machine data	0 - 8199	0 - 8199	-		
TEA3	IAR machine data	1000	5303	-		
ZOA	Zero offsets (G54 to G57)			0 - 16		
SEA	NC setting data	0 - 5799	0 - 5799	-		
TEA4	Cycles - MD					
	- channel-specific	0	949	1 - 16		
	- central	1000	8049	-		
SEA4	Cycles - SD	0	949	1 - 16		
TOG	Tool offsets graphics	1 - 127	1 - 127	17, 18		
IKA1	IKA relations	1 - 32	1 - 32	-		
IKA2	Drawing of error curves	1 - 32	1 - 32	-		
IKA3	Compensation points	1 - 3000	1 - 3000	-		

6.6 Interface operator panel/PLC

6.6.1 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)							
		Recall	ETC	Softkey 5	Softkey 4	Softkey 3	Softkey 2	Softkey 1
DR 0	Group A softkeys (static signals)							
		Recall	ETC	Softkey 5	Softkey 4	Softkey 3	Softkey 2	Softkey 1
DL 1	Group B user-assignable keys (dynamic signals)							
	1	2	3	4	5	6	7	8
DR 1	Group B user-assignable keys (static signals)							
	1	2	3	4	5	6	7	8
DL 2	Group B user-assignable keys (dynamic signals)							
			9	10	11	12	13	14
DR 2	Group B user- assignable keys (static signals)							
			9	10	11	12	13	14
DL 3	Group E compensation pointer (dynamic signals)							
			V		>	<	Page V	Page
DR 3	Group E compensation pointer (static signals)							
			V		>	<	Page V	Page
DL 4	Group G Individual functions (dynamic signals)							
				NC channel selection	Installation	Acknowledge alarms	Act. value display	Select
DR 4	Group G Individual functions (static signals)							
				NC channel selection	Installation	Acknowledge alarms	Act. value display	Select
DL 5	Group I selection mode groups (dyn. signals)				Group H editing (dynamic signals)			
	4	3	2	1	Clear	Cancel	Edit	Input
DR 5	Group I selection mode groups (stat. signals)				Group H editing (static signals)			
	4	3	2	1	Clear	Cancel	Edit	Input
DL 6	Group I selection mode groups (dynamic signals)							
				9	8	7	6	5
DR 6	Group I selection mode groups (static signals)							
				9	8	7	6	5

Key codings								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 7	Key hexcode							
DR 7	Operating mode group							

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							
	7	6	5	4	3	2	1	0
DR 8	Static function signals							
	7	6	5	4	3	2	1	0
DL 9	Dynamic function signals							
	15	14	13	12	11	10	9	8
DR 9	Static function signals							
	15	14	13	12	11	10	9	8
DL 39	Dynamic function signals							
	255	254	253	252	251	250	249	248
DR 39	Static function signals							
	255	254	253	252	251	250	249	248
DL 40								
DR 40								Modification function number
DL 41	Bit 15	Softkey function number						Bit 8
DR 41	Bit 7	Softkey function number						Bit 0
DL 42					PLC status display selected	Installation menu	Modification menu number	User menu
DR 42	Menu number							

6.6.2 Operator panel switchover (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 43						Operator panel selection		
						3	2	1
DR 43	Error 3rd operator panel	Error 2nd operator panel				Operator panel active message		
						3	2	1
DL 44	Occupied by internal signals							
DR 44								
DL 45								
DR 45								
DL 46								
DR 46								
DL 47								
DR 47								
DL 48								
DR 48								

6.6.3 Display dialog line

Display dialog line								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 49	Acknow-ledgement fct. result valid	Strobe fct. No. valid						
DR 49	Function number							
DL 50	Function result							
DR 50	Dialog text number							

6.6.4 Menu selection

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
DR 51	Insertion from other PLC active	Own insertion active				Acknowledgements: Insertion already act.	Error	Insertion executed
DL 52	Order number					1 - 15		
DR 52								
DL 53	Menu number					1 - 65535		
DR 53								
DL 54	Mode group number					1 - 8		
DR 54	Channel number					1 - 16		
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 - 16		

Meaning of order number:

0 =	No request	8 =	Request ”Special Recall” + priority
1 =	Insert system area menu (+ mode group and channel)	9 =	Deselect ”Special Recall” (priority remains)
2 =	Insert user area menu (+ mode group and channel)	10 =	Do not request basic display on mode change
3 =	New exit menu in system area	11 =	Do not deselect basic display on mode change
4 =	New exit menu in user area	12 =	Carry out mode group change
5 =	Execute Recall	13 =	Carry out change of channel
6 =	Request priority for PLC	14 =	Initiate menu stack reset
7 =	Deselect priority for PLC (incl. ”Special Recall”)		

6.6.5 Cursor data

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 / **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 / **DR 62**	DW number pointer 0 - 65535							
DL 63 / **DR 63**	Block number 0 - 65535							

6.7 Interface command channel (DB 41)

Interface 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	Request bits							
	8th user interface	7th user interface	6th user interface	5th user interface	4th user interface	3rd user interface	2nd user interface	1st user interface
DL 1	Reserved							
DR 1	Error bits							
	8th user interface	7th user interface	6th user interface	5th user interface	4th user interface	3rd user interface	2nd user interface	1st user interface
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:

The number of user interfaces is set with the PLC MDs 33 (PLC) and 133 (PLC).

Interface 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 m	(High) Function number							
DR m	Low)							
DL m+1	(High) Error number							
DR m+1	Low)							
DL m+2	DB = 0 DX = 1							
DR m+2	Useful data DB/DX number							
DL m+3	(High) Data word number in useful data DB/DX							
DR m+3	(Low)							
DL m+4	DB = 0 DX = 1							
DR m+4	Target DB/DX - number							
DL m+5	(High) Data word number in target DB/DX							
DR m+5	(Low)							
DL m+6								
DR m+5								

Note:

		Possible function numbers:		
m = 6	1st user interface	1	=	Static path dimension
m = 13	2nd user interface	2	=	Division increment
m = 20	3rd user interface	3	=	S external
m = 27	4th user interface	4	=	Dynamic path dimension
m = 34	5th user interface	5	=	M19 over several revolutions
m = 41	6th user interface	6	=	Transformation
m = 48	7th user interface	7	=	Coupled motion
m = 55	8th user interface	8	=	Dynamic path dimension with exact stop fine
		9	=	Temperature compensation
		10	=	Read NC data
		11	=	Write NC data

6.8 Interface communications area/PLC

6.8.1 Signals to/from communications area (DB 48)

Signals to COM								
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	Key-operated switch	Screen saver	Key disable	Cycle disable	Contr. without operator panel		Warm restart
DR 0								

Signals from COM								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 1	REORG activated	REORG of file transfer active					REORG of file transfer ended	REORG ended
DR 1						File transfer busy		Warm restart ended
DL 2	VT 340 active				Connection active	Teleservice input	Teleservice display	Teleservice active
DR 2								

6.9 Interface PLC/PLC

6.9.1 Input signals from PLC 1 (DB 50), PLC 2 (DB 52)

Signals time-controlled 10 ms		
Data word No.	High byte (DL)	Low byte (DR)
DW 0		

Signals cyclic		
Data word No.	High byte (DL)	Low byte (DR)
DW 1		
DW 2		
DW 3		
DW 4		
DW 5		
DW 6		
DW 7		
DW 8		
DW 9		
DW 10		
DW 11		
DW 12		
DW 13		

Signals cyclic		
Data word No.	High byte (DL)	Low byte (DR)
DW 14		
DW 15		
DW 16		
DW 17		
DW 18		
DW 19		
DW 20		
DW 21		
DW 22		
DW 23		
DW 24		

Data transfer PLC/PLC via interface byte
(No. interface byte)

Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 25	Data transfer completed (dynamic)							
	DR 28 (8)	DL 28 (7)	DR 27 (6)	DL 27 (5)	DR 26 (4)	DL 26 (3)	DR 25 (2)	DL 25 (1)
DR 25	Data transfer completed (static)							
	DR 28 (8)	DL 28 (7)	DR 27 (6)	DL 27 (5)	DR 26 (4)	DL 26 (3)	DR 25 (2)	DL 25 (1)
DL 28	DR 40 (32)	DL 40 (31)	DR 39 (30)	DL 39 (29)	DR 38 (28)	DL 38 (27)	DR 37 (26)	DL 37 (25)
DR 28	DR 40 (32)	DL 40 (31)	DR 39 (30)	DL 39 (29)	DR 38 (28)	DL 38 (27)	DR 37 (26)	DL 37 (25)

6.9.2 Output signals to PLC 1 (DB 51), PLC 2 (DB 53)

Signals time-controlled 10 ms		
Data word No.	High byte (DL)	Low byte (DR)
DW 0		

Signals cyclic		
Data word No.	High byte (DL)	Low byte (DR)
DW 1		
DW 2		
DW 3		
DW 4		
DW 5		
DW 6		
DW 7		
DW 8		
DW 9		
DW 10		
DW 11		
DW 12		
DW 13		

Signals cyclic		
Data word No.	High byte (DL)	Low byte (DR)
DW 14		
DW 15		
DW 16		
DW 17		
DW 18		
DW 19		
DW 20		
DW 21		
DW 22		
DW 23		
DW 24		

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 25				Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested
2	DR 25				Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested
32	DR 40				Data transfer ended	Data transfer assigned	Data transfer busy	Fifo full	Data transfer requested

Notes:

- The number of the interface byte must be specified if the function blocks for data transfer PLC/PLC are assigned parameters via flags.
- Data transfer PLC/PLC is effected using function macros FB 63 and FB 64. These function blocks are contained in the system program. The cyclic and time-controlled signals are swapped by the basic program.

6.10 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
DR 0	NC in Emergency Stop state					PLC Emerg. Stop message	PLC error message	PLC operational message

Statuses								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 0	Acknow-ledge NC Emergency Stop		Display in message line: Error messages	Operational messages	Paging		Acknow-ledge PLC error 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 m+							
	7	6	5	4	3	2	1	0
DR 1	Message m+							
	15	14	13	12	11	10	9	8
DL 2	Message m+							
	23	22	21	20	19	18	17	16
DR 2	Message m+							
	31	30	229	28	27	26	25	24

Messages								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 3	Message m+							
	39	38	37	36	35	34	33	32
DR 3	Message m+							
	47	46	45	44	43	42	41	40
DL 4	Message m+							
	55	54	53	52	51	50	49	48
DR 4	Message m+							
	63	62	61	60	59	58	57	56
DL 5	Message m+							
	71	70	69	68	67	66	65	64
DR 5	Message m+							
	79	78	77	76	75	74	73	72
DL 6	Message m+							
	87	86	85	84	83	82	81	80
DR 6	Message m+							
	95	94	93	92	91	90	89	88
DL 7	Message m+							
	103	102	101	100	99	98	97	96
DR 7	Message m+							
	111	110	109	108	107	106	105	104

Notes:

- Address m is dependent on the assigned message area (see Interface Description Part 1, Section 19)
- Whether the message is to be treated as error or operational message is defined via PLC machine data.
- The function blocks for the scan and display of the messages are contained in FB Package 0.

Messages								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 8	Message m+							
	119	118	117	116	115	114	113	112
DR 8	Message m+							
	127	126	125	124	123	122	121	120
DL 9	Message m+							
	135	134	133	132	131	130	129	128
DR 9	Message m+							
	143	142	141	140	139	138	137	136
DL 10	Message m+							
	151	150	149	148	147	146	145	144
DR 10	Message m+							
	159	158	157	156	155	154	153	152
DL 11	Message m+							
	167	166	165	164	163	162	161	160
DR 11	Message m+							
	175	174	173	172	171	170	169	168
DL 12	Message m+							
	183	182	181	180	179	178	177	176
DR 12	Message m+							
	191	190	189	188	187	186	185	184
DL 13	Message m+							
	199	198	197	196	195	194	193	192
DR 13	Message m+							
	207	206	205	204	203	202	201	200
DL 14	Message m+							
	215	214	213	212	211	210	209	208
DR 14	Message m+							
	223	222	221	220	219	218	217	216
DL 15	Message m+							
	231	230	229	228	227	226	225	224
DR 15	Message m+							
	239	238	237	236	235	234	233	232
DL 16	Message m+							
	247	246	245	244	243	242	241	240
DR 16	Reserved							
DL 17	Message m+							
	257	256	255	254	253	252	251	250
DR 17	Message m+							
	265	264	263	262	261	260	259	258

Messages								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 18	Message m+							
	273	272	271	270	269	268	267	266
DR 18	Message m+							
	281	280	279	278	277	276	275	274
DL 19	Message m+							
	289	288	287	286	285	284	283	282
DR 19	Message m+							
	297	296	295	294	293	292	291	290
DL 20	Message m+							
	305	304	303	302	301	300	299	298
DR 20	Message m+							
	313	312	311	310	309	308	307	306
DL 21	Message m+							
	321	320	319	318	317	316	315	314
DR 21	Message m+							
	329	328	327	326	325	324	323	322
DL 22	Message m+							
	337	336	335	334	333	332	331	330
DR 22	Message m+							
	345	344	343	342	341	340	339	338
DL 23	Message m+							
	353	352	351	350	349	348	347	346
DR 23	Message m+							
	361	360	359	358	357	356	355	354
DL 24	Message m+							
	369	368	367	366	365	364	363	362
DR 24	Message m+							
	377	376	375	374	373	372	371	370
DL 25	Message m+							
	385	384	383	382	381	380	379	378
DR 25	Message m+							
	393	392	391	390	389	388	387	386
DL 26	Message m+							
	401	400	399	398	397	396	395	394
DR 26	Message m+							
	409	408	407	406	405	404	403	402
DL 27	Message m+							
	417	416	415	414	413	412	411	410
DR 27	Message m+							
	425	424	423	422	421	420	419	418

Messages								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 28	Message m+							
	433	432	431	430	429	428	427	426
DR 28	Message m+							
	441	440	439	438	437	436	435	434
DL 29	Message m+							
	449	448	447	446	445	444	443	442
DR 29	Message m+							
	457	456	455	454	453	452	451	450
DL 30	Message m+							
	465	464	463	462	461	460	459	458
DR 30	Message m+							
	473	472	471	470	469	468	467	466
DL 31	Message m+							
	481	480	479	478	477	476	475	474
DR 31	Message m+							
	489	488	487	486	485	484	483	482
DL 32	Message m+							
	497	496	495	494	493	492	491	490
DR 32	Reserved							

Notes:

- Address **m** is dependent on the assigned message area (see Interface Description Part 1, Section 19). Assignment via PLC MD 7044.
- Whether the message is to be treated as error or operational message is defined via PLC machine data.
- The function blocks for the scan and display of the messages are contained in FB Package 0.

6.11 Central user DB 59

Data bits for user								
Byte No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 0								
DR 0								
DL 1								
DR 1								
DL 2								
DR 2								
DL 3								
DR 3								
DL 4								
DR 4								
DL 5								
DR 5								
⋮								
DL 127								
DR 127								

The 128 data words of DB 59 can be addressed by all PLCs (PLC and PLC).

6.12 PLC machine data

6.12.1 PLC machine data words

6.12.1.1 PLC machine data words for PLC operating system DB 60

Machine data words for PLC operating system			
DW No. PLC MD No.	High byte (DL)		Low byte (DR)
DW 0 m+0			
DW 1 m+1			
DW 2 m+2	1) Call time reference OB 5 Default setting	n * 2,5 ms (n = 1-3) n = 1	
DW 3 m+3	1) Call time reference OB 6 Default setting	m * 10 ms (m = 1-9) m = 1	
DW 4 m+4	1) Call time reference OB 7 Default setting	p * 100 ms (p = 1-255) p = 1	
DW 5 m+5	2) Last STEP 5 timer Default setting	-1 to 255 = 64	
DW 6 m+6	Start of the operator panel inputs Default setting	64-96 = 64	
DW 7 m+7	Start of the operator panel outputs Default setting	64-112 = 64	
DW 8 m+8	Last active channel Default setting	1-16 = 16	
DW 9 m+9	Last active spindle Default setting	1-6 = 6	
DW 10 m+10	Last active axis Default setting	1-24 = 24	
DW 11 m+11	Deletion limit input image Default setting	63-127 = 127	
DW 12 m+12	Deletion limit output image Default setting	63-127 = 127	
DW 13 m+13			
DW 14 m+14			
DW 15 m+15			

PLC	Address m
1	0
2	200

1) Input = 0 is not allowed
2) -1 means that all timers are disabled

Machine data words for PLC operating system		
DW No. PLC MD No.	High byte (DL)	Low byte (DR)
DW 16 m+16		
DW 17 m+17	Number of wait cycles when user interface busy Default = 1 max. = 10	
DW 18 m+18	No. of user interface processed on synchronization Default = 0 max. = 31	
DW 19 m+19	Reserved for computer link	
DW 20 m+20	Function no. for core sequence triggering Default = 25 max. = 255	
DW 21 m+21	Function no. for core sequence triggering Default = 26 max. = 255	
DW 22 m+22	Function no. for core sequence triggering Default = 30 max. = 255	
DW 23 m+23	Function no. for core sequence triggering Default = 0 max. = 255	
DW 24 m+24	Function no. for core sequence triggering Default = 0 max. = 255	
DW 25 m+25	Function no. for core sequence triggering Default = 0 max. = 255	
DW 26 m+26	Function no. for core sequence triggering Default = 0 max. = 255	
DW 27 m+27	Function no. for core sequence triggering Default = 0 max. = 255	
DW 28 m+28	Function no. for core sequence triggering Default = 0 max. = 255	
DW 29 m+29	Function no. for core sequence triggering Default = 0 max. = 255	
DW 30 m+30		
DW 31 m+31		
DW 32 m+32		
DW 33 m+33	No. of user interfaces for command channels 0 - 8 Default setting: 0	

PLC	Address m
1	0
2	200

Machine data words for PLC operating system (IA)		
DW No. PLC MD No.	High byte (DL)	Low byte (DR)
DW 34 m+34	Initial address 1st DMP submodule, 1st DMP interface module, 1st line –1 –254 Default setting –1	
DW 35 m+35	Initial address 2nd DMP submodule, 1st DMP interface module, 1st line –1 –254 Default setting –1	
DW 36 m+36	Initial address 3rd DMP submodule, 1st DMP interface module, 1st line –1 –254 Default setting –1	
DW 37 m+37	Initial address 4th DMP submodule, 1st DMP interface module, 1st line –1 –254 Default setting –1	
DW 38 m+38	Initial address 5th DMP submodule, 1st DMP interface module, 1st line –1 –254 Default setting –1	
DW 39 m+39	Initial address 6th DMP submodule, 1st DMP interface module, 1st line –1 –254 Default setting –1	
DW 40 m+40	Initial address 7th DMP submodule, 1st DMP interface module, 1st line –1 –254 Default setting –1	
DW 41 m+41	Initial address 8th DMP submodule, 1st DMP interface module, 1st line –1 –254 Default setting –1	
DW 42 m+42	Initial address 9th DMP submodule, 1st DMP interface module, 1st line –1 –254 Default setting –1	
DW 43 m+43	Initial address 10th DMP submodule, 1st DMP interface module, 1st line –1 –254 Default setting –1	
DW 44 m+44	Initial address 11th DMP submodule, 1st DMP interface module, 1st line –1 –254 Default setting –1	
DW 45 m+45	Initial address 12th DMP submodule, 1st DMP interface module, 1st line –1 –254 Default setting –1	
DW 46 m+46	Initial address 13th DMP submodule, 1st DMP interface module, 1st line –1 –254 Default setting –1	
DW 47 m+47	Initial address 14th DMP submodule, 1st DMP interface module, 1st line –1 –254 Default setting –1	
DW 48 m+48	Initial address 15th DMP submodule, 1st DMP interface module, 1st line –1 –254 Default setting –1	
DW 49 m+49	Initial address 1st DMP submodule, 1st DMP interface module, 2nd line –1 –254 Default setting –1	
DW 50 m+50	Initial address 2nd DMP submodule, 1st DMP interface module, 2nd line –1 –254 Default setting –1	
DW 51 m+51	Initial address 3rd DMP submodule, 1st DMP interface module, 2nd line –1 –254 Default setting –1	
DW 52 m+52	Initial address 4th DMP submodule, 1st DMP interface module, 2nd line –1 –254 Default setting –1	

Machine data words for PLC operating system (IA)		
DW No. PLC MD No.	High byte (DL)	Low byte (DR)
DW 53 m+53	Initial address 5th DMP submodule , 1st DMP interface module, 2nd line –1 –254 Default setting –1	
DW 54 m+54	Initial address 6th DMP submodule , 1st DMP interface module, 2nd line –1 –254 Default setting –1	
DW 55 m+55	Initial address 7th DMP submodule , 1st DMP interface module, 2nd line –1 –254 Default setting –1	
DW 56 m+56	Initial address 8th DMP submodule , 1st DMP interface module, 2nd line –1 –254 Default setting –1	
DW 57 m+57	Initial address 9th DMP submodule , 1st DMP interface module, 2nd line –1 –254 Default setting –1	
DW 58 m+58	Initial address 10th DMP submodule , 1st DMP interface module, 2nd line –1 –254 Default setting –1	
DW 59 m+59	Initial address 11th DMP submodule , 1st DMP interface module, 2nd line –1 –254 Default setting –1	
DW 60 m+60	Initial address 12th DMP submodule , 1st DMP interface module, 2nd line –1 –254 Default setting –1	
DW 61 m+61	Initial address 13th DMP submodule , 1st DMP interface module, 2nd line –1 –254 Default setting –1	
DW 62 m+62	Initial address 14th DMP submodule , 1st DMP interface module, 2nd line –1 –254 Default setting –1	
DW 63 m+63	Initial address 15th DMP submodule , 1st DMP interface module, 2nd line –1 –254 Default setting –1	
DW 64 m+64	Initial address 1st DMP submodule , 2nd DMP interface module, 1st line –1 –254 Default setting –1	
DW 65 m+65	Initial address 2nd DMP submodule , 2nd DMP interface module, 1st line –1 –254 Default setting –1	
DW 66 m+66	Initial address 3rd DMP submodule , 2nd DMP interface module, 1st line –1 –254 Default setting –1	
DW 67 m+67	Initial address 4th DMP submodule , 2nd DMP interface module, 1st line –1 –254 Default setting –1	
DW 68 m+68	Initial address 5th DMP submodule , 2nd DMP interface module, 1st line –1 –254 Default setting –1	
DW 69 m+69	Initial address 6th DMP submodule , 2nd DMP interface module, 1st line –1 –254 Default setting –1	
DW 70 m+70	Initial address 7th DMP submodule , 2nd DMP interface module, 1st line –1 –254 Default setting –1	
DW 71 m+71	Initial address 8th DMP submodule , 2nd DMP interface module, 1st line –1 –254 Default setting –1	

Machine data words for PLC operating system (IA)		
DW No. PLC MD No.	High byte (DL)	Low byte (DR)
DW 72 m+72	Initial address 9th DMP submodule, 2nd DMP interface module, 1st line –1 –254 Default setting –1	
DW 73 m+73	Initial address 10th DMP submodule, 2nd DMP interface module, 1st line –1 –254 Default setting –1	
DW 74 m+74	Initial address 11th DMP submodule, 2nd DMP interface module, 1st line –1 –254 Default setting –1	
DW 75 m+75	Initial address 12th DMP submodule, 2nd DMP interface module, 1st line –1 –254 Default setting –1	
DW 76 m+76	Initial address 13th DMP submodule, 2nd DMP interface module, 1st line –1 –254 Default setting –1	
DW 77 m+77	Initial address 14th DMP submodule, 2nd DMP interface module, 1st line –1 –254 Default setting –1	
DW 78 m+78	Initial address 15th DMP submodule, 2nd DMP interface module, 1st line –1 –254 Default setting –1	
DW 79 m+79	Initial address 1st DMP submodule, 2nd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 80 m+80	Initial address 2nd DMP submodule, 2nd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 81 m+81	Initial address 3rd DMP submodule, 2nd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 82 m+82	Initial address 4th DMP submodule, 2nd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 83 m+83	Initial address 5th DMP submodule, 2nd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 84 m+84	Initial address 6th DMP submodule, 2nd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 85 m+85	Initial address 7th DMP submodule, 2nd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 86 m+86	Initial address 8th DMP submodule, 2nd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 87 m+87	Initial address 9th DMP submodule, 2nd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 88 m+88	Initial address 10th DMP submodule, 2nd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 89 m+89	Initial address 11th DMP submodule, 2nd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 90 m+90	Initial address 12th DMP submodule, 2nd DMP interface module, 2nd line –1 –254 Default setting –1	

Machine data words for PLC operating system (IA)		
DW No. PLC MD No.	High byte (DL)	Low byte (DR)
DW 91 m+91	Initial address 13th DMP submodule, 2nd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 92 m+92	Initial address 14th DMP submodule, 2nd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 93 m+93	Initial address 15th DMP submodule, 2nd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 94 m+94	Initial address 1st DMP submodule, 3rd DMP interface module, 1st line –1 –254 Default setting –1	
DW 95 m+95	Initial address 2nd DMP submodule, 3rd DMP interface module, 1st line –1 –254 Default setting –1	
DW 96 m+96	Initial address 3rd DMP submodule, 3rd DMP interface module, 1st line –1 –254 Default setting –1	
DW 97 m+97	Initial address 4rd DMP submodule, 3rd DMP interface module, 1st line –1 –254 Default setting –1	
DW 98 m+98	Initial address 5th DMP submodule, 3rd DMP interface module, 1st line –1 –254 Default setting –1	
DW 99 m+99	Initial address 6th DMP submodule, 3rd DMP interface module, 1st line –1 –254 Default setting –1	
DW 100 m+100	Initial address 7th DMP submodule, 3rd DMP interface module, 1st line –1 –254 Default setting –1	
DW 101 m+101	Initial address 8th DMP submodule, 3rd DMP interface module, 1st line –1 –254 Default setting –1	
DW 102 m+102	Initial address 9th DMP submodule, 3rd DMP interface module, 1st line –1 –254 Default setting –1	
DW 103 m+103	Initial address 10th DMP submodule, 3rd DMP interface module, 1st line –1 –254 Default setting –1	
DW 104 m+104	Initial address 11th DMP submodule, 3rd DMP interface module, 1st line –1 –254 Default setting –1	
DW 105 m+105	Initial address 12th DMP submodule, 3rd DMP interface module, 1st line –1 –254 Default setting –1	
DW 106 m+106	Initial address 13th DMP submodule, 3rd DMP interface module, 1st line –1 –254 Default setting –1	
DW 107 m+107	Initial address 14th DMP submodule, 3rd DMP interface module, 1st line –1 –254 Default setting –1	
DW 108 m+108	Initial address 15th DMP submodule, 3rd DMP interface module, 1st line –1 –254 Default setting –1	
DW 109 m+109	Initial address 1st DMP submodule, 3rd DMP interface module, 2nd line –1 –254 Default setting –1	

Machine data words for PLC operating system (IA)		
DW No. / PLC MD No.	High byte (DL)	Low byte (DR)
DW 110 m+110	Initial address 2nd DMP submodule, 3rd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 111 m+111	Initial address 3rd DMP submodule, 3rd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 112 m+112	Initial address 4th DMP submodule, 3rd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 113 m+113	Initial address 5th DMP submodule, 3rd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 114 m+114	Initial address 6th DMP submodule, 3rd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 115 m+115	Initial address 7th DMP submodule, 3rd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 116 m+116	Initial address 8th DMP submodule, 3rd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 117 m+117	Initial address 9th DMP submodule, 3rd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 118 m+118	Initial address 10th DMP submodule, 3rd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 119 m+119	Initial address 11th DMP submodule, 3rd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 120 m+120	Initial address 12th DMP submodule, 3rd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 121 m+121	Initial address 13th DMP submodule, 3rd DMP interface module, 2nd line –1 –254 Default setting –2	
DW 122 m+122	Initial address 14th DMP submodule, 3rd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 123 m+123	Initial address 15th DMP submodule, 3rd DMP interface module, 2nd line –1 –254 Default setting –1	
DW 124 m+124	Byte number of the 1st alarm byte -1 -127 Default setting –1	
DW 125 m+125	Byte number of the 2nd alarm byte -1 -127 Default setting –1	
DW 126 m+126	Byte number of the 3rd alarm byte -1 -127 Default setting –1	
DW 127 m+127	Byte number of the 4th alarm byte -1 -127 Default setting –1	
DW 128 m+128	Reserved	
DW 129 m+129	Reserved	

Machine data words for PLC operating system (IA)		
DW No. PLC MD No.	High byte (DL)	Low byte (DR)
DW 130 m+130	No. of interrupt byte of 1st interface DMP interface module, 1st line (–1 –254) Default setting –1	
DW 131 m+131	No. of interrupt byte of 1st interface DMP interface module, 2nd line (–1 –254) Default setting –1	
DW 132 m+132	No. of interrupt byte of 2nd interface DMP interface module, 1st line (–1 –254) Default setting –1	
DW 133 m+133	No. of interrupt byte of 2nd interface DMP interface module, 2nd line (–1 –254) Default setting –1	
DW 134 m+134	No. of interrupt byte of 3rd interface DMP interface module, 1st line (–1 –254) Default setting –1	
DW 135 m+135	No. of interrupt byte of 3rd interface DMP interface module, 2nd line (–1 –254) Default setting –1	
DW 136 m+136	No. of configuration block with arbitruary configuration Default setting =0 (no DB/DX)	

Notes:

- Only one interrupt byte is possible per DMP interface module, i. e. only one of the two machine data of an interface module is allowed to contain a value other than –1. 1)
- Up to 3 interrupt bytes are possible. 1)
- The interrupt byte in the DMP line is always the **first** input byte of a DMP station. 1)
- Free configuration of the DMP
  - The MD 34 ... 135 and 6068 to 6079 can be processed by the IF DMP module as before. In this case MD 136 = 0.
  - For extended addressing of the DMP stations, the user can compile the MDs in a DB of the user program. He enters the number of the DB or DX used for this purpose in MD 136.
  - The configuration data block allows both configuration of the individual slots for inputs and outputs of the DMP compact submodule and separate setting of inputs and outputs on conventional DMP stations.
  - Please refer to the SINUMERIK 880 GA2 Installation Instructions for more detailed information on the configuration DB (free configuration).

1) Valid if PLC MD 136 = 0

6.12.1.2 PLC machine data words for function blocks DB 61

Machine data words for function blocks (IA)		
DW No. / PLC MD No.	High byte (DL)	Low byte (DR)
DW 0 2000 : DW 77 2077	Reserved for tool management . . . Reserved for tool management	
DW 78 2078 : DW 89 2089	Reserved for computer link . . . Reserved for computer link	
DW 90 2090	Reserved for loading/unloading code carrier	
DW 91 2091 : DW 95 2095	Reserved . . . Reserved	
DW 96 2096 : DW 119 2119	Reserved for computer link . . . Reserved for computer link	
DW 120 2120 : DW 139 2139	Reserved for tool management . . . Reserved for tool management	
DW 140 2140 : DW 149 2149	Reserved	

Note:

Please refer to the documentation on the individual FB Packages for more detailed information.

PLC	Address m
1	2000
2	2250

6.12.1.3 PLC machine data words for user DB 62

Machine data words for user		
DW No. PLC MD No.	High byte (DL)	Low byte (DR)
DW 0 m+0		
DW 1 m+1		
DW 2 m+2		
DW 3 m+3		
DW 4 m+4		
DW 5 m+5		
DW 6 m+6		
DW 7 m+7		
DW 8 m+8		
DW 9 m+9		
DW 10 m+10		
DW 11 m+11		
DW 12 m+12		
DW 13 m+13		
⋮		
DW 49 m+49		

PLC	Address m
1	4000
2	4100

6.12.2 PLC machine data bits

6.12.2.1 PLC machine data bits for PLC operating system DB 63

Channel-specific processing								
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 m	Signals from/to NC channel							
	8	7	6	5	4	3	2	1
DR 0 m+1	16	15	14	13	12	11	10	9
DL 1 m+2								
DR 1 m+3	Signals from NC channel							
	8	7	6	5	4	3	2	1
DL 2 m+4	16	15	14	13	12	11	10	9
DR 2 m+5								
DL 3 m+6	Feedrate disable and read-in disable to NC channel							
	8	7	6	5	4	3	2	1
DR 3 m+7	16	15	14	13	12	11	10	9
DL 4 m+8								
DR 4 m+9	M decoding with extended address for NC channel							
	8	7	6	5	4	3	2	1
DL 5 m+10	16	15	14	13	12	11	10	9
DR 5 m+11								

Spindle-specific processing								
Byte No. PLC MD No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 6 m+12					Signals from/to spindle			
			6	5	4	3	2	1
DR 6 m+13								
DL 7 m+14					Signals from spindle			
			6	5	4	3	2	1
DR 7 m+15								

PLC	Address m
1	6000
2	6100

Axis-specific processing								
Byte No. PLC MD No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 8 m+16	Signals from/to axis							
	8	7	6	5	4	3	2	1
DR 8 m+17	Signals from/to axis							
	16	15	14	13	12	11	10	9
DL 9 m+18	Signals from/to axis							
	24	23	22	21	20	19	18	17
DR 9 m+19								
DL 10 m+20								
DR 10 m+21	Signals from/to axis							
	8	7	6	5	4	3	2	1
DL 11 m+22	Signals from/to axis							
	16	15	14	13	12	11	10	9
DR 11 m+23	Signals from/to axis							
	24	23	22	21	20	19	18	17
DL 12 m+24								
DR 12 m+25								

General machine data								
Byte No. PLC MD No	Bit No.							
	7	6	5	4	3	2	1	0
DL 13 m+26	Serial interface	Reserved S5-155U	Deselection of automa-tic NC Start inhibit	Operator panel switchover	Save FY 200 - FY 255	Access inhibited via @ commands	Command channel active	
DR 13 m+27					Access to I/O submodule (inputs)			
					4	3	22	1
DL 14 m+28					Access to I/O submodule (outputs)			
					4	3	2	1
DR 14 m+29					Message in source/tar-get channel	ELG signals to NC		T/H word routing
DL 15 m+30	Error/operational message with inactive channels							
	8	7	6	5	4	3	2	1
DR 15 m+31	16	15	14	13	12	11	10	9

PLC	Address m
1	6000
2	6100

Processing of error messages								
Byte No. PLC MD No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 16 m+32	Error messages SIGNALS TO NC CHANNEL							
	DR 9	DL 9	DR 8	DL 8	DR 7	DL 7	DR 6	DL 6
DR 16 m+33	Error messages SIGNALS TO NC CHANNEL							
					DR 11	DL 11	DR 10	DL 10
DL 17 m+34	Error messages SIGNALS TO SPINDLE							
							DR K+3	DL K+3
DR 17 m+35	Error messages SIGNALS TO AXIS							
							DR K+3	DL K+3
DL 18 m+36	Error messages DB 58 MESSAGES							
	DR 4	DL 4	DR 3	DL 3	DR 2	DL 2	DR 1	DL 1
DR 18 m+37	Error messages DB 58 MESSAGES							
	DR 8	DL 8	DR 7	DL 7	DR 6	DL 6	DR 5	DL 5
DL 19 m+38	Error messages DB 58 MESSAGES							
	DR12	DL 12	DR 11	DL 11	DR 10	DL 10	DR 9	DL 9
DR 19 m+39	Error messages DB 58 MESSAGES							
		DL 16	DR 15	DL 15	DR 14	DL 14	DR 13	DL 13

Processing of operational messages								
Byte No. PLC MD No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 20 m+40	Operational messages SIGNALS TO NC CHANNEL							
	DR 9	DL 9	DR 8	DL 8	DR 7	DL 7	DR 6	DL 6
DR 20 m+41	Operational messages SIGNALS TO NC CHANNEL							
					DR 11	DL 11	DR 10	DL 10
DL 21 m+42	Operational messages SIGNALS TO SPINDLE							
							DR K+3	DL K+3
DR 21 m+43	Operational messages SIGNALS TO AXIS							
							DR K+3	DL K+3
DL 22 m+44	Operational messages DB 58 MESSAGES							
	DR 4	DL 4	DR 3	DL 3	DR 2	DL 2	DR 1	DL 1
DR 22 m+45	Operational messages DB 58 MESSAGES							
	DR 8	DL 8	DR 7	DL 7	DR 6	DL 6	DR 5	DL 5
DL 23 m+46	Operational messages DB 58 MESSAGES							
	12	DL 12	DR 11	DL 11	DR 10	DL 10	DR 9	DL 9
DR 23 m+47	Operational messages DB 58 MESSAGES							
		DL 16	DR 15	DL 15	DR 14	DL 14	DR 13	DL 13

PLC	Address m
1	6000
2	6100

PLC operating characteristics								
Byte No. PLC MD No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 24 m+48	Stop on processing time delay by							
	OB7	OB6	OB5	OB4	OB3	OB2		
DR 24 m+49							IP/WF module inserted	Access to PLC I/Os
DL 25 m+50	Disabling of							
	OB7	OB6	OB5	OB4	OB3	OB2		
DR 25 m+51							PG mode 0 155U 1=135WB	PLC mode

PLC operating characteristics								
Byte No. PLC MD No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 26 m+52	Reserved							
DR 26 m+53	Reserved							
DL 27 m+54	Reserved							
DR 27 m+55	Reserved							
DL 28 m+56	Reserved							
DR 28 m+57	Reserved							
DL 29 m+58	Reserved							
DR 29 m+59	Reserved							
DL 30 m+60	PLC Stop on failure of				Servo CPU 4	Servo CPU 3	Servo CPU 2	Servo CPU 1
DR 30 m+61	PLC Stop on failure of						NC CPU 2	NC CPU 1
DL 31 m+62	Reserved							
DR 31 m+63	Reserved						always 1	
DL 32 m+64	Reserved							
DR 32 m+65	Reserved							

PLC	Address m
1	6000
2	6100

PLC operating characteristics								
Byte No. PLC MD No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 33 m+66	Reserved							
DR 33 m+67	Reserved							
DL 34 m+68	Interrupt-triggering edge for interrupt inputs 1st interface DMP interface module					1st line, bit 0...7		
DR 34 m+69	Interrupt-triggering edge for interrupt inputs 1st interface DMP interface module					2nd line, bit 0...7		
DL 35 m+70	Interrupt-triggering edge for interrupt inputs 2nd interface DMP interface module					1st line, bit 0...7		
DR 35 m+71	Interrupt-triggering edge for interrupt inputs 2nd interface DMP interface module					2nd line, bit 0...7		
DL 36 m+72	Interrupt-triggering edge for interrupt inputs 3rd interface DMP interface module					1st line, bit 0...7		
DR 36 m+73	Interrupt-triggering edge for interrupt inputs 3rd interface DMP interface module					2nd line, bit 0...7		
DL 37 m+74	Enable interrupt inputs 1st interface DMP interface module					1st line, bit 0...7		
DR 37 m+75	Enable interrupt inputs 1st interface DMP interface module					2nd line, bit 0...7		
DL 38 m+76	Enable interrupt inputs 2nd interface DMP interface module					1st line, bit 0...7		
DR 38 m+77	Enable interrupt inputs 2nd interface DMP interface module					2nd line, bit 0...7		
DL 39 m+78	Enable interrupt inputs 3rd interface DMP interface module					1st line, bit 0...7		
DR 39 m+79	Enable interrupt inputs 3rd interface DMP interface module					2nd line, bit 0...7		

PLC	Address m
1	6000
2	6100

Processing of operational messages								
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 m+80	Error messages DB 58 MESSAGES							
	DR 20	DL 20	DR 19	DL 19	DR 18	DL 18	DR 17	DL 17
DR 40 m+81	Error messages DB 58 MESSAGES							
	DR 24	DL 24	DR 23	DL 23	DR 22	DL 22	DR 21	DL 21
DL 41 m+82	Error messages DB 58 MESSAGES							
	DR 28	DL 28	DR 27	DL 27	DR 26	DL 26	DR 25	DL 25
DR 41 m+83	Error messages DB 58 MESSAGES							
		DL 32	DR 31	DL 31	DR 30	DL 30	DR 29	DL 29
DL 42 m+84	Operational messages DB 58 MESSAGES							
	DR 20	DL 20	DR 19	DL 19	DR 18	DL 18	DR 17	DL 17
DR 42 m+85	Operational messages DB 58 MESSAGES							
	DR 24	DL 24	DR 23	DL 23	DR 22	DL 22	DR 21	DL 21
DL 43 m+86	Operational messages DB 58 MESSAGES							
	DR 28	DL 28	DR 27	DL 27	DR 26	DL 26	DR 25	DL 25
DR 43 m+87	Operational messages DB 58 MESSAGES							
		DL 32	DR 31	DL 31	DR 30	DL 30	DR 29	DL 29
DL 44 m+88	Reserved							
DR 44 m+89	Reserved							
DL 45 m+90	Reserved							
DR 45 m+91	Reserved							
DL 46 m+92	Reserved							
DR 46 m+93	Reserved							
DL 47 m+94	Reserved							
DR 47 m+95	Reserved							

PLC	Address m
1	6000
2	6100

PLC operating characteristics								
Byte No. PLC MD No.	15	14	13	12	11	10	9	8
	Bit No.							
	7	6	5	4	3	2	1	0
DL 48 m+96	Reserved							
DR 48 m+97	Reserved							
DL 49 m+98	Reserved							
DR 49 m+99	Reserved							

PLC	Address m
1	6000
2	6100

Standard setting of the machine data bits for the PLC operating system

MD	PLC I	PLC II	
m+00	11111111		i.e. Signals from/to NC channel 1-8
m+06	11111111		i.e. Feedrate disable and read in disable to NC channel 1-8
m+12	00000001		i.e. Signals from/to spindle 1
m+16	11111111		i.e. Signals from/to axis 1-16
m+26	10000000		i.e. Serial interface for PLC I
m+27	00000001		i.e. Inputs from input/output submodule 1
m+28	00000001		i.e. Outputs from input/output submodule 1
m+48	11111100	11111100	i.e. STOP processing time delay OB 2...7
m+50	11111100	11111100	i.e. Disable the respective OBs
m+51	00000001	00000001	i.e. Normal mode for changing the processing levels

Machine data not listed or without information are defaulted with the standard value 00000000.

6.12.2.2 PLC machine data bits for function blocks DB 64

Machine data bits for function blocks								
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 m+0	Reserved for computer link							
DR 0 m+1	See documentation on FB Packages 4+5 for explanation							
⋮	:							
DR 2 m+5	:							
⋮								
⋮								
DL 5 m+10	Reserved for tool management							
DR 5 m+11	See documentation on FB Packages 1+2 for explanation							
⋮	:							
DR 21 m+43	:							
DL 22 m+44	Reserved for FB Package 0, message groups See documentation on Interface Signals Section 19.3.3 for explanation							
DR 22 m+45								
DL 23 m+46	Reserved for computer link							
DR 23 m+47	See documentation on FB Packages 4+5 for explanation							
⋮								
DR 39 m+79								

PLC	Address m
1	7000
2	7250

6.12.2.3 PLC machine data bits for user DB 65

Machine data bits for user								
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 m+0								
DR 0 m+1								
DL 1 m+2								
DR 1 m+3								
DL 2 m+4								
DR 2 m+5								
DL 3 m+6								
DR 3 m+7								
DL 4 m+8								
DR 4 m+9								
DL 5 m+10								
DR 5 m+11								
⋮								
DL 24 m+48								
DR 24 m+49								

PLC	Address m
1	8000
2	8050

6.13 DBs set-up for the user

6.13.1 DB set-up for the user, words DB 68

User words		
DW No. PLC MD No.	High byte (DL)	Low byte (DR)
DW 0		
DW 1		
DW 2		
DW 3		
DW 4		
DW 5		
DW 6		
DW 7		
DW 8		
DW 9		
DW 10		
DW 11		
DW 12		
DW 13		
⋮		
DW 63		

6.13.2 DB set-up for the user, bits DB 71

User bits								
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								
DR 0								
DL 1								
DR 1								
DL 2								
DR 2								
DL 3								
DR 3								
DL 4								
DR 4								
DL 5								
DR 5								
⋮								
DL 15								
DR 15								

6.14 Decoding lists for M signals (DB 80...DB 95)

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, free entries must be defaulted with 0. All entries not made are listed 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, consequently, DB 95 for NC channel 16.
- Activation of M decodings according to the decoding list is channel-specific via MDs.

7 Error List for PLC 135WB on System Stop

7.1 Error numbers (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 7.2).

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 164 (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
DW 164	Suppl. error information	4th word	F0004
DW 165	Reserved		
DW 166	ACCU 1, low word		
DW 167	ACCU 2, low word		

- **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 (ACR command)

- **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	MD20-29: Impermissible quantity for core sequences
30	MD128: Address 1st machine control panel too high (max. 120), SIN 840 only
31	MD129: Address 2nd machine control panel too high (max. 120), SIN 840 only
32	Synchronization error between PLCs in the I/O configuration with 16-bit link
33	MD error with DMP assignment lists (overlapping) *)
34	Interface DMP incorrectly started (system start) *)
35	Synchronization error between PLCs: Global address routing of the EUs cannot be carried out
36	Synchronization error between PLCs: I/O configuration not possible because not all PLCs have signalled their central I/O configuration
37	INT EU/MPC module does not exist, but MD interrupt address is on ”available” *)

Cold restart

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 (double addressing of interrupt byte)
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	Illegal addition of interface DMP firmware
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	Modification 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 user data 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 *)

Warm restart	
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 *)

Cold and/or warm restart	
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, SIN 840 only
6E	MD error *)
6F	EUs not switched on or incorrectly jumpered (rotary switch) *)

- **Operational and user errors**

Dynamic system monitoring	
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

Cyclic system monitoring	
74	Communication CPU in system failed
75	One PLC CPU in system failed
76	One or several NC 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, SIN 840 only
7B	Reserved
7C	DMP interface no ready signal

- **Error messages from interrupt routines**

System errors	
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

Timeouts	
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 *)
9B	Timeout when processing high-level language blocks *)
9C	Timeout on access to page commands LY CB, LY CW, LY CD, TY CB, TY CB, TY CW, TY CD, TSC *)

Error messages of distributed I/Os	
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 *)
B1	Output module failed or changed *)

Cycle time monitoring	
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	Sytem STOP by HLL user *)

HLL_S5 function	
DE	Unknown pseudo parameter in STACK
DF	S5 block called not available
E0	S5 block called not in line with paragraph
E1	Block called is not a S5 block

Other operational and user errors

F7	M decoding: byte number for DB30>63
F8	PROTES system error: Error with P link, SIN 840 only *)
F9	Interrupts from interrupt-generating I/O devices not acknowledged by OB2

Errors in addressing decoding data blocks

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

Error message with function macros

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.

7.2 Supplementary error information (DB1 DW161-164)

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 F0004 or can be obtained from DW161 to 164 in the diagnostics DB (DB1).

In the case of supplementary error details marked with ++), the representation of F0001 to F004 in DB1 High**/**Low is reversed.

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 ++) High byte: Identifier for preceding command Low byte: OB number where the error occurred Opcode 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 in which overflow occurred – – – –
0B	F0000 F0001 F0002 F0003	0B: Stop caused by STS command OB number in which STS occurred – – – –
0D	F0000 F0001 F0002 F0003	0D: Error number processing time delay OB number in which processing time delay occurred – – – –
33	F0000 F0001 F0002	33: MD error in the DMP assigment list or error in the DMP configuration DB/DX 00: Error in DMP assignment lists (overlapping) Other than 00: Error in configuration DB**/**DX number of DB**/**DX from MD 136 (BCD format) Number of the faulty/missing data word in the configuration DB/DX (BCD format) ++)

Error No.	Address	Contents/Designation
34	F0000 F0001 F0002 F0003 F0004	34: Error number interface DMP incorrectly started or EU incorrectly routed 00: Interface DMP incorrectly started (system start) 01: Identifier for incorrect EU routing No. of interface module (with F0001 = 01) Submodule number (with F0001 = 01) Line number (with F0001 = 01)
37	F0000 F0001 F0002 F0003	37: Distributed interrupt byte not available Byte number (BCD format) – – – –
3C	F0000 F0001 F0002 F0003	3C: Error number MD double addressing inputs Group number (BCD format) – – – –
3D	F0000 F0001 F0002 F0003	3D: Error number MD double addressing outputs Group number (BCD format) – – – –
3E	F0000 F0001 F0002 F0003	3E: Error number output group per MD for several PLCs Group number (BCD format) – – – –
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 (BCD format) – – – –
48	F0000 F0001 F0002 F0003	48: Error number double addressing outputs Byte number (BCD format) – – – –
49	F0000 F0001 F0002 F0003	49: Error number modification of I/O modules Low byte: 3C: Address location of I/O byte changed 00: I/O failure High byte (type of I/O device): 01: Distributed I/Os 03: 16 bit link 04: DMP 0E or 0A identifier input/output Byte number (BCD format) ++)

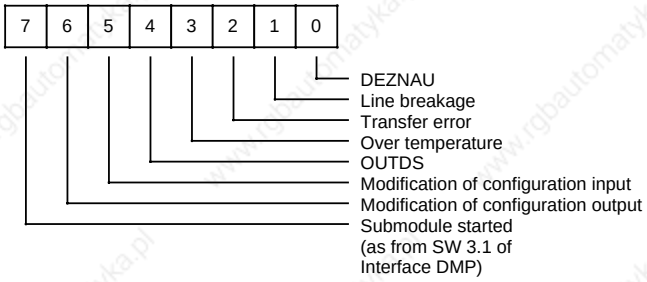
***) Type identifier of timeout:*
0001 = Internal timeout
0002 = Link bus timeout
0003 = Local bus timeout

Error No.	Address	Contents/Designation
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: 16 bit link 04: DMP 05: Global I/Os 0E or 0A identifier input/output Byte number (BCD format) ++)
66	F0000 F0001 F0002 F0003	SIN 840 only 0: Cold restart: NC CPU synchronization error 1: NC CPU 2: NC CPU and IFC – – – –
67	F0000 F0001 F0002 F0003	SIN 840 only 0: Cold restart: synchronization error NC CPU 1: NC CPU 2: NC CPU and IFC – – – –
6D	F0000 F0001 F0002 F0003	Error number for machine control panel to IFC (only SIN 840) 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 – – – –

Error No.	Address	Contents/Designation
6E	F0000 F0001	6E: Group error number 0: Serial interface activated for several PLCs 3: PLC MD for from/to NC channel set for several PLCs 4: PLC MD for from/to spindle set for several PLCs 5: PLC MD for from/to axis set for several PLCs 6: PLC MD output to output submodule set for several PLCs 7: PLC MD for error and operational messages (channel-specific) set 8: PLC MD for error and operational messages (spindle-specific) set 9: PLC MD for error and operational messages (axis-specific) set 10: PLC MD for M decoding set for extended addresses. At least one decoding list missing. 11: PLC MD for I submodule 1 set - submodule missing 12: PLC MD for I submodule 2 set - submodule missing 13: PLC MD for I submodule 3 set - submodule missing 14: PLC MD for I submodule 4 set - submodule missing 15: PLC MD for O submodule 1 set - submodule missing 16: PLC MD for O submodule 2 set - submodule missing 17: PLC MD for O submodule 3 set - submodule missing 18: PLC MD for O submodule 4 set - submodule missing 19: PLC MD for error and operational messages (DB58) set 20: PLC MD for operator panel switchover set for several PLCs 21: PLC FB MD: EM**/**OM message area set for several PLCs 22: PLC FB MD: More than 2 EM**/**OM message areas defined within one PLC 23: PLC MD for enabling transfer of ELG signals from the user to the MC set for several PLCs
6F	F0000 F0001 F0002 F0003 F0004	Error number 6F, I/O device fault on starting Identifier of type I/O device 16 bit link = 3 DMP = 4 Number of interface from 0 to 2 EU number from 0 to 3 with DMP submodule number from 0 to 14 (as from SW 3.1 of interface DMP, otherwise 0) Line (MPC) number from 1 to 2 with DMP only (as from SW 3.1 of interface DMP, otherwise 1) If one DMP interface activates error identifier 6F, the status register displays of the DMP submodules are additionally transferred to DB 1 from DW 70 onwards (see also error numbers B0**/**B1). ++)

Error No.	Address	Contents/Designation
7A	F0000 F0001	7A: Failure machine control panel to CPU interface (SIN 840 only) 1: Failure 1st machine control panel 2: Failure 2nd machine control panel
92	F0000 F0001 F0002 F0003	92: Timeout in the case of buffered access to link-local bus Bus address (segment), at which timeout occurs Bus adress (offset), at which timeout occurs Type identifier of timeout++)
93	F0000 F0001 F0002 F0003	93: Error number timeout with system progr. processing CS when timeout occurs IP when timeout occurs Type identifier of the timeout **)++)
94	F0000 F0001 F0002 F0003	94: Error number timeout with LIR/TIR OPCODE command Offset address Segment number ++)
95	F0000 F0001 F0002 F0003	95: Error number timeout with TNB/TNW OPCODE command Offset address Segment number ++)
96	F0000 F0001 F0002 F0003 F0004	96: Error number timeout with LPB/LPW/TPB/TPW OPCODE command Specification of input or output Byte No. (BCD format) Identifier of type of I/O device: 01: Distributed I/Os 03: 16 bit link 04: DMP ++)
97	F0000 F0001 F0002 F0003	97: Error number timeout with substitution command Substitution command Substituted command – – ++)
99	F0000 F0001 F0002 F0003	99: Error number timeout not interpretable when interpreter active CS when timeout occurs IP when timeout occurs Type identifier of the timeout **) ++)
9A	F0000 F0001 F0002 F0003	9A: Error number timeout when processing FB OPCODE command Command parameter (with FX only, otherwise 0000) Type identifier of the timeout

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

Error No.	Address	Contents/Designation
9B	F0000	9B: Error number timeout when processing high-level language
	F0001	CS when timeout occurs
	F0002	IP when timeout occurs
	F0003	Type identifier of the timeout
	F0004	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	F0000	Error number B0/B1 ++)
	F0001	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 05: Global I/Os
	F0002	0E or 0A identifier inputs/outputs
	F0003	Byte number (BCD format)
	F0004	Line number In addition, DB1 contains the following information on the failure of I/O devices: DW 10 Identifier of type of I/O device Central I/Os, TPx, LPx = 1 16 bit link = 3 DMP = 4 DW 12-13 Error message I modules DW 14-15 Error message O modules 1 bit per module 1 module = 8 bytes DW 30-45 Error message I byte DW 46-61 Error message Q byte 1 bit per byte DW 70-159 Status register display of DMP submodules 
DD	F0000	DD: Error number system STOP by HLL user
	F0001	User STOP number
	F0002	HLL call address (offset)
	F0003	HLL call address (segment) ++)
F8	F0000	F8: Error with PG link (SIN 840 only)
	F0001	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	F0000	FF: Group error with function macro
	F0001	Current OB No. (No. of processing level)
	F0002	– –
	F0003	– –

7.3 LED error display with 135WB

LED	Meaning
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 (red) Once	Error with cross-checksum test via the system program
Twice	Error with CPU RAM test
3 times	Error timer 0 (process-internal timer) or error watchdog
4 times	Error with monitoring test for timeout
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)
6 times	Error on test access to a link RAM
7 times	Error in system initialization program
8 times	Failure of other PLC (with DUO PLC only)
9 times	**SINUMERIK 840**: synchronization error with PG link
10 times	Error of internal coprocessor (COP) registers or with step address counter (SAZ) generation
11 times	Command delegation to the word processor (WOP)
12 times	Processing of binary commands
13 times	Processing of OR, bracket, NOP or BLD commands
14 times	Processing of block call and jump commands
15 times	Processing of timer and counter operations
16 times	Addressing in the data memory
17 times	Command execution mode
18 times	Test address comparator machine code (MC5) and interrupt processing from coprocessor
19 times	Monitoring test for timeout on access of the coprocessor to the user memory
20 times	ACOP Redesign not inserted

8 ASCII Table and Hexadecimal Key Code

ASCII	HEX	DEC	OCT	BINARY	ASCII	HEX	DEC	OCT	BINARY
NUL	00	00	00	0000 0000	GS	1D	29	35	0001 1101
SOH	01	01	01	0000 0001	RS	1E	30	36	0001 1110
STX	02	02	02	0000 0010	US	1F	31	37	0001 1111
ETX	03	03	03	0000 0011	(SPACE)	20	32	40	0010 0000
EOT	04	04	04	0000 0100	!	21	33	41	0010 0001
ENQ	05	05	05	0000 0101	”	22	34	42	0010 0010
ACK	06	06	06	0000 0110	#	23	35	43	0010 0011
BEL	07	07	07	0000 0111	$	24	36	44	0010 0100
BS	08	08	10	0000 1000	%	25	37	45	0010 0101
HT	09	09	11	0000 1001	&	26	38	46	0010 0110
LF	0A	10	12	0000 1010	'	27	39	47	0010 0111
VT	0B	11	13	0000 1011	(	28	40	50	0010 1000
FF	0C	12	14	0000 1100	)	29	41	51	0010 0001
CR	0D	13	15	0000 1101	*	2A	42	52	0010 1010
SO	0E	14	16	0000 1110					
SI	0F	15	17	0000 1111					
DLE	10	16	20	0001 0000					
DC1	11	17	21	0001 0001					
DC2	12	18	22	0001 0010					
DC3	13	19	23	0001 0011					
DC4	14	20	24	0001 0100					
NAK	15	21	25	0001 0101					
SYN	16	22	26	0001 0110					
ETB	17	23	27	0001 0111					
CAN	18	24	30	0001 1000					
EM	19	25	31	0001 1001					
SUB	1A	26	32	0001 1010					
ESC	1B	27	33	0001 1011					
FS	1C	28	34	0001 1100					

ASCII	HEX	DEC	OCT	BINARY	ASCII	HEX	DEC	OCT	BINARY
+	2B	43	53	0010 1011	H	48	72	110	0100 1000
'	2C	44	54	0010 1100	I	49	73	111	0100 1001
-	2D	45	55	0010 1101	J	4A	74	112	0100 1010
.	2E	46	56	0010 1110	K	4B	75	113	0100 1011
/	2F	47	57	0010 1111	L	4C	76	114	0100 1100
0	30	48	60	0011 0000	M	4D	77	115	0100 1101
1	31	49	61	0011 0001	N	4E	78	116	0100 1110
2	32	50	62	0011 0010	O	4F	79	117	0100 1111
3	33	51	63	0011 0011	P	50	80	120	0101 0000
4	34	52	64	0011 0100	Q	51	81	121	0101 0001
5	35	53	65	0011 0101	R	52	82	122	0101 0010
6	36	54	66	0011 0110	S	53	83	123	0101 0011
7	37	55	67	0011 0111	T	54	84	124	0101 0100
8	38	56	70	0011 1000	U	55	85	125	0101 0101
9	39	57	71	0011 1001					
:	3A	58	72	0011 1010					
;	3B	59	73	0011 1011					
<	3C	60	74	0011 1100					
=	3D	61	75	0011 1101					
>	3E	62	76	0011 1110					
?	3F	63	77	0011 1111					
@	40	64	100	0100 0000					
A	41	65	101	0100 0001					
B	42	66	102	0100 0010					
C	43	67	103	0100 0011					
D	44	68	104	0100 0100					
E	45	69	105	0100 0101					
F	46	70	106	0100 0110					
G	47	71	107	0100 0111					

ASCII	HEX	DEC	OCT	BINARY	ASCII	HEX	DEC	OCT	BINARY
V	56	86	126	0101 0110	s	73	115	163	0111 0011
W	57	87	127	0101 0111	t	74	116	164	0111 0100
X	58	88	130	0101 1000	u	75	117	165	0111 0101
Y	59	89	131	0101 1001	v	76	118	166	0111 0110
Z	5A	90	132	0101 1010	w	77	119	167	0111 0111
[	5B	91	133	0101 1011	x	78	120	170	0111 1000
\	5C	92	134	0101 1100	y	79	121	171	0111 1001
]	5D	93	135	0101 1101	z	7A	122	172	0111 1010
^	5E	94	136	0101 1110	{	7B	123	173	0111 1011
_	5F	95	137	0101 1111	|	7C	124	174	0111 1100
`	60	96	140	0110 0000	}	7D	125	175	0111 1101
a	61	97	141	0110 0001	~	7E	126	176	0111 1110
b	62	98	142	0110 0010	DEL	7F	127	177	0111 1111
c	63	99	143	0110 0011					
d	64	100	144	0110 0100					
e	65	101	145	0110 0101					
f	66	102	146	0110 0110					
g	67	103	147	0110 0111					
h	68	104	150	0110 1000					
i	69	105	151	0110 1001					
j	6A	106	152	0110 1010					
k	6B	107	153	0110 1011					
l	6C	108	154	0110 1100					
m	6D	109	155	0110 1101					
n	6E	110	156	0110 1110					
o	6F	111	157	0110 1111					
p	70	112	160	0111 0000					
q	71	113	161	0111 0001					
r	72	114	162	0111 0010					

Key	HEX	Key	HEX
Softkey 1	80	CURSOR right	90
Softkey 2	81	CURSOR left	91
Softkey 3	82	CURSOR up	92
Softkey 4	83	CURSOR down	93
Softkey 5	84	Channel switchover	99
ETC	85	Mode group 1	A5
RECALL	86	Mode group 2	A6
+/–	87	Mode group 3	A7
INPUT	89	Mode group 4	A8
EDIT	8A	Mode group 5	A9
CANCEL	8B	Mode group 6	AA
CLEAR	8C	Mode group 7	AB
SELECT	8D	Mode group 8	AC
PAGE up	8E	Mode group 9	AD
PAGE down	8F		
Terminal operation	9A		

9 Module Replacement

The following action must be performed by the operator after withdrawing or replacing modules.

SINUMERIK 880 GA2

Module or module location / slot		6FX 1...	Delete/ load NC/PLC MD	Softkey: Format user memory	Softkey: Clear part program memory	Com-plete installa-tion	PLC overall reset	PLC cold restart	Other remarks
Multiport two-tier	Version 5, 7	136 - 8BA01	X	X		X	X	X	
Dual port single-tier	Version 1, 2, 3	124 - 0BA03	X	X		X	X	X	
Power supply unit - cent.cont.		6EW 1861-2A.							
Power supply unit- oper.panel		6EW 1861-3A.							
Replace buffer battery while	control is on	/							
	control is off	/	X	X	X	X	X	X	
COM CPU		147 - 4BB00		X	X				
EPROM submodule for COM CPU		124 - 1CC00							
INT MEM submodule		147 - 5BA01		X	X				
NC CPU 2)		147 - 4BB00		X					2)
EPROM submodule for NC CPU		124 - 1CC00							
Servo CPU		136 - 3BB01							
EPROM submodule for servo CPU		124 - 1CB00							
PLC CPU		838 - 6BL01					X	X	
UMS 1)									1)

Other remarks:

1) The UMS submodule can only be replaced in installation mode (rotary switch on COM-CPU to position ”1”).

2) Compensation data and cycles machine data must be backed up and reloaded after having been changed.

Caution:

Modules and submodules can only be withdrawn or replaced in off-load state of the control. The EEC protection rules must be complied with.

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Suggestions

Corrections

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Suggestions and/or corrections

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