

CNC

MELDAS C6/C64/C64T

DDB INTERFACE MANUAL



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Introduction

This manual describes the DDB (Direct Data Bus) function used to realize data input/output with a CNC while running a program developed with a MELDAS C6/C64/C64T user PLC (ladder language).







The methods for reading and writing various NC information using the DDB from a PLC are described in this manual.

Please read this manual before programming.

Please read the "Precautions for Safety" listed on the following page to ensure safe use of the MELDAS C6/C64/C64T.

Details described in this manual

CAUTION

-  For items described in "Restrictions" or "Usable State", the instruction manual issued by the machine maker takes precedence over this manual.
-  Items not described in this manual must be interpreted as "not possible".
-  This manual is written on the assumption that all option functions are added. Refer to the specifications issued by the machine maker before starting use.
-  Refer to the Instruction Manual issued by each machine tool builder for details on each machine tool.
-  Some screens and functions may differ depending on the NC system (or its version), and some functions may not be possible. Please confirm the specifications before use.
-  Setting incorrect values could cause the machine to malfunction or run away. Take care when programming.

General precautions

The following documents are available as documents related to the contents of this manual. Refer to these as required.

C6/C64	PLC Programming Manual(Ladder section with MELSEC tool)	BNP-B2309
C6/C64/C64T	PLC Interface Manual.....	BNP-B2261

Precautions for Safety

Always read the specifications issued by the machine maker, this manual, related manuals and enclosed documents before starting installation, operation, programming, maintenance or inspections to ensure correct use. Thoroughly understand the basics, safety information and precautions of this numerical controller before using the unit.

The safety precautions are ranked as "DANGER", "WARNING" and "CAUTION" in this manual.




When there is a great risk that the user could be subject to fatalities or serious injuries if handling is mistaken.



When the user could be subject to fatalities or serious injuries if handling is mistaken.



When the user could be subject to injuries or when physical damage could occur if handling is mistaken.

Note that even if the item is ranked as " **CAUTION**", incorrect handling could lead to serious results. Important information is described in all cases, so please observe the items.

DANGER







Not applicable in this manual.

WARNING

Not applicable in this manual.

CAUTION

1. Items related to product and manual

-  For items described as "Restrictions" or "Usable State" in this manual, the instruction manual issued by the machine maker takes precedence over this manual.
-  Items not described in this manual must be interpreted as "not possible".
-  This manual is written on the assumption that all option functions are added. Refer to the specifications issued by the machine maker before starting use.
-  Refer to the Instruction Manual issued by each machine tool builder for details on each machine tool.
-  Some screens and functions may differ depending on the NC system (or its version), and some functions may not be possible. Please confirm the specifications before use.
-  Setting incorrect values could cause the machine to malfunction or run away. Take care when programming.

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1. Outline

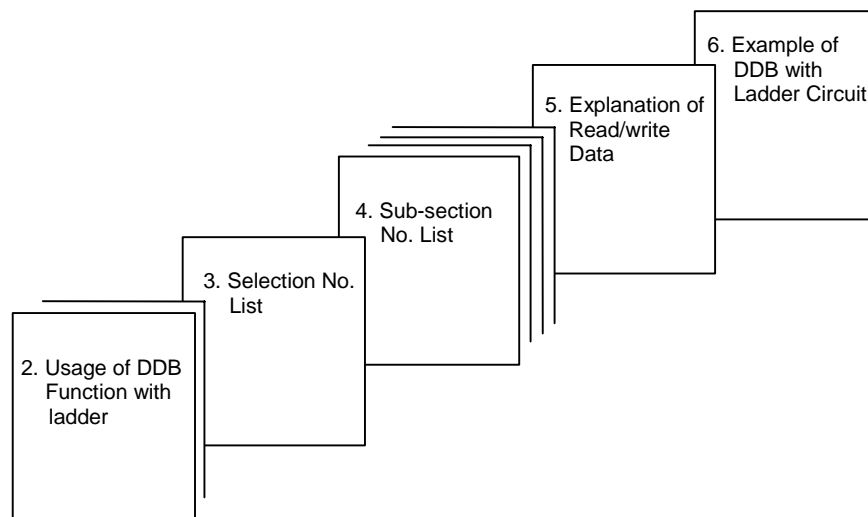
This manual describes the DDB (Direct Data Bus) function used to realize data input/output with a CNC while running a program developed with the user PLC ladder language.

DDB includes the synchronous type (DDBS) and the asynchronous type (DDBA), but only the asynchronous type will be explained in this manual.

DDB is a function that allows the PLC to directly read and write the various data in the CNC. By setting the information required for reading and writing into the buffer and calling out the DDB function, the PLC can set (write) the designated data into the CNC. Generally, the data is read and written in one piece units, but data related to the control axis can be processed for the designated number of axes.

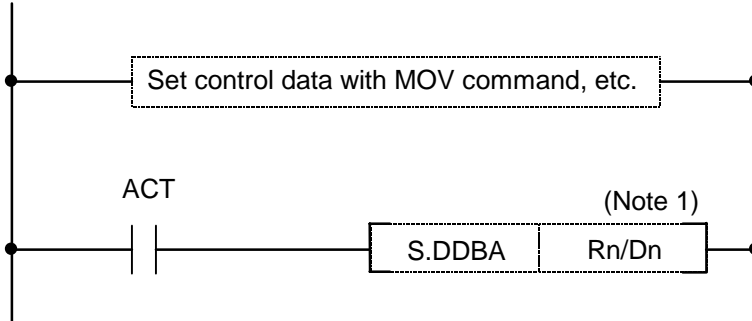
Features of this function include that the read data can be referred to in the step immediately following the execution of the DDBA command. This also applies to the written data. (Note that for the parameters, they may not be valid immediately after writing.)

This manual is organized in the following manner after the first chapter. Please refer to the required section for use.



2. Usage of DDB Function with Ladder

2.1 Basics of commands



(Note 1) The file registers (Rn) and data registers (Dn) in the range usable by the user can be used in the control data buffer of the asynchronous type DDB .
The file registers (R) usable by the user are from R4000 to R4499 (not backup) and from R6400 to R7199 (backup).

2.2 Basic format of control data

Rn	(Dn)	Control signal
Rn+1	(Dn+1)	Section No.
Rn+2	(Dn+2)	Sub-section No.
Rn+4	(Dn+4)	Data size
Rn+5	(Dn+5)	Axis/part system designation for read/write
Rn+6	(Dn+6)	Read/write data (for 1st axis)
Rn+8	(Dn+8)	(for 2nd axis)
Rn+10	(Dn+10)	(for 3rd axis)
Rn+12	(Dn+12)	(for 4th axis)
:	:	:
Rn+32	(Dn+32)	(for 14th axis)

(Note 1) The part system designation is used when there is a multi-part system specification.

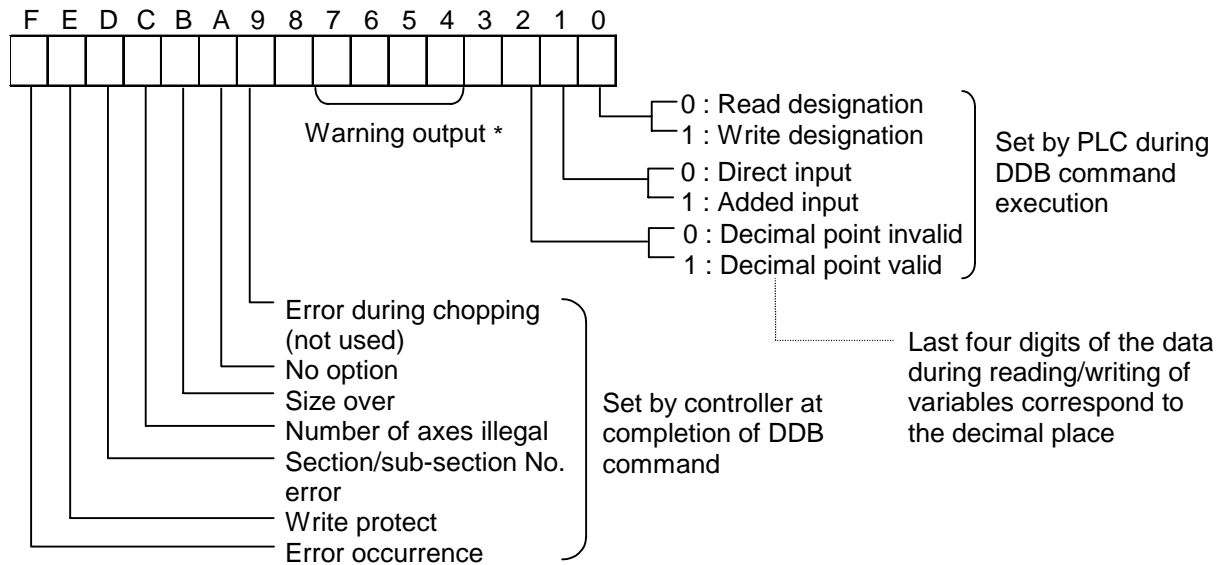
(Note 2) Always secure 4 bytes as the buffer for one read/write data item.

(Note 3) Always secure the buffer size equivalent to 14 axes (28 words data).

(Note 4) For example, if only the 3rd axis is designated, the data for the 3rd axis will be the read/write data.

2. Usage of DDB Function with Ladder

2.2.1 Control signals (Rn or Dn)



*Warning output
bit 4= 1 : Variable data blank
0 : Variable data not blank
bit 5= 1 : Variable data overflowing
0 : Variable data not overflowing

2.2.2 Section No. (Rn+1 or Dn+1)

The section No. of the data to be read/written is designated with a binary. Refer to the "3. Section No. List" for details.

2.2.3 Sub-section No. (Rn+2, Rn+3 or Dn+2, Dn+3) (LOW HIGH)

The sub-section No. of the data to be read/written is designated with a binary. Refer to the "4. Sub-section No. List" for details.

2.2.4 Data size (Rn+4 or Dn+4)

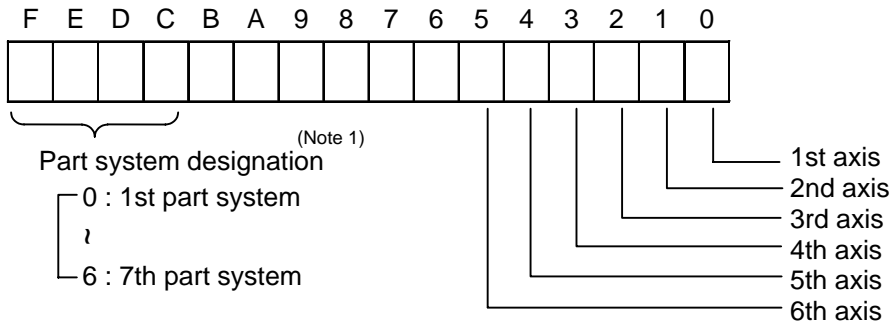
The size of the data to be read/written is designated with a binary.
1: 1 byte
2: 2 bytes
4: 4 bytes

(Note) The date size has not been checked, so give an attention to data size when setting.

2. Usage of DDB Function with Ladder

2.2.5 Read/write designated axis (Rn+5 or Dn+5)

When reading or writing data per axis classified with the section No., designate the axis and part system.

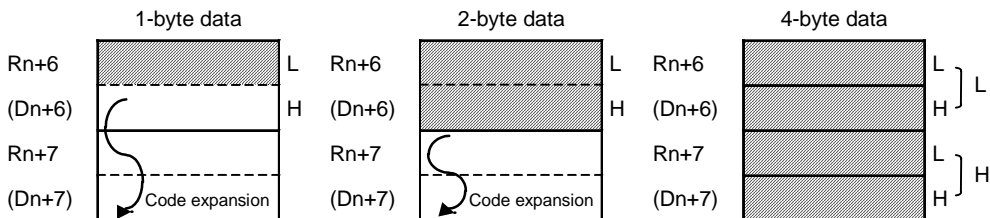


(Note 1) The part system designation is used when there is a multi-part system specification.

(Note 2) When reading and writing the axis data, if there is no axis designation or if the designation exceeds the maximum control axes, the alarm "No. of axes illegal" will occur.

2.2.6 Read/write data (Rn+6, Rn+7 or Dn+6, Dn+7) (LOW) (HIGH)

When read is designated, the data designated by the PLC will be output by the CNC.
When write is designated, the data to be written will be set by the PLC.



The valid area of the data will differ according to the data size. (Shaded area)

When read is designated, a code will be added to the 1-byte and 2-byte data to create a 4-byte data size. Thus, even when reading 1-byte or 2-byte data, 4 bytes are required for the buffer size.

3. Section No. List

3. Section No. List

Section No.	Details	Write	Axis designation	Part system designation	Remarks
1	Parameters common to each axis	Possible (partially not possible)	Partially valid	Partially valid	
2	Axis independent parameters	Possible	Invalid	Valid	
3	Machine error compensation information	Not possible (partially possible)	Invalid	Invalid	
4	Workpiece coordinate system offset, external workpiece coordinate system offset	Possible	Valid	Valid	
5	Alarm information	Not possible	Invalid	Valid	
6					
7					
8					
9					
10					
11	Axis common non-modal information in block being executed	Not possible	Invalid	Valid	
12	Axis independent non-modal information in block being executed	Not possible	Valid	Valid	
13	Axis common modal information in block being executed	Not possible	Invalid	Valid	
14	Axis independent modal information in block being executed	Not possible	Valid	Valid	
15	Axis common non-modal information in next block	Not possible	Invalid	Valid	
16	Axis independent non-modal information in next block	Not possible	Valid	Valid	
17	Axis common modal information in next block	Not possible	Invalid	Valid	
18	Axis independent modal information in next block	Not possible	Valid	Valid	
19					
20	Axis common machine control information 1	Not possible	Invalid	Valid	
21	Axis independent machine control information 1	Not possible	Valid	Valid	
22	Information input from PLC to controller	Not possible	Invalid	Valid	
23	Information output from controller to PLC	Not possible	Invalid	Valid	
24	Cumulative time data	Possible	Invalid	Invalid	
25					
26	Axis common machine control information 2	Not possible	Invalid	Valid	
27	Axis independent machine control information 2	Not possible	Valid	Valid	
28					
29	Common variable value 1	Possible	Invalid	Invalid	From #500
30	Local variable value	Possible	Invalid	Valid	
31	Tool compensation amount	Possible	Invalid	Valid	
32	Common variable value 2	Possible	Invalid	Valid	From #100

4. Sub-section No. List

4. Sub-section No. List

The sub-section No. list shows the sub-section No. of each data in correspondence with the section No.

Each data has a search No. To refer to the contents of the data, search for the corresponding data in "5. Explanation of Read/Write Data" using this search No.

Search No.

4. Sub-section No. List

Section No.	1	Parameters common to each axis				
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(Note) "System" indicates "Part system".

Search No.	Details	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
	Maximum spindle speed (Gear 1st step)	8960	4	Possible	Invalid/Valid	
	Maximum spindle speed (Gear 2nd step)	8964	4	Possible	Invalid/Valid	
1-10	Maximum spindle speed (Gear 3rd step)	8968	4	Possible	Invalid/Valid	
	Maximum spindle speed (Gear 4th step)	8972	4	Possible	Invalid/Valid	

1 - 10

→ No. of searching (Note) This is not the sub-section No.

→ Section No.

5. Explanation of Read/Write Data

1-10	Maximum spindle speed (Gear 1st step to gear 4th step)
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[Data definition]

This is a parameter for the maximum spindle speed of each gear step.
 (This corresponds to the setup parameter, spindle parameter smax1 to 4.)
 The CNC creates the spindle gear shift command 1 and 2 based on this value and the commanded S command.
 During tapping, the maximum speed will be the spindle tap speed.

4. Sub-section No. List

Sub-section No. list

Section No.	1	Parameters common to each axis
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Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
1-10	Maximum spindle speed (Gear 1st step)	8960	4	Possible	Invalid/Valid	
	Maximum spindle speed (Gear 2nd step)	8964	4	Possible	Invalid/Valid	
	Maximum spindle speed (Gear 3rd step)	8968	4	Possible	Invalid/Valid	
	Maximum spindle speed (Gear 4th step)	8972	4	Possible	Invalid/Valid	
1-11	Spindle limit speed (Gear 1st step)	8976	4	Possible	Invalid/Valid	
	Spindle limit speed (Gear 2nd step)	8980	4	Possible	Invalid/Valid	
	Spindle limit speed (Gear 3rd step)	8984	4	Possible	Invalid/Valid	
	Spindle limit speed (Gear 4th step)	8988	4	Possible	Invalid/Valid	
1-13	Spindle shift speed (Gear 1st step)	9008	2	Possible	Invalid/Valid	
	Spindle shift speed (Gear 2nd step)	9010	2	Possible	Invalid/Valid	
	Spindle shift speed (Gear 3rd step)	9012	2	Possible	Invalid/Valid	
	Spindle shift speed (Gear 4th step)	9014	2	Possible	Invalid/Valid	
1-20	Spindle orient speed	9024	2	Possible	Invalid/Valid	
1-21	Minimum spindle speed	9026	2	Possible	Invalid/Valid	
1-30	Spindle parameter SP001	8192	2	Possible	Invalid/Valid	
	Spindle parameter SP002	8194	2	Possible	Invalid/Valid	
	:	:	:	:	:	
	Spindle parameter SP384	8958	2	Possible	Invalid/Valid	

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
1-50	Method selection parameter (1) BIT0 : BIT1 : BIT2 : BIT3 : BIT4 : BIT5 : BIT6 : Synchronous tapping BIT7 :	195	1	Not possible	Invalid/Valid	
1-70	Method selection parameter (3) BIT0 : BIT1 : Tool compensation method (Tabsmv) BIT2 : BIT3 : BIT4 : BIT5 : BIT6 : BIT7 :	130	1	Possible	Invalid/Valid	
1-80	Method selection parameter (4) BIT0 : BIT1 : BIT2 : BIT3 : BIT4 : BIT5 : Reference point middle point ignore BIT6 : BIT7 :	194	1	Possible	Invalid/Valid	

4. Sub-section No. List

Section No.	1
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Parameters common to each axis (Position switch)

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks	
1-100	Position switch [1]	axis	11984	1	Possible	Valid/Valid	Designate ASCII code with a decimal
		dog 1	11968	4	Possible	Valid/Valid	
		dog 2	11972	4	Possible	Valid/Valid	
1-100	Position switch [2]	axis	12004	1	Possible	Valid/Valid	Designate ASCII code with a decimal
		dog 1	11988	4	Possible	Valid/Valid	
		dog 2	11992	4	Possible	Valid/Valid	
1-100	Position switch [3]	axis	12024	1	Possible	Valid/Valid	Designate ASCII code with a decimal
		dog 1	12008	4	Possible	Valid/Valid	
		dog 2	12012	4	Possible	Valid/Valid	
1-100	Position switch [4]	axis	12044	1	Possible	Valid/Valid	Designate ASCII code with a decimal
		dog 1	12028	4	Possible	Valid/Valid	
		dog 2	12032	4	Possible	Valid/Valid	
1-100	Position switch [5]	axis	12064	1	Possible	Valid/Valid	Designate ASCII code with a decimal
		dog 1	12048	4	Possible	Valid/Valid	
		dog 2	12052	4	Possible	Valid/Valid	
1-100	Position switch [6]	axis	12084	1	Possible	Valid/Valid	Designate ASCII code with a decimal
		dog 1	12068	4	Possible	Valid/Valid	
		dog 2	12072	4	Possible	Valid/Valid	
1-100	Position switch [7]	axis	12104	1	Possible	Valid/Valid	Designate ASCII code with a decimal
		dog 1	12088	4	Possible	Valid/Valid	
		dog 2	12092	4	Possible	Valid/Valid	
1-100	Position switch [8]	axis	12124	1	Possible	Valid/Valid	Designate ASCII code with a decimal
		dog 1	12108	4	Possible	Valid/Valid	
		dog 2	12112	4	Possible	Valid/Valid	

4. Sub-section No. List

Section No.	1
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Parameters common to each axis (Position switch)

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks	
1-100	Position switch [9]	axis	14128	1	Possible	Valid/Valid	Designate ASCII code with a decimal
		dog 1	14112	4	Possible	Valid/Valid	
		dog 2	14116	4	Possible	Valid/Valid	
1-100	Position switch [10]	axis	14148	1	Possible	Valid/Valid	Designate ASCII code with a decimal
		dog 1	14132	4	Possible	Valid/Valid	
		dog 2	14136	4	Possible	Valid/Valid	
1-100	Position switch [11]	axis	14168	1	Possible	Valid/Valid	Designate ASCII code with a decimal
		dog 1	14152	4	Possible	Valid/Valid	
		dog 2	14156	4	Possible	Valid/Valid	
1-100	Position switch [12]	axis	14188	1	Possible	Valid/Valid	Designate ASCII code with a decimal
		dog 1	14172	4	Possible	Valid/Valid	
		dog 2	14176	4	Possible	Valid/Valid	
1-100	Position switch [13]	axis	14208	1	Possible	Valid/Valid	Designate ASCII code with a decimal
		dog 1	14192	4	Possible	Valid/Valid	
		dog 2	14196	4	Possible	Valid/Valid	
1-100	Position switch [14]	axis	14228	1	Possible	Valid/Valid	Designate ASCII code with a decimal
		dog 1	14212	4	Possible	Valid/Valid	
		dog 2	14216	4	Possible	Valid/Valid	
1-100	Position switch [15]	axis	14248	1	Possible	Valid/Valid	Designate ASCII code with a decimal
		dog 1	14232	4	Possible	Valid/Valid	
		dog 2	14236	4	Possible	Valid/Valid	
1-100	Position switch [16]	axis	14268	1	Possible	Valid/Valid	Designate ASCII code with a decimal
		dog 1	14252	4	Possible	Valid/Valid	
		dog 2	14256	4	Possible	Valid/Valid	

Section No.	2
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Axis independent parameters

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
2-10	1st reference point coordinates	272	4	Possible	Valid/Valid	
	2nd reference point coordinates	276	4	Possible	Valid/Valid	
	3rd reference point coordinates	280	4	Possible	Valid/Valid	
	4th reference point coordinates	284	4	Possible	Valid/Valid	
2-11	Stored stroke limit I (+)	288	4	Possible	Valid/Valid	For machine tool builder
	Stored stroke limit I (-)	292	4	Possible	Valid/Valid	

4. Sub-section No. List

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
2-20	Movement control parameters BIT0 : BIT1 : Inch output BIT2 : Reference point return direction (-) BIT3 : Servo OFF error compensation BIT4 : Rotary axis BIT5 : Motor CCW BIT6 : BIT7 : BIT8 : BIT9 : BITA : No reference point axis BITB : BITC : BITD : Diameter designated axis BITE : BITF :	20	2	Not possible	Valid/Valid	
2-30	Reference point return approach speed	38	2	Possible	Valid/Valid	
2-35	Reference point return shift amount	44	2	Possible	Valid/Valid	
2-36	Rapid traverse backlash amount	46	2	Possible	Valid/Valid	
2-37	Cutting feed backlash amount	48	2	Possible	Valid/Valid	
2-39	Axis parameters BIT0 : BIT1 : (System reserve) BIT2 : BIT3 : BIT4 : BIT5 : BIT6 : (System reserve) BIT7 : BIT8 : BIT9 : BITA : Soft limit invalid #8202 BITB : (System reserve) BITC : (System reserve) BITD : (System reserve) BITE : BITF :	640	2	Possible	Valid/Valid	
2-40	Stored stroke limit II (+) Stored stroke limit II (-)	656 660	4 4	Possible Possible	Valid/Valid Valid/Valid	For user For user
2-50	Cutting feed time constant G1t	32	2	Possible	Valid/Valid	
2-51	Current limit value 2 (SV014)	122	2	Possible	Valid/Valid	

4. Sub-section No. List

Section No.	3	Machine error compensation information
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Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
3-10	Compensation basic axis number	2	1	Not possible	Invalid/Invalid	
3-11	Compensation direction axis number	6	1	Not possible	Invalid/Invalid	
3-12	Division point number at reference position	10	2	Not possible	Invalid/Invalid	
3-13	Division point number at the most negative side	14	2	Not possible	Invalid/Invalid	
3-14	Division point number at the most positive side	18	2	Not possible	Invalid/Invalid	
3-15	Compensation scale factor	20	2	Possible	Invalid/Invalid	
3-16	Division interval	28	4	Possible	Invalid/Invalid	

Section No.	4	Workpiece coordinate system offset, external workpiece coordinate system offset
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Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
4-10	G54 workpiece coordinate system offset	0	4	Possible	Valid/Valid	
4-11	G55 workpiece coordinate system offset	4	4	Possible	Valid/Valid	
4-12	G56 workpiece coordinate system offset	8	4	Possible	Valid/Valid	
4-13	G57 workpiece coordinate system offset	12	4	Possible	Valid/Valid	
4-14	G58 workpiece coordinate system offset	16	4	Possible	Valid/Valid	
4-15	G59 workpiece coordinate system offset	20	4	Possible	Valid/Valid	
4-16	External workpiece coordinate system offset	24	4	Possible	Valid/Valid	

4. Sub-section No. List

Section No.	5	Alarm information
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Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks	
5-30	Servo alarm No.	Main	16	2	Not possible	Valid/Invalid	
		Attribute (bit F)	18	2	Not possible	Valid/Invalid	(0-Invalid, 1-Valid)
		Sub 1	20	2	Not possible	Valid/Invalid	
		Sub 2	22	2	Not possible	Valid/Invalid	
5-90	Servo warning No.	Main	64	2	Not possible	Valid/Invalid	
		Attribute (bit F)	66	2	Not possible	Valid/Invalid	(0-Invalid, 1-Valid)
		Sub 1	68	2	Not possible	Valid/Invalid	
		Sub 2	70	2	Not possible	Valid/Invalid	
5-130	Operation error No.	Main	96	2	Not possible	Valid/Invalid	
		Attribute (bit F)	98	2	Not possible	Valid/Invalid	(0-Invalid, 1-Valid)
		Sub 1	100	2	Not possible	Valid/Invalid	
		Sub 2	102	2	Not possible	Valid/Invalid	
5-140	Automatic stop code	Main	104	2	Not possible	Valid/Invalid	
		Attribute (bit F)	106	2	Not possible	Valid/Invalid	(0-Invalid, 1-Valid)
		Sub 1	108	2	Not possible	Valid/Invalid	
		Sub 2	110	2	Not possible	Valid/Invalid	

4. Sub-section No. List

Section No.	ACT 11 PCB 15	Axis common non-modal information in block being executed (ACT) and in next block (PCB)
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Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
11/15-10	Interpolation vector length	172	4	Not possible	Valid/Invalid	
11/15-20	Movement mode gmov Binary data 0 : Positioning (each axis independent) 1 : Positioning (linear) 2 : Linear interpolation 3 : Circular interpolation (CW) 4 : Circular interpolation (CCW) 5 : Helical interpolation (CW) 6 : Helical interpolation (CCW) 7 : 8 : 9 : 10 : 11 : Time designated dwell 12 : 13 : No. 1 reference point compare 14 : No. 2 reference point compare 15 : No. 3 reference point compare 16 : No. 4 reference point compare 17 : Automatic reference point return 18 : Return from automatic reference point return 19 : No. 2 reference point return 20 : No. 3 reference point return 21 : No. 4 reference point return 22 : Skip function 23 : Multi-step skip function 1 24 : Multi-step skip function 2 25 : Multi-step skip function 3 26 : Thread cutting 27 : 28 : 29 : Coordinate system setting	71	1	Not possible	Valid/Invalid	

Section No.	ACT 12 PCB 16	Axis independent non-modal information in block being executed (ACT) and in next block (PCB)
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Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
12/16-10	Axis direction movement amount	4	4	Not possible	Valid/Valid	

4. Sub-section No. List

Section No.	ACT 13 PCB 17	Axis common modal information in block being executed (ACT) and in next block (PCB)
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Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
13/17-10	G code (group 1)	0	1	Not possible	Valid/Invalid	Interpolation mode
13/17-11	G code (group 2)	1	1	Not possible	Valid/Invalid	Plane selection
13/17-12	G code (group 5)	2	1	Not possible	Valid/Invalid	Feed mode
13/17-13	G code (group 7)	3	1	Not possible	Valid/Invalid	Radius compensation modal
13/17-14	G code (group 9)	4	1	Not possible	Valid/Invalid	Fixed cycle modal
13/17-15	G code (group 12)	5	1	Not possible	Valid/Invalid	Workpiece coordinate system modal
13/17-16	G code (group 13)	6	1	Not possible	Valid/Invalid	Cutting mode
13/17-17	G code (group 3, 4, 6, 10, 17, 18) BIT0 : Absolute/incremental mode BIT1 : Barrier check BIT2 : Inch/metric mode BIT3 : Fixed cycle R point return BIT4 : BIT5 : Constant surface speed control BIT6 : Balance cut BIT7 :	7	1	Not possible	Valid/Invalid	
13/17-20	Block No.	15	1	Not possible	Valid/Invalid	0 to 99
13/17-30	Shape compensation No.	76	2	Not possible	Valid/Invalid	
13/17-31	Wear compensation No.	78	2	Not possible	Valid/Invalid	
13/17-40	Miscellaneous function code	208	4	Not possible	Valid/Invalid	M code (binary)
13/17-41	Spindle function code	212	4	Not possible	Valid/Invalid	S code (binary)
13/17-42	Tool function code	216	4	Not possible	Valid/Invalid	T code (binary)
13/17-43	2nd miscellaneous function code	220	4	Not possible	Valid/Invalid	B code (binary)
13/17-44	Program No.	240	4	Not possible	Valid/Invalid	O 1 to 99999999
13/17-45	Sequence No.	244	4	Not possible	Valid/Invalid	N 1 to 99999

Section No.	ACT 14 PCB 18	Axis independent modal information in block being executed (ACT) and in next block (PCB)
--------------------	----------------------	---

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
14/18-10	Tool length compensation No.	112	2	Not possible	Valid/Valid	Machining center system only

4. Sub-section No. List

Section No.	20	Axis common machine control information 1
--------------------	-----------	--

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
20-10	Automatic effective feedrate	84	4	Not possible	Valid/Invalid	Effective speed of feed direction
20-11	Manual effective feedrate	88	4	Not possible	Valid/Invalid	Effective speed of axis direction
20-20	In-position	4	2	Not possible	Valid/Invalid	

Section No.	21	Axis independent machine control information 1
--------------------	-----------	---

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
21-10	Current position in machine coordinate system	0	4	Not possible	Valid/Valid	
21-12	Manual interrupt amount (1)	8	4	Not possible	Valid/Valid	When manual ABS switch is OFF
21-13	Manual interrupt amount (2)	12	4	Not possible	Valid/Valid	When manual ABS switch is ON
21-20	Current position in workpiece coordinate system	36	4	Not possible	Valid/Valid	
21-30	Current position in workpiece coordinate system during skip ON	112	4	Not possible	Valid/Valid	
21-31	Current position in machine coordinate system during skip ON	116	4	Not possible	Valid/Valid	
21-32	Remaining distance during skip ON	120	4	Not possible	Valid/Valid	
21-33	Current position in machine coordinate system during manual skip ON	124	4	Not possible	Valid/Valid	

4. Sub-section No. List

Section No.	22	Information input from PLC to controller
--------------------	-----------	---

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
22-10	Emergency stop causes BIT0 : Built-in PLC Software stop state BIT1 : External PLC No hardware BIT2 : External PLC Not ready BIT3 : External PLC Communication error BIT4 : External PLC Emergency stop output BIT5 : BIT6 : Built-in PLC Software emergency stop output device Y427 is "1". BIT7 : BIT8 : BIT9 : BITA : BITB : User PLC Illegal codes exist. BITC : PLC high-speed processing error BITD : Door interlock, dog/OT arbitrary allocation device illegal BITE : Spindle drive unit emergency stop output BITF : Servo drive unit emergency stop output	0	2	Not possible	Valid/Invalid	

Section No.	23	Information output from controller to PLC
--------------------	-----------	--

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
23-10	Spindle command speed (effective value)	48	4	Not possible	Valid*/Invalid	Including override

*The system designation bit is used in the spindle No.

- 0: 1st spindle
- 2: 2nd spindle
- : :
- 6: 7th spindle

Section No.	24	Cumulative time data
--------------------	-----------	-----------------------------

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
24-1	Power ON time	0	4	Possible	Invalid/Invalid	
24-2	Automatic operation time	4	4	Possible	Invalid/Invalid	
24-3	Automatic start up time	8	4	Possible	Invalid/Invalid	
24-4	External cumulative time 1	12	4	Possible	Invalid/Invalid	
24-5	External cumulative time 2	16	4	Possible	Invalid/Invalid	

4. Sub-section No. List

Section No.	26	Axis common machine control information 2
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Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
26-10	Spindle Motor real speed	8992	4	Not possible	Invalid/Valid	Including override
26-20	Spindle Motor load	8988	2	Not possible	Invalid/Valid	

Section No.	27	Axis independent machine control information 2
--------------------	-----------	---

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
27-10	Smoothing status, servo status BIT0 : Ready ON BIT1 : Servo ON BIT2 : In emergency stop BIT3 : In alarm BIT4 : Absolute position established BIT5 : Z phase passed BIT6 : In-position BIT7 : Torque limit BIT8 : Smoothing 0 BIT9 : Smoothing+ BITA : Smoothing - BITB : BITC : Hardware OT+ BITD : Hardware OT- BITE : Near-point dog ON BITF : Amp. unequipped	74	2	Not possible	Valid/Valid	
27-20	Servo delay amount	308	4	Not possible	Valid/Valid	
27-30	Feed axis motor load A (%)	328	2	Not possible	Valid/Valid	
27-31	Feed axis motor load B (%)	330	2	Not possible	Valid/Valid	
27-33	Feed axis motor speed (r/min)	312	2	Not possible	Valid/Valid	

Section No.	29	Common variable value 1
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Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
29-10	50 sets #500 to #549	500 to 549	4	Possible	Invalid/Invalid	Common for part systems
	100 sets #500 to #599	500 to 599	4	Possible	Invalid/Invalid	
	200 sets #500 to #699	500 to 699	4	Possible	Invalid/Invalid	

4. Sub-section No. List

Section No.	30	Local variable value
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Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
30-10	Local variables (level 0)	1 to 32	4	Possible	Valid/Invalid	
30-11	Local variables (level 1)	101 to 132	4	Possible	Valid/Invalid	
30-12	Local variables (level 2)	201 to 232	4	Possible	Valid/Invalid	
30-13	Local variables (level 3)	301 to 332	4	Possible	Valid/Invalid	
30-14	Local variables (level 4)	401 to 432	4	Possible	Valid/Invalid	

Section No.	31	Tool compensation amount
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Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
31-10	Tool compensation amount 1	1 to 400	4	Possible	Valid/Invalid	The contents will differ according to the type of tool offset memory.
31-20	Tool compensation amount 2	1001 to 1400	4	Possible	Valid/Invalid	
31-30	Tool compensation amount 3	6001 to 6400	4	Possible	Valid/Invalid	
31-40	Tool compensation amount 4	7001 to 7400	4	Possible	Valid/Invalid	
31-100	X axis tool length compensation amount	1 to 40	4	Possible	Valid/Invalid	The contents will differ according to the type of tool offset memory.
31-110	X axis wear compensation amount	1001 to 1040	4	Possible	Valid/Invalid	
31-120	3rd axis tool length compensation amount	2001 to 2040	4	Possible	Valid/Invalid	
31-130	3rd axis wear compensation amount	3001 to 3040	4	Possible	Valid/Invalid	
31-140	Z axis tool length compensation amount	4001 to 4040	4	Possible	Valid/Invalid	
31-150	Z axis wear compensation amount	5001 to 5040	4	Possible	Valid/Invalid	
31-160	Nose R compensation amount	6001 to 6040	4	Possible	Valid/Invalid	
31-170	Nose R wear compensation amount	7001 to 7040	4	Possible	Valid/Invalid	
31-180	Hypothetical nose No.	8001 to 8040	1	Possible	Valid/Invalid	

Section No.	32	Common variable value 2
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Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
32-10	50 sets * No. of part systems #100 to #149	100 to 149	4	Possible	Valid/Invalid	Variables per part system
	100 sets * No. of part systems #100 to #199	100 to 199	4	Possible	Valid/Invalid	

5. Explanation of Read/Write Data

5.1 How to refer to the data

The explanation of the read and write data is common for all machine type. The method for referring to the data is shown below.

4. Sub-section No. List

Section No.	1	Parameters common to each axis				
(Note) "System" indicates "Part system".						
Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
← (1)	Maximum spindle speed (Gear 1st step) → (1)	8960	4	Possible	Invalid/Valid	
(2) ↓	Maximum spindle speed (Gear 2nd step)	8964	4	Possible	Invalid/Valid	
1-10	Maximum spindle speed (Gear 3rd step)	8968	4	Possible	Invalid/Valid	
	Maximum spindle speed (Gear 4th step)	8972	4	Possible	Invalid/Valid	
1-11	Spindle limit speed (Gear 1st step)	8976	4	Possible	Invalid/Valid	
	Spindle limit speed (Gear 2nd step)	8980	4	Possible	Invalid/Valid	
	Spindle limit speed (Gear 3rd step)	8984	4	Possible	Invalid/Valid	
	Spindle limit speed (Gear 4th step)	8988	4	Possible	Invalid/Valid	
⋮	⋮	⋮	⋮	⋮	⋮	

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(3)

5. Explanation of Read/Write Data

→ 1-10	Maximum spindle speed (Gear 1st step to gear 4th step)
--------	--

[Data definition]
 This is a parameter for the maximum spindle speed of each gear step.
 (This corresponds to the setup parameter, spindle parameter smax1 to 4.)
 The CNC creates the spindle gear shift command 1 and 2 with this value and the commanded S command.
 During tapping, the maximum speed will be the spindle tap speed.

[Data unit, range]
 The data unit is r/min, and the setting range is 0 to 99999.

[Precaution]
 After being set (written), this data is valid from the next spindle speed (S) command.
 However, the clamping operation with the maximum speed will be validated immediately.

~

- (1) Search for the data to be read or written from the type of data given in the "Sub-section No. List" of the target model.
- (2) Confirm the search No. corresponding to the searched data.
- (3) Search for the reference data from the "5. Explanation of Read/Write Data" based on the confirmed search No.

(Note 1) Note that the first value of the search No. (for example, 1-10) is the section No., but the second value is not the sub-section No.

(Note 2) The expression "1-50-6" in the read/write data explanation indicates section No.: 1, search No.: 50 and bit: 6.

(Note 3) The search No. expressed as "11/15-10" in the read/write data explanation indicates that the contents are common to the data in section No.:11, search No.: 10, and the data in section No.: 15 and search No.: 10.

5.2 Data unit system

The unit system indicated in this manual is shown below.

Unit system		B (1 μm system)	C (0.1 μm system)	Selection parameter
Input unit	mm	0.001	0.0001	Setup parameter Basic specification parameter #1041 I_inch = 0
	inch	0.0001	0.00001	Setup parameter Basic specification parameter #1041 I_inch = 1
Output unit (Detection unit)	mm	0.0005	0.00005	Setup parameter Basic specification parameter #1061 iout = 0
	inch	0.00005	0.000005	Setup parameter Basic specification parameter #1061 iout = 1
Machine constant input unit	mm	0.001	0.001	Setup parameter Basic specification parameter #1040 M_inch = 0
	inch	0.0001	0.00001	Setup parameter Basic specification parameter #1040 M_inch = 1

- (Note 1)** The unit systems B and C are settings for the setup parameters (basic specification parameters: #1003 iunit). This may differ according to the machine type.
- (Note 2)** The unit system C (0.1 μm system) is an option specification.
- (Note 3)** Of the selection parameters, #1041 I_inch and #1040 M_inch are common for each axis, and #1061 iout is for the independent axis.
- (Note 4)** The data is read and written in the internal unit.

5.3 Explanation of data details

The details of the data that are read or written with the DDB are explained below.

1-10	Maximum spindle speed (Gear 1st step to gear 4th step)
-------------	---

[Data definition]

This is a parameter for the maximum spindle speed of each gear step.
 (This corresponds to the setup parameter, spindle parameter smax1 to 4.)
 The CNC creates the spindle gear shift command 1 and 2 with this value and the commanded S command.
 During tapping, the maximum speed will be the spindle tap speed.

[Data unit, range]

The data unit is r/min, and the setting range is 0 to 99999.

[Precaution]

After being set (written), this data is valid from the next spindle speed (S) command.
 However, the clamping operation with the maximum speed will be validated **immediately**.

1-11	Spindle limit speed (Gear 1st step to gear 4th step)
-------------	---

[Data definition]

This parameter is used to calculate the spindle speed (S-analog) data for each gear step.
 (This corresponds to the setup parameter, spindle parameter slimt 1 to 4.)
 The CNC determines the corresponding spindle limit speed with the spindle gear selection input (Y ...) output from the PLC, and calculates the spindle speed (S-analog) data.

$$\text{Spindle speed data} = \frac{Sd_1d_2d_3d_4}{\text{slimt } n} \times \frac{\text{SOVR}}{100}$$

- slimt n : Spindle limit speed of corresponding gear step determined with spindle gear selection input. (n: 1~4)
- Sd₁d₂d₃d₄ : Spindle speed (S) command
- SOVR : Spindle override

[Data unit, range]

The data unit is r/min, and the setting range is 0 to 99999.

[Precaution]

This setting is validated immediately after setting (writing).

5. Explanation of Read/Write Data

1-13	Spindle shift speed (Gear 1st step to gear 4th step)
------	---

[Data definition]

When changing the spindle gears, the spindle motor is run slowly at a constant speed to make the changeover operation smooth. This parameter is used to designate the speed at that time.

(This corresponds to the setup parameter, spindle parameter ssift 1 to 4.)

The CNC determines the corresponding spindle shift speed with the spindle gear selection input (Y···) output from the PLC.

$$\text{Spindle speed data for gear shift} = \frac{\text{ssift } n}{\text{slimt } n}$$

slimt n : Spindle limit speed of corresponding gear step determined with spindle gear selection input (n: 1~4)

ssift n : Spindle shift speed of corresponding gear step determined with spindle gear selection input

[Data unit, range]

The data unit is r/min, and the setting range is 0 to 32767.

[Precaution]

This setting is validated immediately after setting (writing).

1-20	Spindle orient speed
------	-----------------------------

[Data definition]

This parameter is used to rotate the spindle at a slow constant speed when carrying out spindle orientation (orient position stop).

(This corresponds to the setup parameter, spindle parameter sori.)

$$\text{Spindle speed data for orient} = \frac{\text{sori}}{\text{slimt } n}$$

sori : Spindle orient speed

slimt n : Spindle limit speed of corresponding gear step determined with spindle gear selection input (n: 1~4)

[Data unit, range]

The data unit is r/min, and the setting range is 0 to 32767.

[Precaution]

This setting is validated immediately after setting (writing).

[Supplement]

The orient function is provided for most of the recent spindle controllers, so this parameter is not used often for the spindle orientation.

5. Explanation of Read/Write Data

1-21	Minimum spindle speed
------	-----------------------

[Data definition]

This parameter specifies the minimum spindle speed value.

If the S command issued is a spindle speed lower than this parameter value or if the results of the spindle override are lower than this parameter value, the spindle will be rotated at this minimum spindle speed.

(This corresponds to the setup parameter, spindle parameter smini.)

[Data unit, range]

The data unit is r/min, and the setting range is 0 to 32767.

[Precaution]

This setting is validated immediately after setting (writing).

1-30	Spindle parameter (SP001 to SP384)
------	------------------------------------

[Data definition]

These parameters are used to control the spindles.

(These correspond to the setup parameter, spindle parameter “#3201 SP001” to “#3584 SP384”.)

Refer to Parameter Manual for details of these parameters.

[Data unit, range]

The data unit and the setting range differ depending on the parameters. Refer to Parameter Manual for details.

[Precaution]

Setting of some parameters will become valid after turning the NC power ON. Please turn the NC power ON after setting the data using DDB.

5. Explanation of Read/Write Data

1-50	Method selection parameter (1)
-------------	---------------------------------------

[Data definition]

The following parameters are indicated in bit units.

1-50-6) Synchronous tapping

This parameter is used when carrying out the machining program's tapping cycle (G84, G74) with the synchronous method.

0 : Asynchronous method

1 : Synchronous method

(This corresponds to the setup parameter, basic specification parameter set01.)

1-70	Method selection parameter (3)
-------------	---------------------------------------

[Data definition]

The following parameters are set in bit units.

[Data range]

The setting range is 0 to 255.

The set data could affect the other bits, so take care when setting.

1-70-1) Tool compensation method Valid only for lathe (L) system

The type of movement command for when the tool compensation operation (Tmove) is set to "1" is designated.

0 : Compensation is carried out regardless of the movement command type.

1 : Compensation is carried out only for a movement command issued with an absolute value.

(This corresponds to the setup parameter, basic specification parameter Tabsmv.)

1-80	Method selection parameter (4)
-------------	---------------------------------------

[Data definition]

The following parameters are set in bit units.

[Data range]

The setting range is 0 to 255.

The set data could affect the other bits, so take care when setting.

1-80-5) Reference point middle point ignored

This parameter designates how to handle the middle point during G28 and G30 reference point return.

0 : Move to the reference point via the middle point designated in the program.

1 : Ignore the middle point designated in the program, and move directly to the reference point.

(This corresponds to the setup parameter, basic specification parameter Mpoint.)

5. Explanation of Read/Write Data

1-100	Position switches [1] to [16]
-------	-------------------------------

[Data definition]

A software dog switch is established at a designated point of the axis on the machine, and the output signal from this switch is output to the PLC interface when the axis passes over this switch. A maximum of sixteen switches can be set per part system. This switch can be used after the zero point is established.
(This corresponds to the setup parameter, position switches axis, dog1 and dog 2.)

The position switch uses the axis, dog1 and dog2 data as one set.

Axis : Name of axis for which switch is established.

dog1 : Distance 1 from basic machine coordinate system zero point

dog2 : Distance 2 from basic machine coordinate system zero point

The difference of dog1 and dog2 becomes the position switch width.

[Data unit, range]

The data unit is 1/2 of the machine constant input unit. The setting range is -99999.999 mm to +99999.999 mm.

[Precaution]

There will be a slight delay in the output signal changes in respect to the actual machine position. This maximum delay time (tmax) can be obtained with the following equation.

$$t_{max} = 0.06 + TP \text{ [s]}$$

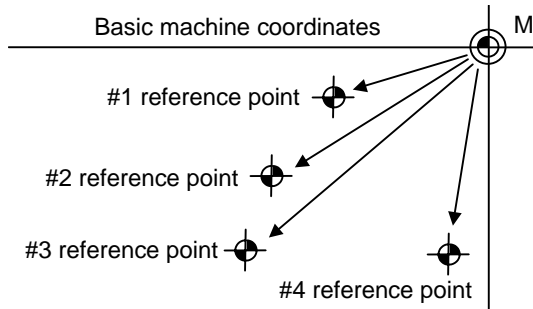
TP : Position loop time constant ($\frac{1}{PGN}$ [s])

5. Explanation of Read/Write Data

2-10	Axis n	1st to 4th reference point coordinates
------	--------	--

[Data definition]

The 1st reference point, 2nd reference point, 3rd reference point and 4th reference point using 0 of the basic machine coordinates as the base point can be set for each axis with these parameters. (This corresponds to the setup parameter, reference point return parameters G53ofs to #4_rfp.)



[Data unit, range]

The data unit is 1/2 of the machine constant input unit. The setting range is -99999.999 mm to +99999.999 mm.

[Precaution]

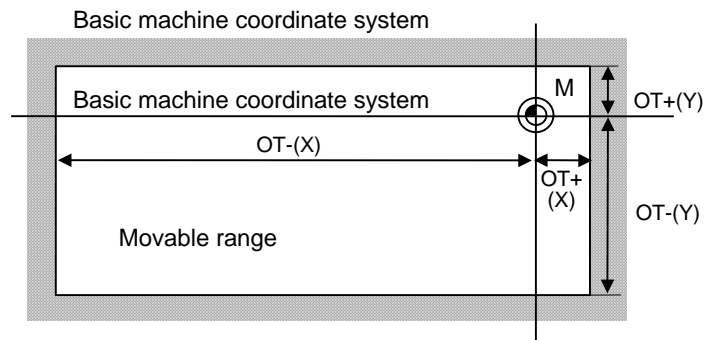
This setting is validated from the next reference point return after setting (writing).

2-11	Axis n	Stored stroke limit I (+), (-) For machine tool builder
------	--------	---

[Data definition]

These parameters indicate the movable range in the (+) or (-) limit using 0 of the basic machine coordinates as the base point. These can be set for each axis.

(This corresponds to the setup parameter, axis specification parameters OT+ and OT-.)



[Data unit, range]

The data unit is 1/2 of the machine constant input unit. The setting range is -99999.999 mm to +99999.999 mm.

[Precaution]

This setting is validated immediately after setting (writing). (Note that this is only when the axis movement is stopped.)

5. Explanation of Read/Write Data

2-20	Axis n	Movement control parameters
------	--------	-----------------------------

[Data definition]

The following parameters are indicated in bit units.

2-20-1) Inch output

This parameter indicates whether the output unit is a metric unit or inch unit.

(This corresponds to the setup parameter, basic specification parameter iout.)

0 : When the machine side detectors (ball screw and detectors) are metric specifications.)

1 : When the machine side detectors (ball screw and detectors) are inch specifications.)

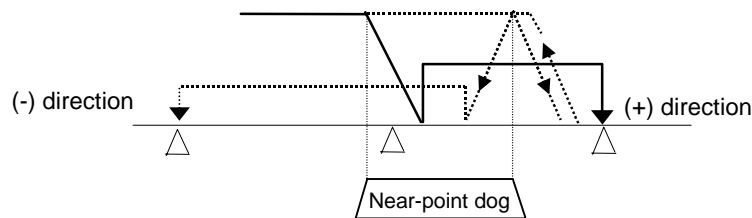
2-20-2) Reference point return direction (-)

This parameter indicates whether the reference point position is to the (-) direction or (+) direction from the reference point return near-point detection (near-point dog).

(This corresponds to the setup parameter, reference point return parameter dir(-).)

0 : (+) direction

1 : (-) direction



2-20-3) Servo OFF error compensation

The servo system will enter the servo OFF state when the servo OFF nth axis (*SVFn) signal is input from the PLC to the CNC. This parameter indicates for each axis whether the amount that the motor rotated during servo OFF is to be returned to the original state when the servo is turned ON again.

(This corresponds to the setup parameter, basic specifications parameter svof.)

0 : Compensate the error (Do not return to the original state.)

1 : Do not compensate the error

2-20-4) Rotary axis

This parameter indicates whether the target control axis is a linear axis or rotary axis.

0 : Linear axis

1 : Rotary axis

(This corresponds to the setup parameter, basic specification parameter rot.)

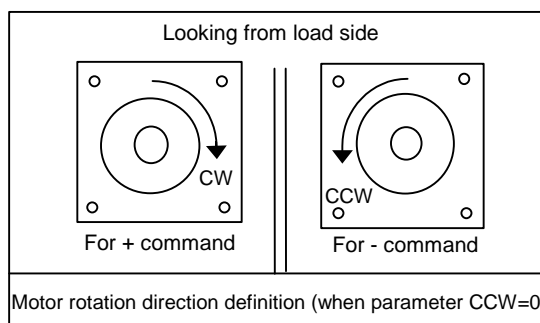
2-20-5) Motor CCW

This parameter indicates the motor rotation direction when commanded in the + direction.

0 : CW direction looking from motor load side

1 : CCW direction looking from motor load side

(This corresponds to the setup parameter, basic specification parameter ccw.)



5. Explanation of Read/Write Data

2-20-A) No reference point axis

This parameter indicates that the control axis is one that does not have a reference point or that reference point return is not required.

0 : G28, G29, G30, manual reference point return is carried out.

1 : G28, G29, G30, manual reference point return is ignored.

(This corresponds to the setup parameter, zero point return parameter noref.)

2-20-D) Diameter designated axis Valid only for lathe system

This parameter indicates the movement amount (commanded with U) in the X axis direction to half of the command value.

The command in address X will always be a diameter command.

0 : Addresses X and U command movement amounts are the same.

1 : The address U command movement amount is half of the address X movement amount.

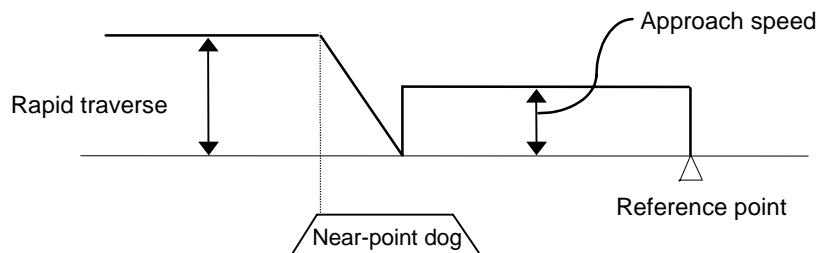
(This corresponds to the setup parameter, basic specification parameter dia.)

2-30	Axis n	Reference point return approach speed
------	--------	---------------------------------------

[Data definition]

This parameter indicates the movement speed when moving toward the reference point after detecting the near-point dog and decelerating to a stop during the reference point return command. This parameter can be set for each axis.

(This corresponds to the setup parameter, reference point return parameter G28crp.)



[Data unit, range]

The data unit is mm/min, °/min or inch/min. The setting range is 1 to 999999.

[Precaution]

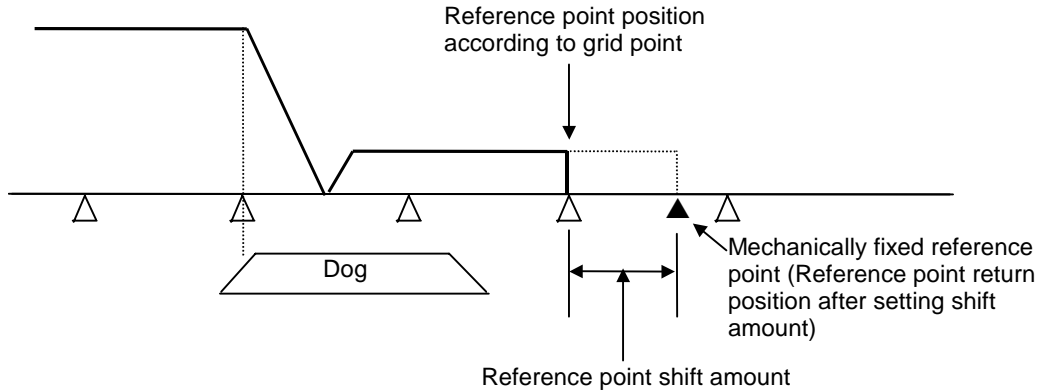
This setting is validated immediately after setting (writing).

5. Explanation of Read/Write Data

2-35	Axis n	Reference point return shift amount
-------------	---------------	--

[Data definition]

This parameter defines the distance from the electrical reference point (grid) to the actual machine reference point during the reference point return command. This can be set for each axis.
(This corresponds to the setup parameter, reference point return parameter G28sft.)



[Data unit, range]

The data unit is 1/2 of the machine constant input unit. The setting range is 1 to 65535 (μm).

[Precaution]

This setting is validated immediately after setting (writing).

2-36	Axis n	Rapid traverse backlash amount
-------------	---------------	---------------------------------------

[Data definition]

This parameter indicates the backlash amount to be compensated when the movement direction is reversed with the movement command in the rapid traverse mode or with the manual operation (excluding handle feed). This can be set for each axis.
(This corresponds to the setup parameter, axis specification parameter G0back.)

[Data unit, range]

The data unit is 1/2 of the machine constant input unit. The setting range is -9999 to +9999 pulses.

[Precaution]

This setting is valid immediately after setting (writing).

2-37	Axis n	Cutting feed backlash amount
-------------	---------------	-------------------------------------

[Data definition]

This parameter indicates the backlash amount to be compensated when the movement direction is reversed with the movement command in the cutting feed mode or with the handle feed mode of the manual operation.
(This corresponds to the setup parameter, axis specification parameter G1back.)

[Data unit, range]

The data unit is 1/2 of the machine constant input unit. The setting range is -9999 to +9999 pulses.

[Precaution]

This setting is validated immediately after setting (writing).

5. Explanation of Read/Write Data

2-39	Axis n	Axis parameters
-------------	---------------	------------------------

[Data definition]

The following parameters are indicated in the bit unit.

2-39-A)

Select the soft limit function (stored stroke limit II or IIB) set in the parameter #8204 and #8205.

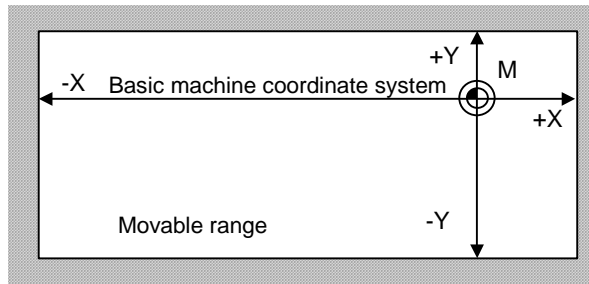
- 0 : Soft limit valid
- 1 : Soft limit invalid

2-40	Axis n	Stored stroke limit II (+), (-) For user
-------------	---------------	---

[Data definition]

These parameters indicate the movable range in the (+) or (-) limit using 0 of the basic machine coordinates as the base point. These can be set for each axis.

(This corresponds to the setup parameter, axis specification parameters soft limit (+) and soft limit (-).)



[Data unit, range]

The data unit is 1/2 of the machine constant input unit. The setting range is -99999.999 mm to +99999.999 mm.

[Precaution]

This setting is validated immediately after setting (writing). (Note that this is only when the axis movement is stopped.)

2-50	Axis n	Cutting feed time constant G1t
-------------	---------------	---------------------------------------

[Data definition]

Set up the primary-delay time constant for the acceleration and deceleration in the cutting feed mode. This can be set for each axis with the parameter.

(This corresponds to the setup parameter, axis specifications parameter G1t1. When acceleration or deceleration by software is selected, the second stage time constant is used in G1t1.)

[Data unit, range]

The data unit is ms. The setting range is 1 to 5000 (ms).

[Precaution]

This setting is validated immediately after setting (writing). (Note that this is only when the axis movement is stopped.)

5. Explanation of Read/Write Data

2-51	Axis n	Current limit value 2 (SV014)
------	--------	-------------------------------

[Data definition]

Set the rate (%) in respect to the stall rated current for special operations (absolute position initialization, stopper operation, etc). (This is the limit value for both the + and – direction.) For making the maximum driver torque level available, assign “500”. This can be set for each axis with the parameter.

(This corresponds to the setup parameter, servo parameter SV014.)

[Data unit, range]

The data unit is the stall rated current %. The setting range is 0 to 999 (%).

[Precaution]

This setting is validated immediately after setting (writing). (Note that this is only when the axis movement is stopped.)

5. Explanation of Read/Write Data

3-10	Compensation basic axis number
-------------	---------------------------------------

[Data definition]

Specify the basic axis address for machine error compensation.
For pitch error compensation, set the name of the axis to be compensated.
For relative position compensation, set the name of the axis to be the base axis.
In the multi-part system, set "part system No. + axis name".
(This corresponds to the setup parameter, machine compensation parameter cmpax.)

[Data unit, range]

Set the axis address of X, Y, Z, U, V, W, A, B, or C etc.

[Precaution]

This setting is validated immediately after setting (writing). (Note that this is only when the axis movement is stopped.)

3-11	Compensation direction axis number
-------------	---

[Data definition]

Specify the compensation axis address for machine error compensation.
For pitch error compensation, set the same axis name as #4001 cmpax.
For relative position compensation, set the name of the axis to be actually compensated.
In the multi-part system, set "part system No. + axis name".
(This corresponds to the setup parameter, machine compensation parameter drcac.)

[Data unit, range]

Set the axis address of X, Y, Z, U, V, W, A, B, or C etc.

[Precaution]

This setting is validated immediately after setting (writing). (Note that this is only when the axis movement is stopped.)

3-12	Division point number at reference position
-------------	--

[Data definition]

Set the compensation data No. corresponding to the reference point position. The reference point is actually the base, so there is no compensation No. Set the number that is decremented by 1.
(This corresponds to the setup parameter, machine compensation parameter rdvno.)

[Data unit, range]

The setting range is 4101 to 5124.

[Precaution]

This setting is validated immediately after setting (writing). (Note that this is only when the axis movement is stopped.)

5. Explanation of Read/Write Data

3-13	Division point number at the most negative side
-------------	--

[Data definition]

Set the compensation data No. that is on the farthest negative side.
(This corresponds to the setup parameter, machine compensation parameter mdvno.)

[Data unit, range]

The setting range is 4101 to 5124.

[Precaution]

This setting is validated immediately after setting (writing). (Note that this is only when the axis movement is stopped.)

3-14	Division point number at the most positive side
-------------	--

[Data definition]

Set the compensation data No. that is on the farthest positive side.
(This corresponds to the setup parameter, machine compensation parameter pdvno.)

[Data unit, range]

The setting range is 4101 to 5124.

[Precaution]

This setting is validated immediately after setting (writing). (Note that this is only when the axis movement is stopped.)

3-15	Compensation scale factor
-------------	----------------------------------

[Data definition]

Set the compensation amount's scale.
(This corresponds to the setup parameter, machine compensation parameter sc.)

[Data unit, range]

The setting range is 0 to 99.

[Precaution]

This setting is validated immediately after setting (writing). (Note that this is only when the axis movement is stopped.)

3-16	Division interval
-------------	--------------------------

[Data definition]

Set the interval to divide the basic axis. Each compensation data will be the compensation amount for each of these intervals.
(This corresponds to the setup parameter, machine compensation parameter spcdy.)

[Data unit, range]

The setting range is 1 to 9999999.

[Precaution]

This setting is validated immediately after setting (writing). (Note that this is only when the axis movement is stopped.)

5. Explanation of Read/Write Data

4-10	Axis n G54 Workpiece coordinate system offset
4-11	Axis n G55 Workpiece coordinate system offset
4-12	Axis n G56 Workpiece coordinate system offset
4-13	Axis n G57 Workpiece coordinate system offset
4-14	Axis n G58 Workpiece coordinate system offset
4-15	Axis n G59 Workpiece coordinate system offset

[Data definition]

These are the G54 to G59 workpiece offset amount of the nth axis (n: 1 to No. of control axes.)
(This corresponds to the tool/correction amount workpiece coordinate offset G54 to G59.)

[Data unit, range]

Unit:

Input unit system (iunit)	Linear axis		Rotary axis
	Input unit (metric)	Input unit (inch)	
B	0.0005 mm	0.00005 inch	0.0005 °
C	0.00005 mm	0.000005 inch	0.00005 °

Range: -199999998 to +199999998

[Precautions]

- (1) This setting is valid after the data is rewritten and the next workpiece coordinate changeover is commanded.

4-16	Axis n External workpiece coordinate system offset
------	--

[Data definition]

This is the external workpiece coordinate system offset amount of the nth axis (n : 1 to No. of control axes).
(This corresponds to the tool/correction amount workpiece coordinate offset EXT.)

[Data unit, range]

Unit:

Input unit system (iunit)	Linear axis		Rotary axis
	Input unit (metric)	Input unit (inch)	
B	0.0005 mm	0.00005 inch	0.0005 °
C	0.00005 mm	0.000005 inch	0.00005 °

Range: -199999998 to +199999998

[Precautions]

- (1) This setting is valid after the data is rewritten and the next workpiece coordinate changeover is commanded.

5. Explanation of Read/Write Data

5-30	Servo alarm No.
------	-----------------

[Data definition]

This indicates that an error has occurred in the servo system.
When an error occurs, the NC alarm 2 (AL2: X431) will turn ON.

(1) Data configuration

Sub-section No.	Details
16	Alarm No. main (2-byte)
18	Alarm attribute (2-byte) bit F 0: No alarm 1: Alarm has occurred
20	Alarm No. sub 1 (2-byte)
22	Alarm No. sub 2 (2-byte)

(hexadecimal)

(2) Alarm contents

Alarm No. Main	Alarm No. Sub 1	Alarm No. Sub 2	Alarm contents
1	10	Alarm axis	Insufficient voltage
1	11	—	Axis selection error
1	12	Alarm axis	Memory error 1
1	13	—	Software processing error 1
1	16	Alarm axis	Magnetic pole position detection error
1	17	Alarm axis	A/D converter error
1	18	Alarm axis	Motor side detector: Initial communication error
1	1A	Alarm axis	Machine side detector: Initial communication error
1	1B	Alarm axis	Machine side detector: CPU error 1
1	1C	Alarm axis	Machine side detector: EEPROM/LED error
1	1D	Alarm axis	Machine side detector: Data error
1	1E	Alarm axis	Machine side detector: Memory error
1	1F	Alarm axis	Machine side detector: Communication error
1	20	Alarm axis	Motor side detector: No signal
1	21	Alarm axis	Machine side detector: No signal
1	22	Alarm axis	LSI error
1	23	Alarm axis	Excessive speed error 1
1	25	Alarm axis	Absolute position data lost
1	26	—	Unused axis error
1	27	Alarm axis	Machine side detector: CPU error 2
1	28	Alarm axis	Machine side detector: Overspeed
1	29	Alarm axis	Machine side detector: Absolute position data error
1	2A	Alarm axis	Machine side detector: Relative position data error
1	2B	Alarm axis	Motor side detector: CPU error 1
1	2C	Alarm axis	Motor side detector: EEPROM/LED error

(Continued on next page)

5. Explanation of Read/Write Data

Alarm No. Main	Alarm No. Sub 1	Alarm No. Sub 2	Alarm contents
1	2D	Alarm axis	Motor side detector: Data error
1	2F	Alarm axis	Motor side detector: Communication error
1	30	Alarm axis	Over regeneration
1	31	Alarm axis	Overspeed
1	32	Alarm axis	Power module overcurrent
1	33	Alarm axis	Overvoltage
1	34	—	NC-DRV communication: CRC error
1	35	Alarm axis	NC command error
1	36	—	NC-DRV communication: Communication error
1	37	Alarm axis	Initial parameter error
1	38	—	NC-DRV communication: Protocol Error 1
1	39	Alarm axis	NC-DRV communication: Protocol Error 2
1	3A	Alarm axis	Overcurrent
1	3B	Alarm axis	Power module overheat
1	3C	Alarm axis	Regeneration circuit error
1	40	Alarm axis	Detector selection unit switching error
1	41	Alarm axis	Detector selection unit communication error
1	42	Alarm axis	Feedback error 1
1	43	Alarm axis	Feedback error 2
1	46	Alarm axis	Motor overheat
1	50	Alarm axis	Overload 1
1	51	Alarm axis	Overload 2
1	52	Alarm axis	Excessive error 1
1	53	Alarm axis	Excessive error 2
1	54	Alarm axis	Excessive error 3
1	55	—	External emergency stop error
1	58	Alarm axis	Collision detection 1: G0
1	59	Alarm axis	Collision detection 1: G1
1	5A	Alarm axis	Collision detection 2
1	5C	Alarm axis	Orientation feedback error
1	5F	—	External contactor error
1	61	—	Power module overcurrent
1	63	—	Supplementary regeneration error
1	65	—	Rush relay error
1	67	—	Phase interruption
1	68	—	Watchdog
1	69	—	Grounding
1	6A	—	External contactor welding
1	6B	—	Rush relay welding

(Continued on next page)

5. Explanation of Read/Write Data

Alarm No. Main	Alarm No. Sub 1	Alarm No. Sub 2	Alarm contents
1	6C	—	Main circuit error
1	6D	—	Parameter error
1	6E	—	Memory error
1	6F	—	Power supply error
1	71	—	Instantaneous power interruption
1	73	—	Over regeneration
1	74	—	Regenerative resistor overheat
1	75	—	Overvoltage
1	76	—	External emergency stop setting error
1	77	—	Power module overheat
1	88	—	Watchdog

(Note 1) Depending on the driver type and power supply type, there may be some alarms that might not occur.

(Note 2) Refer to the alarm No. when the alarm attribute bit F is set to 1.

5. Explanation of Read/Write Data

5-90	Servo warning No.
-------------	--------------------------

[Data definition]

This indicates that a warning alarm has occurred in the servo system.

(1) Data configuration

Sub-section No.	Details
64	Alarm No. main (2-byte)
66	Alarm attribute (2-byte) bit F 0: No alarm 1: Alarm has occurred
68	Alarm No. sub 1 (2-byte)
70	Alarm No. sub 2 (2-byte)

(hexadecimal)

(2) Alarm contents

Alarm No. Main	Alarm No. Sub 1	Alarm No. Sub 2	Alarm contents
2	90	Alarm axis	Detector : Initial communication error
2	91	Alarm axis	Detector : Communication error
2	92	Alarm axis	Detector : Protocol error
2	93	Alarm axis	Initial absolute position fluctuation
2	96	Alarm axis	Scale feedback error
2	97	Alarm axis	Scale offset error
2	9E	Alarm axis	Absolute position detector : Revolution counter error
2	9F	—	Battery voltage drop
2	A8	Alarm axis	Turret indexing warning
2	E0	Alarm axis	Over regeneration warning
2	E1	Alarm axis	Overload warning
2	E3	Alarm axis	Absolute position counter warning
2	E4	Alarm axis	Set parameter warning
2	E6	Alarm axis	Control axis detachment warning
2	E7	—	In NC emergency stop state
2	E8	—	Excessive supplementary regeneration frequency
2	E9	—	Instantaneous power interruption warning
2	EA	—	In external emergency stop state
2	EB	—	Over regeneration warning

(Note 1) E7 of the alarm No. sub 1 cannot be viewed as the servo warning No.

(Note 2) Refer to the alarm No. when the alarm attribute bit F is set to 1.

5. Explanation of Read/Write Data

5-130	Operation error No.
--------------	----------------------------

[Data definition]

This indicates that the axis cannot move, etc., due to the operation or machine side conditions. When an error occurs, the NC alarm 4 (AL4) will turn ON.

AL4	\$1	\$2	\$3	\$4	\$5	\$6	\$7
	X633	X6B3	X733	X7B3	X833	X8B3	X933

(1) Data configuration

Sub-section No.	Details
96	Alarm No. main (2-byte)
98	Alarm attribute (2-byte) bit F 0: No alarm 1: Alarm has occurred (hexadecimal)
100	Alarm No. sub 1 (2-byte)
102	Alarm No. sub 2 (2-byte)

(2) Alarm contents

Alarm No. Main	Alarm No. Sub 1	Alarm No. Sub 2	Alarm contents
1	1	Alarm axis	Dog overrun
1	2	Alarm axis	Z-axis not cross
1	3	Alarm axis	Invalid return
1	4	Alarm axis	External interlock
1	5	Alarm axis	Internal interlock
1	6	Alarm axis	H/W stroke end
1	7	Alarm axis	S/W stroke end
1	8	—	Chuck/tail-stock barrier stroke end axis found
1	9	—	Reference point return number illegal
1	20	—	Reference point return illegal
1	24	—	Reference point return disabled during absolute position detection alarm
1	25	—	Reference point return disabled during zero point initialization
1	51	—	Synchronization error too large
1	101	—	Not operation mode
1	102	—	Override zero
1	103	—	External feedrate zero
1	104	—	F1-digit speed zero
1	105	—	Spindle stop
1	106	—	Handle feed axis No. illegal
1	107	—	Spindle speed excessive
1	108	—	Fixed point mode feed axis No. illegal
1	109	—	Block start interlock

(Continued on next page)

5. Explanation of Read/Write Data

Alarm No. Main	Alarm No. Sub 1	Alarm No. Sub 2	Alarm contents
1	110	—	Cutting block start interlock
1	112	—	Program check mode
1	113	—	Automatic start during buffer correction
1	115	—	Resetting
1	117	—	Play back not possible
1	120	—	Synchronization correction mode ON
1	121	—	No synchronous control option
1	124	Alarm axis	Simultaneous axes movement prohibition when the incline axis control is valid
1	160	Alarm axis	Axis with no maximum speed set for the outside of the soft limit range
1	1005	—	Execution of G114.* during G114.*
1	1106	—	Spindle synchronization phase calculation illegal

(Note 1) Refer to the alarm No. when the alarm attribute bit F is set to 1.

5. Explanation of Read/Write Data

5-140	Automatic stop code
--------------	----------------------------

[Data definition]

This indicates the cause of automatic stop or block stop.

(1) Data configuration

Sub-section No.	Details	
104	Alarm No. main (2-byte)	
106	Alarm attribute (2-byte) bit F	0: No alarm 1: Alarm has occurred (hexadecimal)
108	Alarm No. sub 1 (2-byte)	
110	Alarm No. sub 2 (2-byte)	

(2) Alarm contents

Alarm No. Main	Alarm No. Sub 1	Alarm No. Sub 2	Alarm contents
1	101	—	Axis in motion
1	102	—	Ready off
1	103	—	Reset on
1	104	—	Automatic operation stop signal "ON"
1	105	—	H/W stroke end axis
1	106	—	S/W stroke end axis
1	107	—	No operation mode
1	108	—	Operation mode duplicated
1	109	—	Operation mode shift
1	110	—	Buffer correction execution
1	113	—	Thermal alarm
1	138	—	Disabled start during absolute position detection alarm
1	139	—	Disabled start during zero point initialization
1	141	—	Start during MDI operation at other part system disable
1	190	—	Automatic start disabled
1	191	—	Automatic start disabled
2	201	—	H/W stroke end axis
2	202	—	S/W stroke end axis
2	203	—	Reset signal on
2	204	—	Automatic operation stop
2	205	—	Automatic mode change
2	206	—	Acceleration and deceleration time constant too large
2	215	—	Absolute position detection alarm stop
3	301	—	Single block on
3	302	—	User macro stop
3	303	—	Mode change
3	304	—	MDI completion

(Continued on next page)

5. Explanation of Read/Write Data

Alarm No. Main	Alarm No. Sub 1	Alarm No. Sub 2	Alarm contents
3	305	—	Block start interlock
3	306	—	Cutting block start interlock
3	310	—	Offset change of inclined Z-axis during program operation
10	(Note 2)	—	The error number is displayed while each of the completion wait modes listed in the table below is on. It disappears when the mode is canceled.

(Note 1) Refer to the alarm No. when the alarm attribute bit F is set to 1.

(Note 2) 0

Alarm No.	Waiting for unclamp signal (Note3)				Alarm No.	Door open (Note4)			Waiting for spindle position to be looped	Alarm No.	Waiting for spindle orientation to complete	Waiting for cutting speed deceleration	Waiting for rapid traverse deceleration	Waiting for MSTB completion
0					0					0				
1				×	1				×	1				×
8	×				8	×				2			×	
9	×			×	9	×			×	3			×	×
										4		×		
										5		×		×
										6		×	×	
										7		×	×	×
										8	×			
										9	×			×
										A	×		×	
										B	×		×	×
										C	×	×		
										D	×	×		×
										E	×	×	×	
										F	×	×	×	×

(Note 3) Waiting for unclamp when "#2076 index_x" = 1.

(Note 4) Door open mode is enabled by the door interlock function.

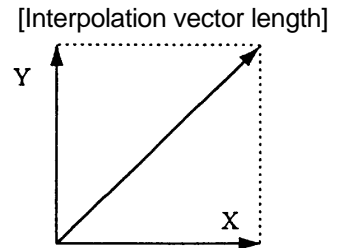
5. Explanation of Read/Write Data

11/15-10	Interpolation vector length
-----------------	------------------------------------

[Data definition]

The remaining movement distance of the block being executed is indicated.

$$\sqrt{\sum (\text{Remaining movement distance of each axis})^2}$$



[Data unit]

The unit is 1/2 of the input unit. (Either 0.5μm, or 0.05μm)

[Precaution]

The data is not set when G0 non-interpolation (G0Intp = 1). The data will be updated with the interpolation cycle.

11/15-20	Movement mode
-----------------	----------------------

[Data definition]

Data (binary)	Contents
0	G00 Positioning (each axis independent)
1	G00 Positioning (linear)
2	G01 Linear interpolation
3	G02 Circular interpolation (CW)
4	G03 Circular interpolation (CCW)
5	G02 X__Y__Z__ Helical interpolation (CW)
6	G03 X__Y__Z__ Helical interpolation (CCW)
7	
8	
9	
10	
11	G04 Time designated dwell
12	
13	G27_P1 1st reference point compare
14	G27_P2 2nd reference point compare
15	G27_P3 3rd reference point compare
16	G27_P4 4th reference point compare
17	G28 Automatic reference point return
18	G29 Return from automatic reference point
19	G30_P2 2nd reference point return
20	G30_P3 3rd reference point return
21	G30_P4 4th reference point return
22	G31 Skip function
23	G31.1 Multi-step skip function 1
24	G31.2 Multi-step skip function 2
25	G31.3 Multi-step skip function 3
26	G33 Thread cutting (G32 for lathe G code series 2.)
27	G34 Variable lead thread cutting (only lathe)
28	
29	G92 Coordinate system setting
30	

5. Explanation of Read/Write Data

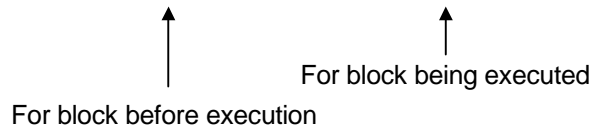
12/16-10	Axis direction movement amount
----------	--------------------------------

[Data definition]

The remaining movement distance of each axis in the block being executed is indicated.

(Machine position at movement end point)

- (Machine position at movement start point or current position)



[Data unit]

The unit is 1/2 of the input unit. (Either 0.5 μ m, or 0.05 μ m)

[Precautions]

- (1) If the movement mode is skip or multi-step skip, the movement end point will not be the skip stop point, but instead will be a value calculated from the commanded value.
- (2) If the movement mode is counter preset, the counter preset value will be set instead of the remaining movement distance of each axis. The value will be cleared immediately after the counter preset is executed.
- (3) If the movement mode is reference point return, the remaining movement distance to the middle point will be set.
- (4) If the movement mode is start position return, the remaining movement distance from the middle point will be set.

5. Explanation of Read/Write Data

13/17-10	Interpolation mode (G code group 1)
-----------------	--

[Data definition]

The current movement modal (group 1) is indicated.

Data	Machining center system	Lathe system	
		Series 2	Series 3
0	G00	G00	G00
1	G01	G01	G01
2	G02	G02	G02
3	G03	G03	G03
4	—	—	—
5	—	—	—
6	G33	G32	G33
7	—	—	—
8	—	G34	G34

13/17-11	Plane selection (G code group 2)
-----------------	---

[Data definition]

The current plane selection modal (group 2) is indicated.

Data	Machining center system	Lathe system	
		Series 2	Series 3
0	G17	G17	G17
1	G18	G18	G18
2	G19	G19	G19

13/17-12	Feed mode (G code group 5)
-----------------	-----------------------------------

[Data definition]

The current feed modal (group 5) is indicated.

Data	Machining center system	Lathe system	
		Series 2	Series 3
0	—	—	—
1	G94	G98	G94
2	G95	G99	G95

5. Explanation of Read/Write Data

13/17-13	Radius compensation modal (G code group 7)
-----------------	---

[Data definition]

The current radius compensation modal (group 7) is indicated.

Data	Machining center system	Lathe system	
		Series 2	Series 3
0	G40	G40	G40
1	G41	G41	G41
2	G42	G42	G42
3	—	G46	G46

13/17-14	Fixed cycle modal (G code group 9)
-----------------	---

[Data definition]

The current fixed cycle modal (group 9) is indicated.

Data	Machining center system	Lathe system	
		Series 2	Series 3
0	—	G72	G72
1	—	G73	G73
2	—	G74	G74
3	—	G75	G75
4	—	G76	G76
5	—	G90	G77
6	—	G92	G78
7	—	G94	G79
8	G80	G80	G80
9	G81	—	—
10	G82	—	—
11	G83	G83	G83
12	G84	G84	G84
13	G85	G85	G85
14	G86	—	—
15	G87	G87	G87
16	G88	G88	G88
17	G89	G89	G89
18	—	—	—
19	—	G70	G70
20	—	G71	G71
21	G73	—	—
22	G74	—	—
23	G76	G79	G83.2

5. Explanation of Read/Write Data

13/17-15	Workpiece coordinate system modal (G code group 12)
-----------------	--

[Data definition]

The current workpiece coordinate system modal (group 12) is indicated.

Data	Machining center system	Lathe system	
		Series 2	Series 3
0	G54	G54	G54
1	G55	G55	G55
2	G56	G56	G56
3	G57	G57	G57
4	G58	G58	G58
5	G59	G59	G59

13/17-16	Cutting mode (G code group 13)
-----------------	---------------------------------------

[Data definition]

The current cutting modal (group 13) is indicated.

Data	Machining center system	Lathe system	
		Series 2	Series 3
0	G61	G61	G61
1	G62	G62	G62
2	G63	G63	G63
3	G64	G64	G64
4	G61.1	G61.1	G61.1

13/17-17	Other G modals (G code group 3, 4, 6, 10, 17, 18)
-----------------	--

[Data definition]

The current G modal (group 3, 4, 6, 10, 17, 18) is indicated.

	bit7	*bit6	bit5	bit4	bit3	bit2	bit1	bit0
		Group 18	Group 17		Group 10	Group 6	Group 4	Group 3
1		G15	G96		G99	G20	G22	G90
0		G14	G97		G98	G21	G23	G91

* Lathe system

13/17-20	Block No.
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[Data definition]

The current block No. is indicated.

[Data range]

The setting range is 0 to 99.

5. Explanation of Read/Write Data

13/17-30	Shape compensation No.
----------	-------------------------------

[Data definition]

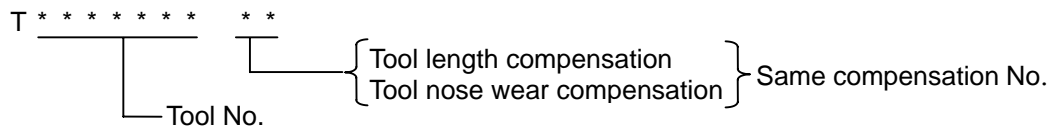
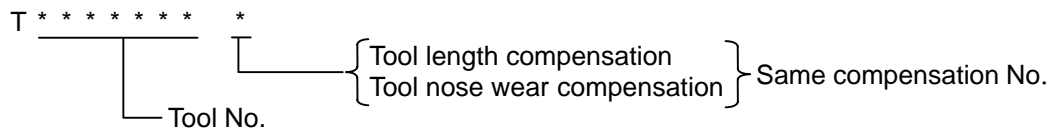
(1) Machining center system

The tool compensation No. commanded with address D in the nose radius compensation (G41, G42) or position compensation (G45 to G48) block is indicated.

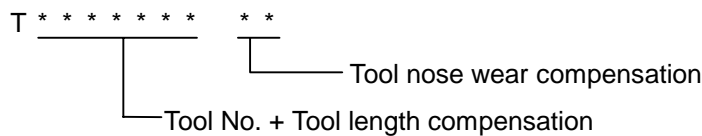
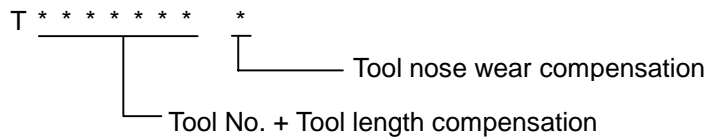
(2) Lathe system

The tool length compensation No. commanded by the tool function code T is indicated.

(a) When designating the tool length and tool nose wear compensation No. with the low-order 1 digit or 2 digits of the T command.



(b) When designating the tool length compensation No. and tool nose wear compensation No. independently.



In this case, the tool length compensation No. is the last two digits of the high-order digit.

13/17-31	Wear compensation No.
----------	------------------------------

[Data definition]

(1) Machining center system

This is the same as the shape compensation No.

(2) Lathe system

The tool nose wear No. commanded with the tool function code (T) is indicated.

5. Explanation of Read/Write Data

13/17-40	Miscellaneous function (M) code (BCD)
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[Data definition]

The miscellaneous function No. commanded with the miscellaneous function code (M) is indicated.

13/17-41	Spindle function (S) code (BIN)
----------	---------------------------------

[Data definition]

The spindle speed commanded with the spindle function code (S) is indicated.

13/17-42	Tool function (T) code (BCD)
----------	------------------------------

[Data definition]

The tool No. commanded with the tool function code (T) is indicated.

13/17-43	2nd miscellaneous function (B) code (BCD)
----------	---

[Data definition]

The data commanded with the 2nd miscellaneous function code (B, A or C) is indicated.

13/17-44	Program No.
----------	-------------

[Data definition]

The current program No. (modal) is indicated.

[Data range]

The setting range is 1 to 99999999 (binary).

13/17-45	Sequence No.
----------	--------------

[Data definition]

The current sequence No. is indicated.

[Data range]

The setting range is 1 to 99999 (binary).

14/18-10	Tool length compensation No.
----------	------------------------------

[Data definition]

The tool length compensation No. of that axis is indicated.

[Data range]

The setting range is 0 to the maximum compensation No. (binary).
This is valid only for the machining center system.

5. Explanation of Read/Write Data

20-10	Automatic effective feedrate
--------------	-------------------------------------

[Data definition]

The actual feedrate in the automatic mode is indicated.

(This includes the speed change conditions such as override.)

- (1) For G0, G1, G2, G3, G27
The composite speed of all commanded axes is indicated.
- (2) For G28, G29, G30
The speed of the fastest axis among the axes moving simultaneously is indicated.

[Data unit]

Input unit system (iunit)	Input unit (metric)	Input unit (inch)
B	1×2^{-10} mm/min	0.1×2^{-10} inch/min
C	0.1×2^{-10} mm/min	0.01×2^{-10} inch/min

20-11	Manual effective feedrate
--------------	----------------------------------

[Data definition]

The actual feedrate in the manual mode is indicated.

(This includes the speed change conditions such as override.)

The speed of the fastest axis among the axes moving simultaneously is indicated.

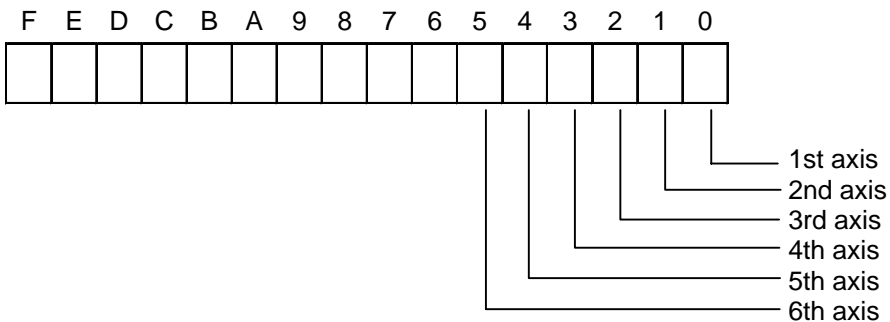
[Data unit]

Input unit system (iunit)	Input unit (metric)	Input unit (inch)
B	1×2^{-10} mm/min	0.1×2^{-10} inch/min
C	0.1×2^{-10} mm/min	0.01×2^{-10} inch/min

20-20	In-position
--------------	--------------------

[Data definition]

This indicates that the control axes which belong to each part system are in the state of in-position



5. Explanation of Read/Write Data

21-10	Current position in machine coordinate system
--------------	--

[Data definition]

The current position of the axis in the machine coordinate system is indicated.

[Data unit]

Input unit system (iunit)	Linear axis		Rotary axis
	Input unit (metric)	Input unit (inch)	
B	0.0005 mm	0.00005 inch	0.0005 °
C	0.00005 mm	0.000005 inch	0.00005 °

21-12	Manual interrupt amount (1) (Manual absolute switch OFF)
--------------	---

[Data definition]

The total of the movement amount in the manual mode with the manual absolute switch OFF is indicated.

The program coordinate system is shifted by the distance corresponding to this data.

[Data unit]

Input unit system (iunit)	Linear axis		Rotary axis
	Input unit (metric)	Input unit (inch)	
B	0.0005 mm	0.00005 inch	0.0005 °
C	0.00005 mm	0.000005 inch	0.00005 °

21-13	Manual interrupt amount (2) (Manual absolute switch ON)
--------------	--

[Data definition]

The total of the movement amount in the manual mode with the manual absolute switch ON is indicated.

This data is cleared in the following cases:

- (1) When calculation of the buffer is started during automatic starting, or when automatic start up is executed.
- (2) When the reset signal is input.

[Data unit]

Input unit system (iunit)	Linear axis		Rotary axis
	Input unit (metric)	Input unit (inch)	
B	0.0005 mm	0.00005 inch	0.0005 °
C	0.00005 mm	0.000005 inch	0.00005 °

5. Explanation of Read/Write Data

21-20	Current position in workpiece coordinate system
--------------	--

[Data definition]

The current position in the currently selected workpiece coordinate system is indicated.

[Data unit]

Input unit system (iunit)	Linear axis		Rotary axis
	Input unit (metric)	Input unit (inch)	
B	0.0005 mm	0.00005 inch	0.0005 °
C	0.00005 mm	0.000005 inch	0.00005 °

21-30	Current position in workpiece coordinate system during skip ON
--------------	---

[Data definition]

The current position in the workpiece coordinate system when the skip signal is input during the G31 command is indicated.

This corresponds to the macro variables #5061, #5062

[Data unit]

Input unit system (iunit)	Linear axis		Rotary axis
	Input unit (metric)	Input unit (inch)	
B	0.0005 mm	0.00005 inch	0.0005 °
C	0.00005 mm	0.000005 inch	0.00005 °

21-31	Current position in machine coordinate system during skip ON
--------------	---

[Data definition]

The current position in the machine coordinate system when the skip signal is input during the G31 command is indicated.

[Data unit]

Input unit system (iunit)	Linear axis		Rotary axis
	Input unit (metric)	Input unit (inch)	
B	0.0005 mm	0.00005 inch	0.0005 °
C	0.00005 mm	0.000005 inch	0.00005 °

5. Explanation of Read/Write Data

21-32	Remaining distance during skip ON
--------------	--

[Data definition]

The remaining commanded distance when the skip signal is input during the G31 command is indicated.

[Data unit]

Input unit system (iunit)	Linear axis		Rotary axis
	Input unit (metric)	Input unit (inch)	
B	0.0005 mm	0.00005 inch	0.0005 °
C	0.00005 mm	0.000005 inch	0.00005 °

21-33	Current position in machine coordinate system during manual skip ON
--------------	--

[Data definition]

The current position in the machine coordinate system when the skip signal is ON during the manual skip command is indicated.

[Data unit]

Input unit system (iunit)	Linear axis		Rotary axis
	Input unit (metric)	Input unit (inch)	
B	0.0005 mm	0.00005 inch	0.0005 °
C	0.00005 mm	0.000005 inch	0.00005 °

5. Explanation of Read/Write Data

22-10	Emergency stop causes
-------	-----------------------

[Data definition]

The cause of why the CNC entered the emergency stop state is indicated.

This data can also be referred to with the file register R21 in the PLC and CNC interfaces.

The correspondence of each bit is explained below. Here, the signal is normally "1", and is set to "0" when an emergency stop occurs.

22-10-0) Built-in PLC Software stop state

This indicates that the emergency stop state was entered because the user PLC's RUN/STOP switch was set to STOP. The user PLC's RUN/STOP switch is set with the rotary switch NCSYS on the control unit. (Normal: 0, at STOP: 1)

This will also occur if the remote I/O unit's 5 V/24 V input is in the abnormal state.

22-10-1) External PLC No hardware

The hardware for the I/F to the external PLC is not equipped, or that is faulty.

22-10-2) External PLC Not ready

With an external PLC link, "0" will be output until the first interrupt is input from the external PLC.

22-10-3) External PLC Communication error

With an external PLC link, this indicates that communication with the external PLC has been cut off.

22-10-4) External PLC Emergency stop output

This indicates that the 24 V is not being supplied to the emergency stop input because the emergency stop switch has been pressed.

22-10-6) Built-in PLC Software emergency stop output device Y427 is "1".

This indicates that the user PLC has entered the emergency stop state.

The PLC device "Y427" is the PLC emergency stop interface.

22-10-B) User PLC Illegal codes exist.

The user PLC has illegal codes.

22-10-C) PLC high-speed processing error

The high-speed processing time is over.

22-10-D) Door interlock, dog/OT arbitrary allocation device illegal

The device No. of door interlock·dog/OT arbitrary allocation overlaps another signal, or that is specified with an illegal No.

22-10-E) Spindle drive unit emergency stop output

This indicates that the spindle controller is in the emergency stop state.

22-10-F) Servo drive unit emergency stop output

This indicates that the servo controller is in the emergency stop state.

5. Explanation of Read/Write Data

23-10	Spindle command speed (Effective value)
-------	---

[Data definition]

This is not the spindle function (S) command value, but instead is the commanded speed that is obtained by adding the conditions such as spindle override, spindle stop and spindle gear shift to the S command. Set the spindle No. in the part system designation bit.
(bit 0:1st spindle, bit 1:2nd spindle, ... bit 6:7th spindle)

[Data unit, range]

The data unit is r/min, and the setting range is 0 to 32767.

24-1	Power ON time
------	---------------

[Data definition]

This is the total cumulative time from when the controller power is turned ON to when it is turned OFF.

[Data unit]

The read data is a binary, and is not a time unit.
The following calculation is carried out to change the data to time (unit: second).

$$\text{Time (second)} = \boxed{\text{DDB read data}} \times \frac{256}{9000}$$

The reverse calculation is carried out to write the data.

$$\boxed{\text{DDB write data}} = \frac{9000}{256} \times \text{time}$$

24-2	Automatic operation time
------	--------------------------

[Data definition]

This is the total cumulative time per machining time from when the automatic start button is pressed in the memory (tape) mode to when the M02/M30 command is issued, or to when the reset process is carried out by pressing the reset button.

[Data unit]

The read data is a binary, and is not a time unit.
The following calculation is carried out to change the data to time (unit: second).

$$\text{Time (second)} = \boxed{\text{DDB read data}} \times \frac{256}{9000}$$

The reverse calculation is carried out to write the data.

$$\boxed{\text{DDB write data}} = \frac{9000}{256} \times \text{time}$$

5. Explanation of Read/Write Data

24-3	Automatic start up time
-------------	--------------------------------

[Data definition]

This is the total cumulative time of automatic starting from when the automatic start button is pressed in the memory (tape) mode or MDI mode to when the feedhold stop, block stop or reset button is pressed.

[Data unit]

The read data is a binary, and is not a time unit.

The following calculation is carried out to change the data to time (unit: second).

$$\text{Time (second)} = \boxed{\text{DDB read data}} \times \frac{256}{9000}$$

The reverse calculation is carried out to write the data.

$$\boxed{\text{DDB write data}} = \frac{9000}{256} \times \text{time}$$

24-4	External cumulative time 1
24-5	External cumulative time 2

[Data definition]

This counts and displays the total cumulative time that the designated signal (Y414, Y415) is ON with the user PLC. The signals are assigned in the following manner.

24-4 External cumulative time 1: Y414

24-5 External cumulative time 2: Y415

[Data unit]

The read data is a binary, and is not a time unit.

The following calculation is carried out to change the data to time (unit: second).

$$\text{Time (second)} = \boxed{\text{DDB read data}} \times \frac{256}{9000}$$

The reverse calculation is carried out to write the data.

$$\boxed{\text{DDB write data}} = \frac{9000}{256} \times \text{time}$$

5. Explanation of Read/Write Data

26-10	Spindle Motor real speed
-------	--------------------------

[Data definition]

This is the real speed of the spindle motor detected by the encoder built into the motor.

[Data unit]

The data unit is r/min.

[Precaution]

This signal is limited to the "MDS-*-SP/SPH/SPJ2" spindle controller.

26-20	Spindle Motor load
-------	--------------------

[Data definition]

This is the load (torque current) of the spindle motor.

The rated load for 30 minutes is regarded as 100%.

$$\text{Spindle motor load (\%)} = \left| \boxed{\text{Read data}} \right| \text{ (An absolute value is retrieved.)}$$

5. Explanation of Read/Write Data

27-10	Smoothing status, servo status
-------	--------------------------------

[Data definition]

The various servo related information is expressed in bit units.

27-10-0) Ready ON

If the drive unit can be entered the ready ON state, including the ready ON request signal from the CNC, the main circuit will be turned ON. While the main circuit is ON, the ready ON signal will turn ON as the answer signal to the CNC.

The conditions for turning OFF are as follows:

- 1) When the ready ON request signal from the CNC turns OFF.
- 2) When the CNC enters the emergency stop state.
- 3) When a servo alarm occurs.

27-10-1) Servo ON

When the above ready ON signal is ON and the servo ON request signal is received from the CNC, if the conditions provide that the servo can be turned ON, the servo ON signal will turn ON (a position loop will be structured). The servo ON signal will remain ON as the answer signal to the CNC while the position loop is structured.

The condition for turning OFF is as follows:

- 1) When in addition to the conditions for the ready ON signal to turn OFF, the servo ON request signal from the CNC turns OFF.

27-10-2) In emergency stop

This is the signal answered by the drive unit when it receives notice that the CNC is in the emergency stop state. **E7** will be displayed on the 7-segment display for drive unit diagnosis.

27-10-3) In alarm

This notifies that the drive unit is in the servo OFF state.

27-10-4) Absolute position established

This turns ON when the absolute position has been established.

27-10-5) Z phase passed

This means that the datum point (Z phase) has been passed by the axis movement after the power was turned ON.

The servo parameter "SPEC" value in the setup parameters determines which datum point (Z phase) is valid among the points output by detector.

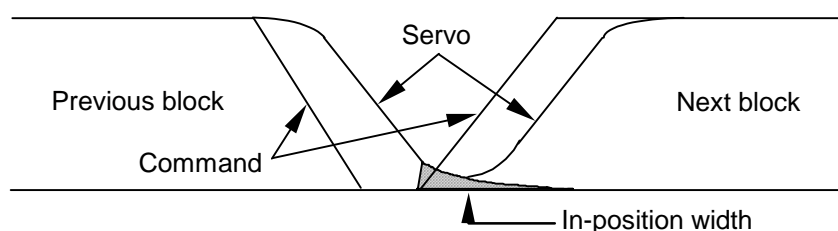
The CNC will determine the reference point return position, etc., based on this signal.

Once turned ON, this signal remains ON until it is turned OFF.

27-10-6) In-position

This indicates that the difference of the command and the feedback from the detector, or in other words, the position deflection (position loop droop) is within the range designated by the servo parameter "SV024" (in-position width) in the setup parameters.

How the CNC operates upon receiving this signal depends on the basic specification parameter "inpos" (in-position check valid) in the setup parameters.



5. Explanation of Read/Write Data

27-10-7) Torque limit

This notifies that the motor drive current has been limited.

The current limit parameter will follow the ILMT (limit values for both + and – directions) in the servo parameters of the setup parameters.

27-10-8) Smoothing 0

The acceleration/deceleration time constant to make the machine movement smooth is applied to the issued step-state command. The circuit onto which the acceleration/deceleration time constant is applied is called the smoothing circuit.

Smoothing 0 means that there is no droop amount in that smoothing circuit.

(Note 1) This may turn ON when the machine is moving at an extremely low speed.

(Note 2) This state is equivalent to when the plus motion (+) signal (MVPn) and the minus motion (-) signal (MVMn) sent from the CNC to the PLC are both OFF.

27-10-9) Smoothing (+)

This indicates that there is a (+) droop amount (movement in the + direction) in the smoothing circuit described in section 27-10-8).

(Note 1) This may turn OFF when the machine is moving at an extremely low speed.

(Note 2) This state is equivalent to the plus motion (+) signal (MVPn) sent from the CNC to the PLC.

27-10-A) Smoothing (-)

This indicates that there is a (-) droop amount (movement in the – direction) in the smoothing circuit described in section 27-10-8).

(Note 1) This may turn OFF when the machine is moving at an extremely low speed.

(Note 2) This state is equivalent to the minus motion (-) signal (MVPn) sent from the CNC to the PLC.

27-10-C) Hardware OT+ (hardware overtravel)

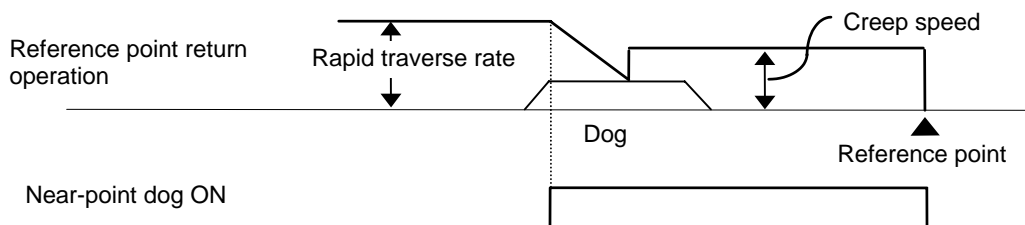
This indicates that the stroke end (+) signal was input for an axis moving in the (+) direction. Once the conditions are met, the signal will turn ON and the axis will move in the (-) direction. And when the stroke end (+) signal is no longer input, this signal will turn OFF.

27-10-D) Hardware OT– (hardware overtravel)

This indicates that the stroke end (-) signal was input for an axis moving in the (-) direction. Once the conditions are met, the signal will turn ON and the axis will move in the (+) direction. And when the stroke end (-) signal is no longer input, this signal will turn OFF.

27-10-E) Near-point dog ON

This turns ON when the reference point return near-point detection signal (dog) for the axis is detected while executing the dog-type reference point return. This turns OFF when the reference point is reached.



27-10-F) Amp. unequipped

This turns ON when the drive unit is not connected or in the equal state to that.

- When the drive unit is not correctly connected.
- When the drive unit power is OFF.
- When the drive unit axis No. switch is illegal.

5. Explanation of Read/Write Data

27-20	Servo delay amount
-------	--------------------

[Data definition]

This is an amount that indicates the difference of the actual machine position from the commanded position. (With code (+) or (-).)

The servo delay amount will be the same as the droop on the diagnosis screen's servo monitor, according to the following equation.

$$\text{Droop [command unit]} = \left| \boxed{\text{Read data}} \right| \times \frac{1}{2}$$

27-30	Feed axis motor load A (%)
-------	----------------------------

[Data definition]

This is the load of the feed axis motor.

The data read with the DDB has a code (+ or -).

$$\text{Feed axis motor load (\%)} = \left| \boxed{\text{Read data}} \right| \text{ (An absolute value is retrieved.)}$$

[Precaution]

The motor data is data that considers the motor type. Thus, conversion may not be required depending on the motor type.

27-31	Feed axis motor load B (%)
-------	----------------------------

[Data definition]

This is the load (current) of the feed axis motor.

$$\text{Feed axis motor load (\%)} = \left| \boxed{\text{Read data}} \right| \text{ (An absolute value is retrieved.)}$$

(Note) The same contents as the feed axis motor load A (27-30) are obtained for the feed axis motor load B.

To read the feed axis motor load, use the feed axis motor load A (27-30).

27-33	Feed axis motor speed (r/min)
-------	-------------------------------

[Data definition]

This is the speed of the feed axis motor.

The data read with the DDB has a code (+ or -).

$$\text{Feed axis motor speed (r/min)} = \left| \boxed{\text{Read data}} \right| \text{ (An absolute value is retrieved.)}$$

5. Explanation of Read/Write Data

29-10	Variable command (common variable values 1)
-------	---

[Data definition]

These are common variables used by the variable commands and user macros.
The sub-section No. of the DDB uses the same value as the variable No. to be read or written.
The common variable 1 can be used common for all the part systems.

Common variables	Function	
	Sub-section No.	Remarks
50 sets: #500 to #549	500 to 549	These can be used in the main program, subprogram and each macro program.
100 sets: #500 to #599	500 to 599	
200 sets: #500 to #699	500 to 699	

[Precautions]

- (1) When data is changed during operation:
 - The data will not be effective on a block that has already been calculated.
- (2) The substitute command is executed when the command block is ACT.
- (3) When handling decimal place with the DDB, the last four digits of the data read or written correspond to the decimal place when the control signal bit 2 is set to "1".
When the control signal bit 2 is set to "0", only the integer is read or written.

5. Explanation of Read/Write Data

30-10	Local variables (level 0)
--------------	----------------------------------

[Data definition]

These are the local variables for the main program (macro level 0).

The sub-section No. of the DDB uses the same value as the local variable No. to be read or written.

[Precautions]

- (1) When data is changed during operation:
 - (a) The data is not effective on a block that has already been calculated.
 - (b) The variable is cleared to a blank when the macro is called.
- (2) The substitute command is executed when the command block is ACT.
- (3) When handling decimal place with the DDB, the last four digits of the data read or written correspond to the decimal place when the control signal bit 2 is set to "1".

30-11	Local variables (level 1)
--------------	----------------------------------

[Data definition]

These are the same as the local variables (level 0), and are the local variables in macro level 1.

Note that the sub-section No. used by the DDB is the value which 100 has been added to the local variable No.

30-12	Local variables (level 2)
--------------	----------------------------------

[Data definition]

These are the same as the local variables (level 1), and are the local variables in macro level 2.

Note that the sub-section No. used by the DDB is the value which 200 has been added to the local variable No.

30-13	Local variables (level 3)
--------------	----------------------------------

[Data definition]

These are the same as the local variables (level 2), and are the local variables in macro level 3.

Note that the sub-section No. used by the DDB is the value which 300 has been added to the local variable No.

31-10	Tool compensation amount 1
--------------	-----------------------------------

[Data definition]

This is the tool offset and differs according to the distinction of shape and wear.

Without shape/wear distinction : Tool compensation amount

With shape/wear distinction : Tool length shape compensation amount

The sub-section No. used by the DDB corresponds to the tool offset No.

[Data unit, range]

Unit : 1/2 of the input unit (Either 0.5 μ m, or 0.05 μ m)

Data range : -99999999 to +99999999 (binary)

[Precaution]

Even if this data is changed during operation, it will not be effective on a block that has already been calculated.

5. Explanation of Read/Write Data

31-20	Tool compensation amount 2
--------------	-----------------------------------

[Data definition]

This is the tool length wear compensation amount.

(This is valid only when there is a shape/wear distinction in the tool offset.)

The sub-section No. used by the DDB is the value which 1000 has been added to the tool offset No.

[Data unit, range]

Unit : 1/2 of the input unit (Either 0.5 μ m, or 0.05 μ m)

Data range : -99999 to +99999 (binary)

[Precaution]

Even if this data is changed during operation, it will not be effective on a block that has already been calculated.

31-30	Tool compensation amount 3
--------------	-----------------------------------

[Data definition]

This is the tool radius shape compensation amount.

(This is valid only when there is a shape/wear distinction in the tool offset.)

The sub-section No. used by the DDB is the value which 6000 has been added to the tool offset No.

The following is the same as tool compensation amount 1.

31-40	Tool compensation amount 4
--------------	-----------------------------------

[Data definition]

This is the tool radius wear compensation amount.

(This is valid only when there is a shape/wear distinction in the tool offset.)

The sub-section No. used by the DDB is the value which 7000 has been added to the tool offset No.

The following is the same as the tool compensation amount 2.

31-100	X axis tool length compensation amount
---------------	---

[Data definition]

This is the X axis tool length compensation amount.

The sub-section No. used by the DDB corresponds to the tool offset No.

[Data unit, range]

Unit : 1/2 of the input unit. (Either 0.5 μ m, or 0.05 μ m)

Data range : -99999999 to +99999999 (binary)

[Precaution]

Even if this data is changed during operation, it will not be effective on a block that has already been calculated.

5. Explanation of Read/Write Data

31-110	X axis wear compensation amount
---------------	--

[Data definition]

This is the X axis wear compensation amount.

The sub-section No. used by the DDB is the value which 1000 has been added to the tool offset No.

[Data unit, range]

Unit : 1/2 of the input unit. (Either 0.5 μ m, or 0.05 μ m)

Data range : 0 to 99999 (binary)

[Precaution]

Even if this data is changed during operation, it will not be effective on a block that has already been calculated.

31-120	3rd axis tool length compensation amount
---------------	---

[Data definition]

This is the 3rd tool length compensation amount.

The sub-section No. used by the DDB is the value which 2000 has been added to the tool offset No.

The following is the same as the X axis tool length compensation amount.

31-130	3rd axis wear compensation amount
---------------	--

[Data definition]

This is the 3rd axis wear compensation amount.

The sub-section No. used by the DDB is the value which 3000 has been added to the tool offset No.

The following is the same as the X axis wear compensation amount.

31-140	Z axis tool length compensation amount
---------------	---

[Data definition]

This is the Z axis tool length compensation amount

The sub-section No. used by the DDB is the value which 4000 has been added to the tool offset No.

The following is the same as the X axis tool length compensation amount.

31-150	Z axis wear compensation amount
---------------	--

[Data definition]

This is the Z axis wear compensation amount.

The sub-section No. used by the DDB is the value which 5000 has been added to the tool offset No.

The following is the same as the X axis wear compensation amount.

31-160	Nose R compensation amount
---------------	-----------------------------------

[Data definition]

This is the nose R compensation amount.

The sub-section No. used by the DDB is the value which 6000 has been added to the tool offset No.

The following is the same as the X axis tool length compensation amount.

5. Explanation of Read/Write Data

31-170	Nose R wear compensation amount
---------------	--

[Data definition]

This is the nose R wear compensation amount.
 The sub-section No. used by the DDB is the value which 7000 has been added to the tool offset No.
 The following is the same as the X axis wear compensation amount.

31-180	Hypothetical nose No.
---------------	------------------------------

[Data definition]

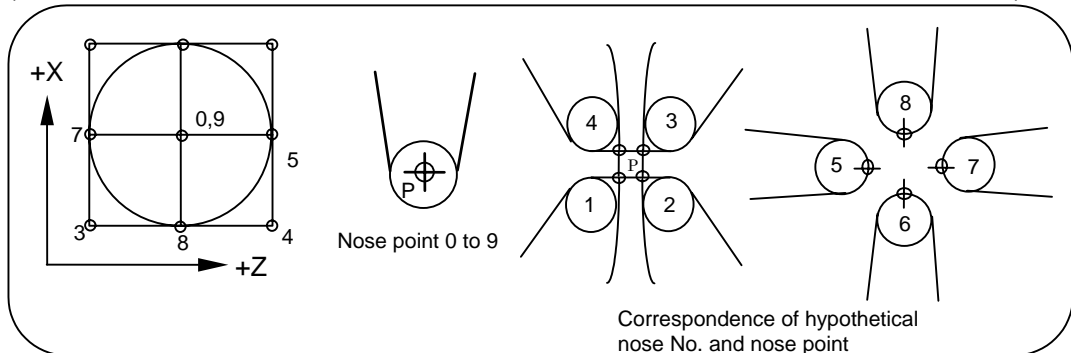
This is the hypothetical nose No.

(1) Nose point

Generally, the tool nose is rounded, so the nose position in the program is aligned to point P as shown in the following example.

With nose R compensation, select one point from the points shown below for each tool No., and preset this position relation.

(In the G46 mode, 1 to 8 are selected, and in the G41/G42 mode, 0 to 9 are selected.)



The sub-section No. used by the DDB is the value which 8000 has been added to the tool offset No.

32-10	Variable command (common variable values 2)
--------------	--

[Data definition]

These are common variables used by the variable commands and user macros.
 The sub-section No. of the DDB uses the same value as the variable No. to be read or written.
 The common variable 2 is prepared per part system. Designate the part system No. on the part system No. designation bit.

Common variables	Function	
	Sub-section No.	Remarks
50 sets * No. of part systems: #100 to #149	100 to 149	These can be used in the main program, subprogram and each macro program.
100 sets * No. of part systems: #100 to #199	100 to 199	

[Precautions]

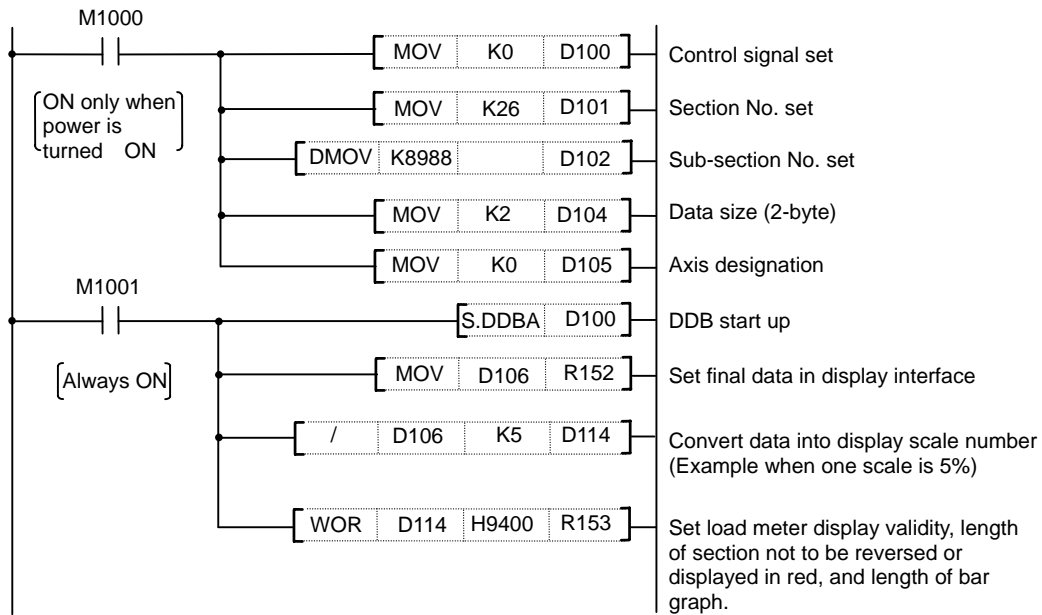
- (1) When data is changed during operation:
 - The data will not be effective on a block that has already been calculated.
- (2) The substitute command is executed when the command block is ACT.
- (3) When handling decimal place with the DDB, the last four digits of the data read or written correspond to the decimal place when the control signal bit 2 is set to "1".
 When the control signal bit 2 is set to "0", only the integer is read or written.

6. Example of DDB with Ladder Circuit

(1) Axis load

The spindle load can be read in, and can be displayed on the CNC screen by using the load meter display function in the PLC.

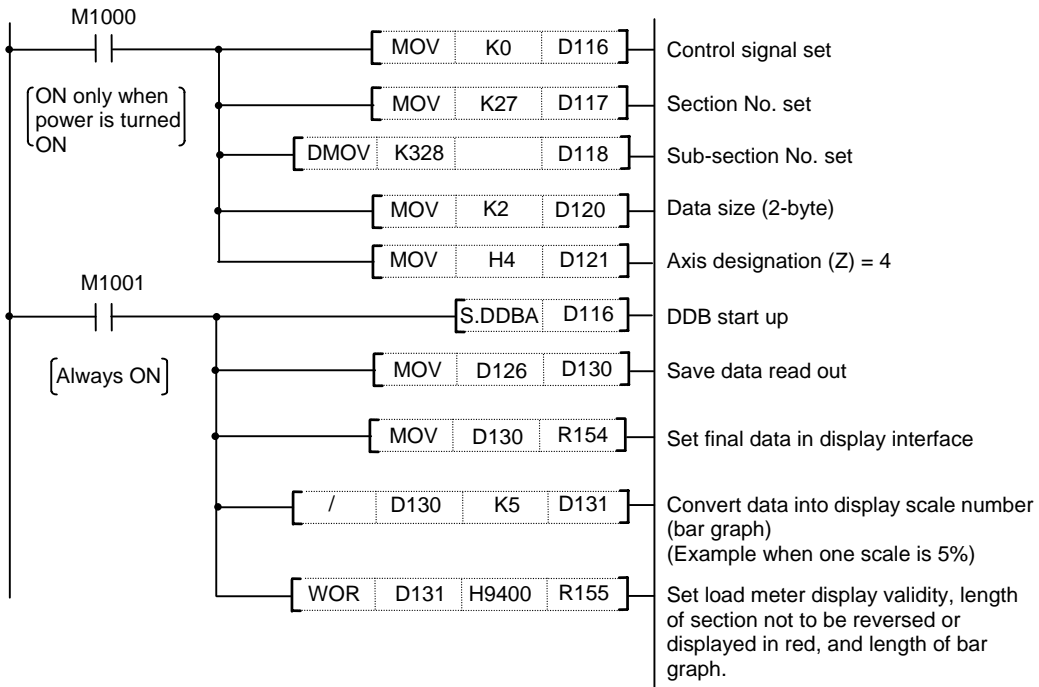
Refer to the section on the PLC Auxiliary Functions in the "PLC Programming Manual " for details on the load meter display.



D100	Control signal = 0
D101	Section No. = 26
D102	Sub-section No. = 8988
D103	
D104	Data size = 2
D105	Axis designation = insignificant
D106	Data read out
D107	

(2) Z axis load

The Z axis load can be read in, and can be displayed on the CNC screen by using the load meter display function in the PLC.



D116	Control signal = 0
D117	Section No. = 27
D118	Sub-section No. = 328
D119	
D120	Data size = 2
D121	Axis designation = insignificant
D122	Data read out (for X axis)
D123	

D124	Data read out (for Y axis)
D125	
D126	Data read out (for Z axis)
D127	
D128	Data read out (for 4th axis)
D129	
D130	(D126)
D131	(D130 ÷ 5)

In this example, only the Z axis data is read out, and the previous states are held for the X, Y and 4th axis data.

Revision History

Date of revision	Manual No.	Revision details
Jan. 2002	BNP-B2312*	First edition created.
Dec. 2004	BNP-B2312A	Mistakes were corrected.

Notice

Every effort has been made to keep up with software and hardware revisions in the contents described in this manual. However, please understand that in some unavoidable cases simultaneous revision is not possible.

Please contact your Mitsubishi Electric dealer with any questions or comments regarding the use of this product.

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