

**CNC**

**MELDAS 60/60S Series  
MELDAS/MAGIC64**

**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 60/60S Series and MELDASMAGIC 64 Series 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 60/60S Series and MELDASMAGIC 64 Series.

\*The "MELDAS60 Series" includes the M64A, M64, M65, M66 and M65V.

\*The "MELDAS60S Series" includes the M64AS, M64S, M65S and M66S.

### 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 maker for details in each machine tool.
-  Some screens and functions may differ or may not be usable depending on the NC version.
-  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.

#### (1) MELDAS 60/60S Series

PLC Programming Manual (Ladder section) .....	BNP-B2212
PLC Programming Manual (Ladder section with MELSEC tool) .....	BNP-B2269
PLC Interface Manual .....	BNP-B2211
PLC Onboard Instruction Manual .....	BNP-B2213

#### (2) MELDASMAGIC 64 Series

PLC Programming Manual (Ladder section) .....	BNP-B2212
PLC Interface Manual .....	BNP-B2211
PLC Onboard Instruction Manual .....	BNP-B2213

## 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 maker for details in each machine tool.
-  Some screens and functions may differ or may not be usable depending on the NC version.
-  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.

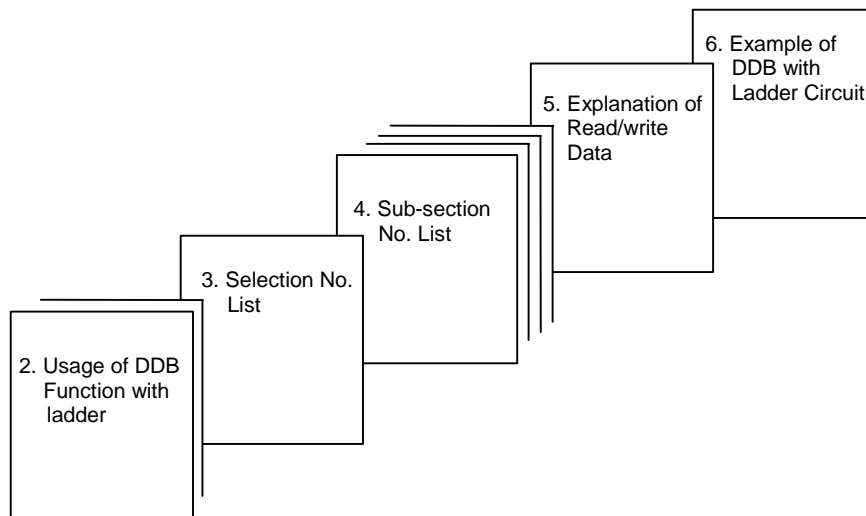
Features of this function include that the read data can be referred to in the step immediately following the execution of the DDBA command. This also applies to the written data.

**(Note 1)** For the parameters, they may not be valid immediately after writing.

**(Note 2)** Even for the parameters that will be valid immediately after writing, displaying the screen again may be required in order to reflect changes to the data displayed on the screen.

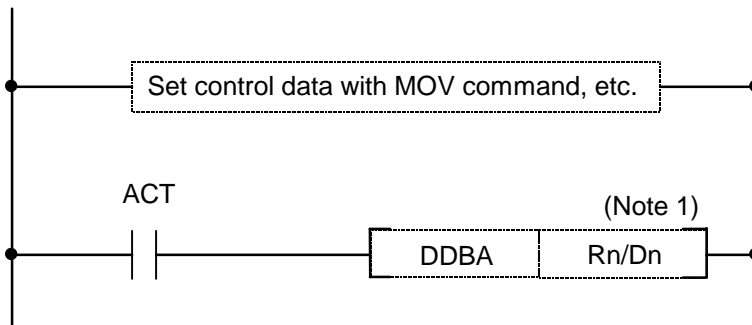
**(Note 3)** The functions related to the specifications not added to the NC cannot be used with the DDB.

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 .

### 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)	Read/write designated axis, system designation
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)
		⋮
		⋮

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

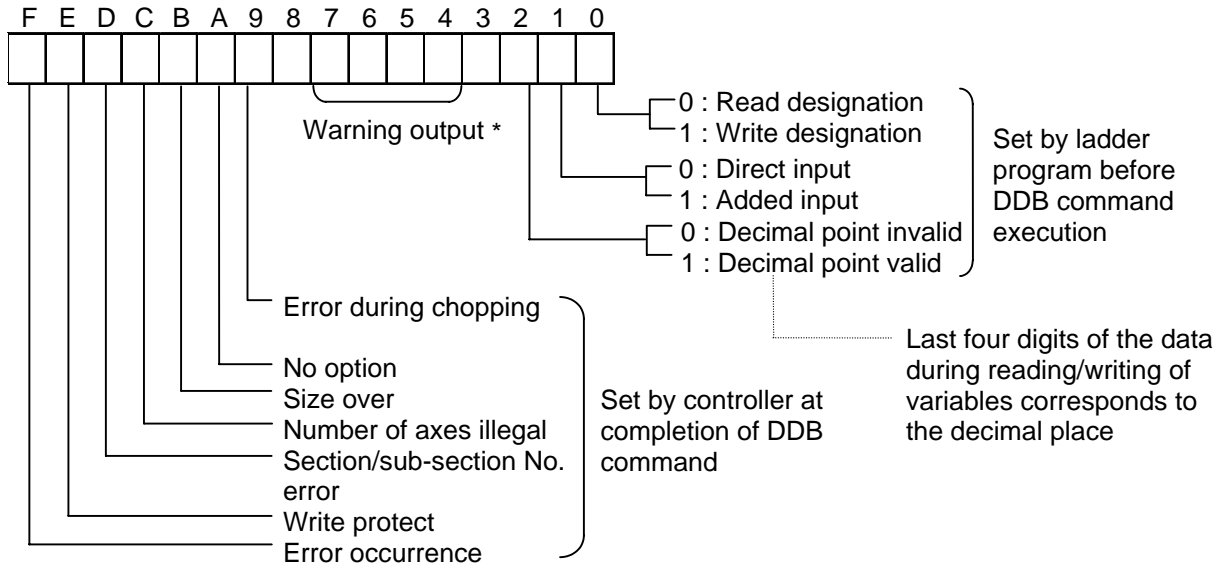
**(Note 2)** Always secure 4 bytes as the buffer for one read/write data item.

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 Basic format of control data**

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**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.

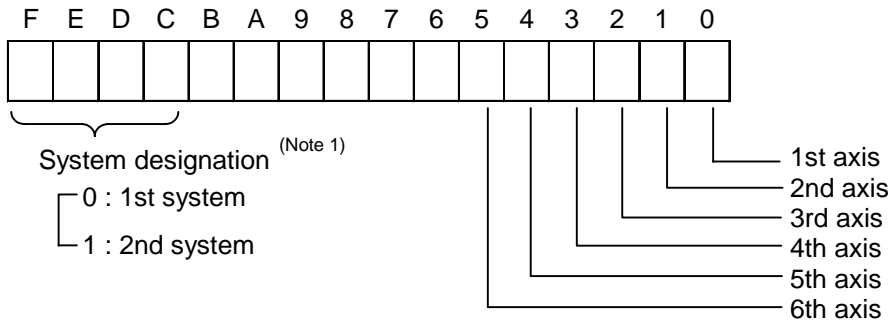


**2. Usage of DDB Function with Ladder**  
**2.2 Basic format of control data**

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**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 system.

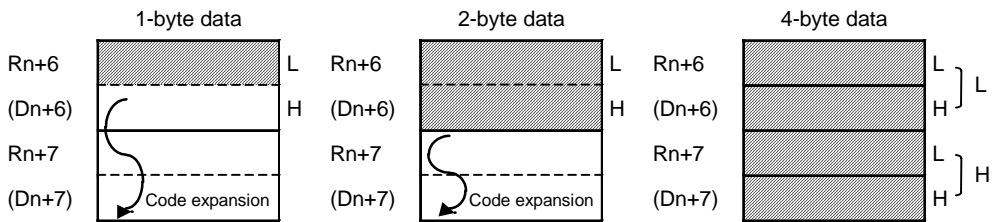


**(Note 1)** The system designation is used when there is a multi-system specification.

**(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.

### **2.2.7 Precautions**

When starting up the DDB with PLC/APLC by using R registers, the following numbers of R registers, starting with the R register specified at the time of startup, are occupied in the system.

M60 : 20 R registers  
M60S : 30 R registers

The R registers occupied in the system should not be used by the other DDB.

**(Example)** When the DDB is started from the PLC by using "DDBA R500", the following R registers are occupied in the system.

M60 : R500 to R519  
M60S : R500 to R529

### 3. Section No. List

### 3. Section No. List

Section No.	Details	Write	Axis designation	System designation	Remarks
1	Parameters common to each axis	Possible (partially not possible)	Invalid	Invalid	
2	Axis independent parameters	Possible (partially not possible)	Valid	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	(Note 1)
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	Invalid	
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	(Note 2)
32	Common variable value 2	Possible	Invalid	Valid	From #100
180	J2-CT parameter	Possible (partially not possible)	Valid (partially invalid)	Invalid	

**(Note 1)** To use the section No. 4 with the MELDASMAGIC 64, the "external workpiece coordinate system compensation input" option is required.

**(Note 2)** To use the section No. 31 with the MELDASMAGIC 64, the "external tool compensation input" option is required.

## 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.

**(Note)** Sub-section No.10000 and after are the dedicated sub-section Nos. for M60S series.

#### Search No.

### 4. Sub-section No. List

<b>Section No.</b>	1	Parameters common to each axis
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Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
	Maximum spindle speed (Gear 1st step)	8960	4	Possible	Invalid/Invalid	
	Maximum spindle speed (Gear 2nd step)	8964	4	Possible	Invalid/Invalid	
1-10	Maximum spindle speed (Gear 3rd step)	8968	4	Possible	Invalid/Invalid	
	Maximum spindle speed (Gear 4th step)	8972	4	Possible	Invalid/Invalid	

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

<b>Section No.</b>	<b>1</b>	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/Invalid	
	Maximum spindle speed (Gear 2nd step)	8964	4	Possible	Invalid/Invalid	
	Maximum spindle speed (Gear 3rd step)	8968	4	Possible	Invalid/Invalid	
	Maximum spindle speed (Gear 4th step)	8972	4	Possible	Invalid/Invalid	
1-11	Spindle limit speed (Gear 1st step)	8976	4	Possible	Invalid/Invalid	
	Spindle limit speed (Gear 2nd step)	8980	4	Possible	Invalid/Invalid	
	Spindle limit speed (Gear 3rd step)	8984	4	Possible	Invalid/Invalid	
	Spindle limit speed (Gear 4th step)	8988	4	Possible	Invalid/Invalid	
1-13	Spindle shift speed (Gear 1st step)	9008	2	Possible	Invalid/Invalid	
	Spindle shift speed (Gear 2nd step)	9010	2	Possible	Invalid/Invalid	
	Spindle shift speed (Gear 3rd step)	9012	2	Possible	Invalid/Invalid	
	Spindle shift speed (Gear 4th step)	9014	2	Possible	Invalid/Invalid	
1-15	Monitor speed for speed monitoring (Spindle 1)	50223	2	Possible	Invalid/Invalid	
	Monitor speed for speed monitoring (Spindle 2)	51223	2	Possible	Invalid/Invalid	
	Monitor speed for speed monitoring (Spindle 3)	52223	2	Possible	Invalid/Invalid	
	Monitor speed for speed monitoring (Spindle 4)	53223	2	Possible	Invalid/Invalid	
1-20	Spindle orient speed	9024	2	Possible	Invalid/Invalid	
1-21	Minimum spindle speed	9026	2	Possible	Invalid/Invalid	
1-50	Method selection parameter (1) BIT0 : BIT1 : BIT2 : BIT3 : BIT4 : BIT5 : BIT6 : Synchronous tapping BIT7 :	195	1	Not possible	Invalid/Invalid	
1-52	Method selection parameter (3) BIT0 : BIT1 : Tool compensation method (Tbsmv) BIT2 : BIT3 : BIT4 : BIT5 : BIT6 : BIT7 :	130	1	Possible	Invalid/Invalid	
1-53	Method selection parameter (4) BIT0 : BIT1 : BIT2 : BIT3 : BIT4 : BIT5 : Reference point middle point ignore BIT6 : BIT7 :	194	1	Possible	Invalid/Invalid	

#### 4. Sub-section No. List

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
1-54	Method selection parameter (5) BIT0 : Status trigger mode valid 1 : Interrupt type 2 valid 2 : 3 : 4 : 5 : 6 : 7 :	20081	1	Possible	Invalid/Invalid	
1-55	Method selection parameter (6) BIT0 : Subprogram type call valid 1 : 2 : 3 : 4 : 5 : 6 : 7 :	20082	1	Possible	Invalid/Invalid	
1-80	Alternate M code valid	1st part system	20083	1	Possible	Invalid/Invalid
		2nd part system	21083	1	Possible	Invalid/Invalid
1-81	G0 non-interpolation	1st part system	20084	1	Possible	Invalid/Invalid
		2nd part system	21084	1	Possible	Invalid/Invalid
1-90	Display language	69	1	Possible	Invalid/Invalid	
1-91	Edit type	154	1	Possible	Invalid/Invalid	

#### 4. Sub-section No. List

Search No.	Data type		Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
1-110	Input setupunit	1st part system	20004	1	Possible	Invalid/Invalid	Designate ASCII code with a hexadecimal
		2nd part system	21004				
1-120	R COMP		20058	1	Possible	Invalid/Invalid	
1-121	DCC ANGLE		20059	1	Possible	Invalid/Invalid	
1-122	COMP CHANGE		20060	1	Possible	Invalid/Invalid	
1-123	CORNER COMP		20061	4	Possible	Invalid/Invalid	
1-124	CURVE COMP		20062	4	Possible	Invalid/Invalid	
1-125	SPLINE ON		20063	1	Possible	Invalid/Invalid	
1-126	CANCEL ANG.		20064	1	Possible	Invalid/Invalid	
1-127	Toler-1		20065	4	Possible	Invalid/Invalid	
1-128	Toler-2		20066	4	Possible	Invalid/Invalid	
1-129	MINUTE LENGTH		20067	1	Possible	Invalid/Invalid	
1-130	Fairing parameters BIT0 : Fairing ON BIT1 : AccClamp ON BIT2 : CordecJudge		20068	1	Possible	Invalid/Invalid	
1-131	CorJudgeL		20069	4	Possible	Invalid/Invalid	
1-132	FairingL		20070	4	Possible	Invalid/Invalid	
1-140	Pre-interpolation acceleration/deceleration maximum speed		20071	4	Possible	Invalid/Invalid	
1-141	Pre-interpolation acceleration/deceleration time constant		20072	2	Possible	Invalid/Invalid	
1-150	Arc command overlap		20073	1	Possible	Invalid/Invalid	
1-160	Feed forward filter		20074	1	Possible	Invalid/Invalid	
1-170	SSS control parameters BIT0 : SSS ON		20075	1	Possible	Invalid/Invalid	
1-171	StdLength		20076	4	Possible	Invalid/Invalid	
1-172	ClampCoeff		20077	2	Possible	Invalid/Invalid	
1-173	StepLeng		20078	4	Possible	Invalid/Invalid	
1-174	DccWaitAdd		20079	1	Possible	Invalid/Invalid	
1-175	Tolerance		20080	4	Possible	Invalid/Invalid	

#### 4. Sub-section No. List

<b>Section No.</b>	<b>1</b>
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Parameters common to each axis (Position switch    No.1 system)

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks	
1-200	Position switch [1]	axis	11984	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog 1	11968	4	Possible	Invalid/Invalid	
		dog 2	11972	4	Possible	Invalid/Invalid	
1-200	Position switch [2]	axis	12004	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog 1	11988	4	Possible	Invalid/Invalid	
		dog 2	11992	4	Possible	Invalid/Invalid	
1-200	Position switch [3]	axis	12024	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog 1	12008	4	Possible	Invalid/Invalid	
		dog 2	12012	4	Possible	Invalid/Invalid	
1-200	Position switch [4]	axis	12044	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog 1	12028	4	Possible	Invalid/Invalid	
		dog 2	12032	4	Possible	Invalid/Invalid	
1-200	Position switch [5]	axis	12064	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog 1	12048	4	Possible	Invalid/Invalid	
		dog 2	12052	4	Possible	Invalid/Invalid	
1-200	Position switch [6]	axis	12084	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog 1	12068	4	Possible	Invalid/Invalid	
		dog 2	12072	4	Possible	Invalid/Invalid	
1-200	Position switch [7]	axis	12104	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog 1	12088	4	Possible	Invalid/Invalid	
		dog 2	12092	4	Possible	Invalid/Invalid	
1-200	Position switch [8]	axis	12124	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog 1	12108	4	Possible	Invalid/Invalid	
		dog 2	12112	4	Possible	Invalid/Invalid	
1-200	Position switch [9]	axis	20010	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	20011	4	Possible	Invalid/Invalid	
		dog2	20012	4	Possible	Invalid/Invalid	
1-200	Position switch [10]	axis	20013	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	20014	4	Possible	Invalid/Invalid	
		dog2	20015	4	Possible	Invalid/Invalid	
1-200	Position switch [11]	axis	20016	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	20017	4	Possible	Invalid/Invalid	
		dog2	20018	4	Possible	Invalid/Invalid	
1-200	Position switch [12]	axis	20019	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	20020	4	Possible	Invalid/Invalid	
		dog2	20021	4	Possible	Invalid/Invalid	



#### 4. Sub-section No. List

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks	
1-200	Position switch [13]	axis	20022	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	20023	4	Possible	Invalid/Invalid	
		dog2	20024	4	Possible	Invalid/Invalid	
1-200	Position switch [14]	axis	20025	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	20026	4	Possible	Invalid/Invalid	
		dog2	20027	4	Possible	Invalid/Invalid	
1-200	Position switch [15]	axis	20028	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	20029	4	Possible	Invalid/Invalid	
		dog2	20030	4	Possible	Invalid/Invalid	
1-200	Position switch [16]	axis	20031	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	20032	4	Possible	Invalid/Invalid	
		dog2	20033	4	Possible	Invalid/Invalid	
1-200	Position switch [17]	axis	20034	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	20035	4	Possible	Invalid/Invalid	
		dog2	20036	4	Possible	Invalid/Invalid	
1-200	Position switch [18]	axis	20037	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	20038	4	Possible	Invalid/Invalid	
		dog2	20039	4	Possible	Invalid/Invalid	
1-200	Position switch [19]	axis	20040	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	20041	4	Possible	Invalid/Invalid	
		dog2	20042	4	Possible	Invalid/Invalid	
1-200	Position switch [20]	axis	20043	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	20044	4	Possible	Invalid/Invalid	
		dog2	20045	4	Possible	Invalid/Invalid	
1-200	Position switch [21]	axis	20046	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	20047	4	Possible	Invalid/Invalid	
		dog2	20048	4	Possible	Invalid/Invalid	
1-200	Position switch [22]	axis	20049	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	20050	4	Possible	Invalid/Invalid	
		dog2	20051	4	Possible	Invalid/Invalid	
1-200	Position switch [23]	axis	20052	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	20053	4	Possible	Invalid/Invalid	
		dog2	20054	4	Possible	Invalid/Invalid	
1-200	Position switch [24]	axis	20055	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	20056	4	Possible	Invalid/Invalid	
		dog2	20057	4	Possible	Invalid/Invalid	

#### 4. Sub-section No. List

<b>Section No.</b>	<b>1</b>
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Parameters common to each axis (Position switch No.2 system)

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks	
1-200	Position switch [1]	axis	12144	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog 1	12128	4	Possible	Invalid/Invalid	
		dog 2	12132	4	Possible	Invalid/Invalid	
1-200	Position switch [2]	axis	12164	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog 1	12148	4	Possible	Invalid/Invalid	
		dog 2	12152	4	Possible	Invalid/Invalid	
1-200	Position switch [3]	axis	12184	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog 1	12168	4	Possible	Invalid/Invalid	
		dog 2	12172	4	Possible	Invalid/Invalid	
1-200	Position switch [4]	axis	12204	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog 1	12188	4	Possible	Invalid/Invalid	
		dog 2	12192	4	Possible	Invalid/Invalid	
1-200	Position switch [5]	axis	12224	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog 1	12208	4	Possible	Invalid/Invalid	
		dog 2	12212	4	Possible	Invalid/Invalid	
1-200	Position switch [6]	axis	12244	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog 1	12228	4	Possible	Invalid/Invalid	
		dog 2	12232	4	Possible	Invalid/Invalid	
1-200	Position switch [7]	axis	12264	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog 1	12248	4	Possible	Invalid/Invalid	
		dog 2	12252	4	Possible	Invalid/Invalid	
1-200	Position switch [8]	axis	12284	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog 1	12268	4	Possible	Invalid/Invalid	
		dog 2	12272	4	Possible	Invalid/Invalid	
1-200	Position switch [9]	axis	21010	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	21011	4	Possible	Invalid/Invalid	
		dog2	21012	4	Possible	Invalid/Invalid	
1-200	Position switch [10]	axis	21013	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	21014	4	Possible	Invalid/Invalid	
		dog2	21015	4	Possible	Invalid/Invalid	
1-200	Position switch [11]	axis	21016	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	21017	4	Possible	Invalid/Invalid	
		dog2	21018	4	Possible	Invalid/Invalid	
1-200	Position switch [12]	axis	21019	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	21020	4	Possible	Invalid/Invalid	
		dog2	21021	4	Possible	Invalid/Invalid	

#### 4. Sub-section No. List

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks	
1-200	Position switch [13]	axis	21022	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	21023	4	Possible	Invalid/Invalid	
		dog2	21024	4	Possible	Invalid/Invalid	
1-200	Position switch [14]	axis	21025	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	21026	4	Possible	Invalid/Invalid	
		dog2	21027	4	Possible	Invalid/Invalid	
1-200	Position switch [15]	axis	21028	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	21029	4	Possible	Invalid/Invalid	
		dog2	21030	4	Possible	Invalid/Invalid	
1-200	Position switch [16]	axis	21031	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	21032	4	Possible	Invalid/Invalid	
		dog2	21033	4	Possible	Invalid/Invalid	
1-200	Position switch [17]	axis	21034	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	21035	4	Possible	Invalid/Invalid	
		dog2	21036	4	Possible	Invalid/Invalid	
1-200	Position switch [18]	axis	21037	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	21038	4	Possible	Invalid/Invalid	
		dog2	21039	4	Possible	Invalid/Invalid	
1-200	Position switch [19]	axis	21040	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	21041	4	Possible	Invalid/Invalid	
		dog2	21042	4	Possible	Invalid/Invalid	
1-200	Position switch [20]	axis	21043	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	21044	4	Possible	Invalid/Invalid	
		dog2	21045	4	Possible	Invalid/Invalid	
1-200	Position switch [21]	axis	21046	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	21047	4	Possible	Invalid/Invalid	
		dog2	21048	4	Possible	Invalid/Invalid	
1-200	Position switch [22]	axis	21049	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	21050	4	Possible	Invalid/Invalid	
		dog2	21051	4	Possible	Invalid/Invalid	
1-200	Position switch [23]	axis	21052	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	21053	4	Possible	Invalid/Invalid	
		dog2	21054	4	Possible	Invalid/Invalid	
1-200	Position switch [24]	axis	21055	1	Possible	Invalid/Invalid	Designate ASCII code with a decimal
		dog1	21056	4	Possible	Invalid/Invalid	
		dog2	21057	4	Possible	Invalid/Invalid	

#### 4. Sub-section No. List

<b>Section No.</b>	<b>2</b>
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Axis independent parameters

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
2-10	1 <sup>st</sup> reference point coordinates	272	4	Possible	Valid/Valid	
	2 <sup>nd</sup> reference point coordinates	276	4	Possible	Valid/Valid	
	3 <sup>rd</sup> reference point coordinates	280	4	Possible	Valid/Valid	
	4 <sup>th</sup> reference point coordinates	284	4	Possible	Valid/Valid	
2-11	Stored stroke limit I (+)	288	4	Possible	Valid/Valid	For machine maker
	Stored stroke limit I (-)	292	4	Possible	Valid/Valid	For machine maker
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	
2-40	Stored stroke limit II (+)	656	4	Possible	Valid/Valid	For user
	Stored stroke limit II (-)	660	4	Possible	Valid/Valid	For user
2-50	Cutting feed time constant G1t	32	2	Possible	Valid/Valid	
2-51	Current limit value 2	122	2	Possible	Valid/Valid	
2-52	Current limit value 1	120	2	Possible	Valid/Valid	
2-60	Positive direction sensor of tool setter	20001	4	Possible	Valid/Valid	
2-61	Negative direction sensor of tool setter or TLM standard length	20002	4	Possible	Valid/Valid	
2-62	Feed forward gain	20004	2	Possible	Valid/Valid	
2-70	Minimum corner deceleration speed	20005	4	Possible	Valid/Valid	
2-80	Rapid traverse rate	20006	4	Possible	Valid/Valid	
2-90	G28 rapid traverse rate	20007	4	Possible	Valid/Valid	

#### 4. Sub-section No. List

<b>Section No.</b>	<b>3</b>	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	

<b>Section No.</b>	<b>4</b>	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	
4-17	Extended workpiece coordinate system offset [1]	20001	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [2]	20002	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [3]	20003	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [4]	20004	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [5]	20005	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [6]	20006	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [7]	20007	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [8]	20008	4	Possible	Valid/Valid	

#### 4. Sub-section No. List

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
4-17	Extended workpiece coordinate system offset [9]	20009	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [10]	20010	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [11]	20011	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [12]	20012	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [13]	20013	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [14]	20014	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [15]	20015	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [16]	20016	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [17]	20017	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [18]	20018	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [19]	20019	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [20]	20020	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [21]	20021	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [22]	20022	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [23]	20023	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [24]	20024	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [25]	20025	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [26]	20026	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [27]	20027	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [28]	20028	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [29]	20029	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [30]	20030	4	Possible	Valid/Valid	

#### 4. Sub-section No. List

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
4-17	Extended workpiece coordinate system offset [31]	20031	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [32]	20032	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [33]	20033	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [34]	20034	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [35]	20035	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [36]	20036	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [37]	20037	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [38]	20038	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [39]	20039	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [40]	20040	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [41]	20041	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [42]	20042	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [43]	20043	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [44]	20044	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [45]	20045	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [46]	20046	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [47]	20047	4	Possible	Valid/Valid	
4-17	Extended workpiece coordinate system offset [48]	20048	4	Possible	Valid/Valid	

#### 4. Sub-section No. List

<b>Section No.</b>	<b>5</b>
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Alarm information

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

<b>Section No.</b>	<b>ACT 11    PCB 15</b>	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	

<b>Section No.</b>	<b>ACT 12    PCB 16</b>	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

<b>Section No.</b>	<b>ACT 13    PCB 17</b>
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Axis common 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
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
13/17-50	Tool radius compensation amount and nose R compensation amount of the 1st axis in plane selection	20001	4	Not possible	Valid/Invalid	I
13/17-50	Tool radius compensation amount and nose R compensation amount of the 2nd axis in plane selection	20002	4	Not possible	Valid/Invalid	J
13/17-50	Tool radius compensation amount and nose R compensation amount of the 3rd axis in plane selection	20003	4	Not possible	Valid/Invalid	K

#### 4. Sub-section No. List

<b>Section No.</b>	<b>ACT 14    PCB 18</b>
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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
14/18-20	Workpiece offset amount	20001	4	Not possible	Valid/Valid	
14/18-21	Tool length compensation amount	20002	4	Not possible	Valid/Valid	Machining center system only
14/18-22	Tool length shape offset amount	20003	4	Not possible	Valid/Valid	Lathe type only
14/18-23	Tool length compensation amount	20004	4	Not possible	Valid/Valid	Lathe type only
14/18-24	Tool wear compensation amount	20005	4	Not possible	Valid/Valid	Lathe type only

<b>Section No.</b>	<b>20</b>
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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	

#### 4. Sub-section No. List

<b>Section No.</b>	<b>21</b>
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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 (Machine position)	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	
21-34	Command position in machine coordinate system	20007	4	Not possible	Valid/Valid	
21-40	Relative value	20001	4	Not possible	Valid/Valid	
21-41	Current value B	20003	4	Not possible	Valid/Valid	
21-42	Axis name	20004	4	Not possible	Valid/Valid	Designate ASCII code with a hexadecimal
21-43	Increment command axis name	20005	4	Not possible	Valid/Valid	Designate ASCII code with a hexadecimal
21-44	2nd axis name	20006	4	Not possible	Valid/Valid	Designate ASCII code with a hexadecimal

#### 4. Sub-section No. List

<b>Section No.</b>	<b>22</b>
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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 Stop state BIT1 : External PLC "FROM,TO" command not executed BIT2 : External PLC Not ready BIT3 : External PLC Renewal error BIT4 : Control unit EMG connector Emergency stop state BIT5 : BIT6 : Built-in PLC Software emergency stop output device Y29F 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	

<b>Section No.</b>	<b>23</b>
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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

<b>Section No.</b>	<b>24</b>
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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

<b>Section No.</b>	<b>26</b>
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Axis common machine control information 2

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
26-10	1st spindle Motor real speed	8992	4	Not possible	Invalid/Invalid	Including override
26-20	1st spindle Motor load	8988	2	Not possible	Invalid/Invalid	
26-10	2nd spindle Motor real speed	7712	4	Not possible	Invalid/Invalid	Including override
26-20	2nd spindle Motor load	7708	2	Not possible	Invalid/Invalid	
26-10	3rd spindle Motor real speed	6432	4	Not possible	Invalid/Invalid	Including override
26-20	3rd spindle Motor load	6428	2	Not possible	Invalid/Invalid	
26-10	4th spindle Motor real speed	5152	4	Not possible	Invalid/Invalid	Including override
26-20	4th spindle Motor load	5148	2	Not possible	Invalid/Invalid	

<b>Section No.</b>	<b>27</b>
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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	

#### 4. Sub-section No. List

<b>Section No.</b>	<b>29</b>
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Common variable value 1

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
29-10	Variable command 100 sets	500 to 549	4	Possible	Invalid/Invalid	System common variables
	Variable command 200 sets	500 to 599	4	Possible	Invalid/Invalid	System common variables
	Variable command 300 sets	500 to 699	4	Possible	Invalid/Invalid	System common variables
	Variable command 600 sets	500 to 999	4	Possible	Invalid/Invalid	System common variables
	(2-system) Variable command 50 + 50*2 sets	500 to 549	4	Possible	Invalid/Invalid	System common variables
	(2-system) Variable command 100 + 100*2 sets	500 to 599	4	Possible	Invalid/Invalid	System common variables

<b>Section No.</b>	<b>30</b>
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Local variable value

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	

<b>Section No.</b>	<b>31</b>
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Tool compensation amount

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	

#### 4. Sub-section No. List

<b>Section No.</b>	<b>32</b>
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Common variable value 2

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
32-10	Variable command 100 sets	100 to 149	4	Possible	Valid/Invalid	Variables per system
	Variable command 200 sets	100 to 199	4	Possible	Valid/Invalid	Variables per system
	Variable command 300 sets	100 to 199	4	Possible	Valid/Invalid	Variables per system
	Variable command 600 sets	100 to 199	4	Possible	Valid/Invalid	Variables per system
	(2-system) Variable command 50 + 50*2 sets	100 to 149	4	Possible	Valid/Invalid	Variables per system
	(2-system) Variable command 100 + 100*2 sets	100 to 199	4	Possible	Valid/Invalid	Variables per system

<b>Section No.</b>	<b>180</b>
--------------------	------------

J2-CT parameter

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
180-10	station: No. of indexing stations	18	2	Possible	Invalid /Valid	Auxiliary axis parameter #100
180-11	Cont1: Control parameter 1	2	2	Possible	Invalid /Valid	Auxiliary axis parameter #101
180-12	Cont2: Control parameter 2	1	1	Possible	Invalid /Valid	Auxiliary axis parameter #102
180-13	Emgcont: Emergency stop control	10	1	Possible	Invalid /Valid	Auxiliary axis parameter #103
180-14	tleng: Linear axis stroke length	36	4	Possible	Invalid /Valid	Auxiliary axis parameter #104
180-15	ZRNspeed: Reference point return speed	64	4	Possible	Invalid /Valid	Auxiliary axis parameter #110
180-16	EZRNcreep: Reference point return creep speed	26	2	Possible	Invalid /Valid	Auxiliary axis parameter #111
180-17	grid mask: Grid mask	24	2	Possible	Invalid /Valid	Auxiliary axis parameter #112
180-18	grspc: Grid spacing	13	1	Possible	Invalid /Valid	Auxiliary axis parameter #113
180-19	ZRNshift: Reference point shift amount	30	2	Possible	Invalid /Valid	Auxiliary axis parameter #114
180-20	ST.offset: Station offset	60	4	Possible	Invalid /Valid	Auxiliary axis parameter #115
180-21	ABSBase: Absolute position zero point	52	4	Possible	Invalid /Valid	Auxiliary axis parameter #116
180-22	Limit(+): Soft limit (+)	44	4	Possible	Invalid /Valid	Auxiliary axis parameter #117



#### 4. Sub-section No. List

Search No.	Data type	Sub-section No.	Size (bytes)	Write	System/axis designation	Remarks
180-23	Limit(-): Soft limit (-)	56	4	Possible	Invalid /Valid	Auxiliary axis parameter #118
180-24	ABStype: Absolute position detection parameter	0	1	Possible	Invalid /Valid	Auxiliary axis parameter #120
180-25	ABS check: Absolute position power OFF tolerable movement value	48	4	Possible	Invalid /Valid	Auxiliary axis parameter #123
180-26	backlash: Backlash compensation amount	28	2	Possible	Invalid /Valid	Auxiliary axis parameter #130
180-40	J2-CTstatus	65536 (0x00010000)	4	Not possible	Invalid/ Invalid (One axis designation)	

**(Note)** Multiple axes can be designated when reading, but only one axis can be designated for writing.

## 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**

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<b>Section No.</b>	1	Parameters common to each axis				
--------------------	---	--------------------------------	--	--	--	--

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/Invalid	
(2) ↓	Maximum spindle speed (Gear 2nd step)	8964	4	Possible	Invalid/Invalid	
-1-10	Maximum spindle speed (Gear 3rd step)	8968	4	Possible	Invalid/Invalid	
	Maximum spindle speed (Gear 4th step)	8972	4	Possible	Invalid/Invalid	
1-11	Spindle limit speed (Gear 1st step)	8976	4	Possible	Invalid/Invalid	
	Spindle limit speed (Gear 2nd step)	8980	4	Possible	Invalid/Invalid	
	Spindle limit speed (Gear 3rd step)	8984	4	Possible	Invalid/Invalid	
	Spindle limit speed (Gear 4th step)	8988	4	Possible	Invalid/Invalid	
⋮	⋮	⋮	⋮	⋮	⋮	

**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 (binary).

**[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. Explanation of Read/Write Data**  
**5.2 Data unit system**

**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)	D (0.01 μm system)	Selection parameter
Input unit	mm	0.001	0.0001	0.00001	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	0.000005	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	0.0001	0.00001	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, C and D are settings for the setup parameters (basic specification parameters: #1003 iunit). This may differ according to the machine type. D is compatible only with the lathe type.
- (Note 2)** The unit system C (0.1 μm system) and D (0.01 μm system) are option specifications.
- (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	<b>Maximum spindle speed (Gear 1st step to gear 4th step)</b>
------	---

**[Data definition]**

This is a parameter for the maximum spindle speed of each gear step.  
(This corresponds to the setup parameter, spindle parameter "#3005 smax1" to "#3008 smax4".)  
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 (binary).

**[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	<b>Spindle limit speed (Gear 1st step to gear 4th step)</b>
------	---

**[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 "#3001 slimt1" to "#3004 slimt4".)  
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)
- Sd<sub>1</sub>d<sub>2</sub>d<sub>3</sub>d<sub>4</sub> : Spindle speed (S) command
- SOVR : Spindle override

**[Data unit, range]**

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

**[Precaution]**

This setting is validated immediately after setting (writing).

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

<b>1-13</b>	<b>Spindle shift speed (Gear 1st step to gear 4th step)</b>
-------------	---

**[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 "#3009 ssift1" to "#3012 ssift4".)  
 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 (binary).

**[Precaution]**

This setting is validated immediately after setting (writing).

<b>1-15</b>	<b>Monitor speed for speed monitoring (Spindle 1 to 4)</b>
-------------	--

**[Data definition]**

Set the spindle limit speed in the door open state. (Invalid when 0 is set.)  
 If the spindle end speed exceeds this setting value when the door is open, the speed monitor error (5E) will occur.  
 (This corresponds to the setup parameter, spindle parameter "#3423 SP223".)

**[Data unit, range]**

The data unit is r/min, and the setting range is 0 to 800 (binary).

<b>1-20</b>	<b>Spindle orient speed</b>
-------------	-----------------------------

**[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 "#3021 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 (binary).

**[Precaution]**

This setting is validated immediately after setting (writing).

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

---

<b>1-21</b>	<b>Minimum spindle speed</b>
-------------	------------------------------

**[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 "#3023 smini".)

**[Data unit, range]**

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

**[Precaution]**

This setting is validated immediately after setting (writing).

<b>1-50</b>	<b>Method selection parameter (1)</b>
-------------	---------------------------------------

**[Data definition]**

The following parameters are indicated in bit units.

**[Data unit, range]**

The setting range is 0 to 255 (binary).

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

**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 "#1229 set01".)

<b>1-52</b>	<b>Method selection parameter (3)</b>
-------------	---------------------------------------

**[Data definition]**

The following parameters are set in bit units.

**[Data unit, range]**

The setting range is 0 to 255 (binary).

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

**1-52-1) 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 "#1101 Tabsmv".)

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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<b>1-53</b>	<b>Method selection parameter (4)</b>
-------------	---------------------------------------

**[Data definition]**

The following parameters are set in bit units.

**[Data unit, range]**

The setting range is 0 to 255 (binary).

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

**1-53-5) 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 "#1091 Mpoint".)

<b>1-54</b>	<b>Method selection parameter (5)</b>
-------------	---------------------------------------

**[Data definition]**

The following parameters are set in bit units.

**[Data unit, range]**

The setting range is 0 to 255 (binary).

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

**1-54-0) Status trigger mode valid**

Specify the validity conditions for the user macro interrupt signal (UIT).

0 : Valid when interrupt signal turns OFF to ON.

1 : Valid when interrupt signal is ON.

(This corresponds to the setup parameter, basic specification parameter "#1112 S\_TRG".)

**1-54-1) Interrupt type 2 valid**

Specify the movement after user macro interrupt signal (UIT) input.

0 : Execute interrupt program without waiting for block being executed to end.

1 : Execute interrupt program after completing block being executed.

(This corresponds to the setup parameter, basic specification parameter "#1113 INT\_2".)

<b>1-55</b>	<b>Method selection parameter (6)</b>
-------------	---------------------------------------

**[Data definition]**

The following parameters are set in bit units.

**[Data unit, range]**

The setting range is 0 to 255 (binary).

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

**1-55-0) Subprogram type interrupt**

The type of user macro interrupt is selected.

0 : Macro type user macro interrupt

1 : Subprogram type user macro interrupt

(This corresponds to the setup parameter, basic specification parameter "#1229 set01/bit0".)

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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<b>1-80</b>	Alternate M code valid
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**[Data definition]**

Select the user macro interrupt with the alternate M code.

**[Data unit, range]**

0 : Alternate M code invalid

1 : Alternate M code valid

(This corresponds to the setup parameter, basic specification parameter "#1109 subs\_M".)

<b>1-81</b>	G0 non-interpolation
-------------	----------------------

**[Data definition]**

Specify the G00 movement path type.

**[Data unit, range]**

0 : Move linearly toward the end point. (interpolation type)

1 : Move to the end point of each axis at the rapid traverse federate for each axis.  
(non-interpolation type)

(This corresponds to the setup parameter, basic specification parameter "#1086 G0Intp".)

<b>1-90</b>	<b>Display language</b>
-------------	-------------------------

**[Data definition]**

Specify the display language.

(This corresponds to the setup parameter, basic specification parameter "#1043 lang".)

- |  |            |
|--|------------|
| 0: Japanese display                                      | (Standard) |
| 1: English display                                       | (Standard) |
| 2: Third language displayed <sup>(Precaution (1))</sup>  | (Option)   |
| 3: Fourth language displayed <sup>(Precaution (1))</sup> | (Option)   |
| 11: Display in German                                    | (Option)   |
| 12: Display in French                                    | (Option)   |
| 13: Display in Italian                                   | (Option)   |
| 14: Display in Spanish                                   | (Option)   |
| 15: Display in Chinese (traditional Chinese)             | (Option)   |
| 16: Display in Korean                                    | (Option)   |
| 17: Display in Portuguese                                | (Option)   |
| 18: Display in Dutch                                     | (Option)   |
| 19: Display in Swedish                                   | (Option)   |
| 20: Display in Hungarian                                 | (Option)   |
| 22: Display in Chinese (simplified Chinese)              | (Option)   |

**[Precaution]**

- (1) If no character package is available for a specified language, the screen is displayed in English.
- (2) This setting is validated immediately after setting (writing).



**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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<b>1-91</b>	<b>Edit type</b>
-------------	------------------

**[Data definition]**

Set up an edit type.

(This corresponds to the setup parameter, basic specification parameter "#1139 edtype".)

0: Screen edit type (M50 or equivalent operation)

1: Screen edit type

(The screen of EDIT or MDI is changed automatically according to the selected operation mode.)

2: Word edit type

(The screen of EDIT or MDI is changed automatically according to the selected operation mode.)

3: Screen edit type (type 0 + retaining cursor position) (Except MELDASMAGIC64)

4: Screen edit type (type 1 + retaining cursor position) (Except MELDASMAGIC64)

**[Precaution]**

This setting is validated immediately after setting (writing).

<b>1-110</b>	<b>Input setting unit</b>
--------------	---------------------------

**[Data definition]**

This parameter sets the input setting unit for each system and the PLC axis.

The parameter units will follow this specification.

(This corresponds to the setup parameter, basic specification parameter "#1003 iunit".)

**[Data unit, range]**

B: 1 $\mu$ m, C: 0.1 $\mu$ m, D: 10nm

Set as a hexadecimal ASCII code.

**[Precaution]**

This setting is validated when the power is turned ON and OFF after setting (writing).

<b>1-120</b>	<b>R COMP</b>
--------------	---------------

**[Data definition]**

This parameter sets the compensation coefficient for further reducing the control error such as corner rounding or arc radius decrease.

The larger the setup value, the smaller the theoretical error will be. However, since the speed at the corner goes down, the cycle time is extended.

Coefficient = 100 – setting value

**(Note)** This is valid when "#8021 COMP CHANGE" is set to "0".

(This corresponds to the machining parameter "#8019 R COMP".)

**[Data unit, range]**

Set with a % unit within the range of 0 to 99.

**[Precaution]**

This parameter is validated immediately after setting (writing).

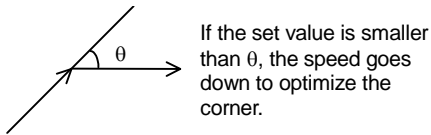
However, if it is changed during the high-accuracy modal, the operation will not be guaranteed.

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

<b>1-121</b>	<b>DCC ANGLE</b>
--------------	------------------

**[Data definition]**

This parameter sets the minimum unit of the angle (external angle) interpreted as a corner. When an inter-block angle (external angle) in high-accuracy mode is larger than the set value, it is determined as a corner and the speed goes down to sharpen the edge.



(This corresponds to the machining parameter "#8020 DCC ANGLE".)

**[Data unit, range]**

Set with a degree( $^{\circ}$ ). unit within the range of 0 to 89.  
 If 0 is set, the same operation as when 5 is set will take place.

**[Precaution]**

This parameter is validated immediately after setting (writing).  
 However, if it is changed during the high-accuracy modal, the operation will not be guaranteed.

<b>1-122</b>	<b>COMP CHANGE</b>
--------------	--------------------

**[Data definition]**

This parameter selects whether to share or separate the compensation coefficients at the corner/curve during the high-accuracy control mode.  
 0 : Share (R COMP)  
 1 : Separate Corner (CORNER COMP), Curve (CURVE COMP)  
 (This corresponds to the machining parameter "#8021 COMP CHANGE".)

**[Data unit, range]**

Set within the range of 0 to 1.

**[Precaution]**

This parameter is validated immediately after setting (writing).  
 However, if it is changed during the high-accuracy modal, the operation will not be guaranteed.

<b>1-123</b>	<b>CORNER COMP</b>
--------------	--------------------

**[Data definition]**

This parameter sets the compensation coefficient for further reducing/enlarging the roundness at the corner during the high-accuracy control mode.  
 Coefficient = 100 - setting value  
**(Note)** This is valid when "#8021 COMP CHANGE" is set to "1".  
 (This corresponds to the machining parameter "#8022 CORNER COMP".)

**[Data unit, range]**

Set with a % unit within the range of -1000 to 99.

**[Precaution]**

This parameter is validated immediately after setting (writing).  
 However, if it is changed during the high-accuracy modal, the operation will not be guaranteed.

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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1-124	<b>CURVE COMP</b>
-------	-------------------

**[Data definition]**

This parameter sets the compensation coefficient for further reducing/enlarging the radius reduction amount at the curve (arc, involute, spline) during the high-accuracy control mode.

Coefficient = 100 - setting value

**(Note)** This is valid when "#8021 COMP CHANGE" is set to "1".

(This corresponds to the machining parameter "#8023 CURVE COMP".)

**[Data unit, range]**

Set with a % unit within the range of -1000 to 99.

**[Precaution]**

This parameter is validated immediately after setting (writing).

However, if it is changed during the high-accuracy modal, the operation will not be guaranteed.

1-125	<b>SPLINE ON</b>
-------	------------------

**[Data definition]**

This parameter selects whether to validate the spline function.

0 : Disable the spline function.

1 : Enable the spline function.

(This corresponds to the machining parameter "#8025 SPLINE ON".)

**[Data unit, range]**

Set within the range of 0 to 1.

**[Precaution]**

This parameter is validated immediately after setting (writing).

However, if it is changed during the high-speed high-accuracy II modal, the operation will not be guaranteed.

1-126	<b>CANCEL ANG.</b>
-------	--------------------

**[Data definition]**

This parameter temporarily cancels the spline interpolation when the angle created by two blocks exceeds the setting value. In consideration of the pick feed, set a value a little smaller than the pick feed angle.

(This corresponds to the machining parameter "#8026 CANCEL ANG".)

**[Data unit, range]**

Set with a deg. unit within the range of 0 to 180.

If 0 is set, the same operation as when 180 is set will take place.

**[Precaution]**

This parameter is validated immediately after setting (writing).

However, if it is changed during the spline modal, the operation will not be guaranteed.

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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<b>1-127</b>	<b>Toler-1</b>
--------------	----------------

**[Data definition]**

This parameter specifies the maximum chord error in a block that includes an inflection point.  
Set the tolerance applicable when the applicable block is developed to fine segments by CAM.  
(normally about 10  $\mu\text{m}$ )  
When 0 is set, the applicable block is linear.  
(This corresponds to the machining parameter "#8027 Toler-1".)

**[Data unit, range]**

Set with a machine constant input unit within the range of 0 to 100000.

**[Precaution]**

This parameter is validated immediately after setting (writing).  
However, if it is changed during the spline modal, the operation will not be guaranteed.

<b>1-128</b>	<b>Toler-2</b>
--------------	----------------

**[Data definition]**

This parameter specifies the maximum chord error in a block that includes no inflection point.  
Set the tolerance applicable when the applicable block is developed to fine segments by CAM.  
(normally about 10  $\mu\text{m}$ )  
When 0 is set, the applicable block is linear.  
(This corresponds to the machining parameter "#8028 Toler-2".)

**[Data unit, range]**

Set with a machine constant input unit within the range of 0 to 100000.

**[Precaution]**

This parameter is validated immediately after setting (writing).  
However, if it is changed during the spline modal, the operation will not be guaranteed.

<b>1-129</b>	<b>MINUTE LENGTH</b>
--------------	----------------------

**[Data definition]**

This parameter temporarily cancels the spline interpolation and interpolates linearly when the length of one block exceeds the setting value.  
Set a value a little smaller than linear block length of the workpiece to be machined.  
If -1 is set, spline interpolation is performed regardless of block length.  
(This corresponds to the machining parameter "#8030 MINUTE LENGTH".)

**[Data unit, range]**

Set with a mm unit within the range of -1 to 127.  
If 0 is set, the same operation as when 127 is set will take place.

**[Precaution]**

This parameter is validated immediately after setting (writing).  
However, if it is changed during the spline modal, the operation will not be guaranteed.

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

---

<b>1-130</b>	<b>Fairing parameters</b>
--------------	---------------------------

**[Data definition]**

The following parameters are indicated in bit units.

**1-130-1) Fairing ON**

This parameter sets whether to use the fairing function.

0 : Fairing invalid

1 : Fairing valid

(This corresponds to the machining parameter "#8033 Fairing ON".)

**1-130-2) AccClamp ON**

This parameter sets the method for clamping the cutting speed.

0 : Clamp with parameter "#2002 clamp" or the corner deceleration function.

1 : Clamp the cutting speed with acceleration judgment.

(This corresponds to the machining parameter "#8034 AccClamp ON".)

**1-130-3) CordecJudge**

This parameter switches the conditions for judging a corner.

0 : Judge the corner from the angle of the neighboring block.

1 : Judge the corner from the angle of the neighboring block, excluding minute blocks.

(This corresponds to the machining parameter "#8036 CordecJudge".)

<b>1-131</b>	<b>CorJudgeL</b>
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**[Data definition]**

This parameter sets the length of the block excluded from fairing.

(This corresponds to the machining parameter "#8037 CorJudgeL".)

**[Data unit, range]**

Set with a machine constant input unit within the range of 0 to 99999999.

**[Precaution]**

This parameter is validated immediately after setting (writing).

However, if it is changed during the high-speed high-accuracy II modal while fairing is valid, the operation will not be guaranteed.

<b>1-132</b>	<b>FairingL</b>
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**[Data definition]**

This parameter sets the length of the block targeted for fairing.

(This corresponds to the machining parameter "#8029 FairingL".)

**[Data unit, range]**

Set with a machine constant input unit within the range of 0 to 100000.

**[Precaution]**

This parameter is validated immediately after setting (writing).

However, if it is changed during the high-speed high-accuracy II modal while fairing is valid, the operation will not be guaranteed.

5. Explanation of Read/Write Data  
5.3 Explanation of data details

1-140	Pre-interpolation acceleration/deceleration maximum speed
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**[Data definition]**

This parameter sets the cutting feedrate for the pre-interpolation acceleration/deceleration.  
(This corresponds to the setup parameter, basic specification parameter "#1206 G1bF".)

**[Data unit, range]**

Set with a mm/min unit within the range of 1 to 999999.

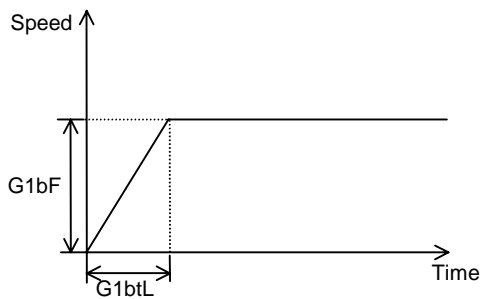
**[Precaution]**

This parameter is validated immediately after setting (writing).  
However, if it is changed during the high-accuracy modal, the operation will not be guaranteed.

1-141	Pre-interpolation acceleration/deceleration time constant
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**[Data definition]**

This parameter sets the cutting feed time constant for pre-interpolation acceleration/deceleration.



(This corresponds to the setup parameter, basic specification parameter "#1207 G1btL".)

**[Data unit, range]**

Set with a ms unit within the range of 1 to 5000.

**[Precaution]**

This parameter is validated immediately after setting (writing).  
However, if it is changed during the high-accuracy modal, the operation will not be guaranteed.

1-150	Arc command overlap
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**[Data definition]**

This parameter eliminates the speed fluctuation at the seam of the arc and straight line or arc and arc during the high-speed high-accuracy control II mode.

0 : Do not overlap arc command blocks.

1 : Overlap arc command blocks. (Eliminate the speed fluctuation)

(This corresponds to the setup parameter, basic specification parameter "#1572 Cirorp".)

**[Data unit, range]**

Set within the range of 0 to 1.

**[Precaution]**

This parameter is validated immediately after setting (writing).  
However, if it is changed during the high-speed high-accuracy II modal, the operation will not be guaranteed.

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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<b>1-160</b>	<b>Feed forward filter</b>
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**[Data definition]**

This parameter filters acceleration changes when starting acceleration or deceleration.  
Specify the parameter in bits.  
(This corresponds to the setup parameter, basic specification parameter "#1131 Fldcc".)

**[Data unit, range]**

bit1 : 7.1 (ms)  
bit2 : 14.2 (ms)  
bit3 : 28.4 (ms)  
bit4 : 56.8 (ms)  
bit5 : 113.6 (ms)

If bit 1 to bit 5 are all "0" or two or more bits of bit 1 to bit 5 are "1", 3.5 (ms) is set up.

**[Precaution]**

This setting is validated when the power is turned ON and OFF after setting (writing).

<b>1-170</b>	<b>SSS control parameters</b>
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**[Data definition]**

The following parameters are indicated in bit units.

**1- -1) SSS ON**

This parameter sets whether to execute SSS (Super Smooth Surface) control during the high-speed high-accuracy control mode.

0 : Do not execute  
1 : Execute

(This corresponds to the machining parameter "#8090 SSS ON".)

<b>1-171</b>	<b>StdLength</b>
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**[Data definition]**

This parameter adjusts the maximum value of the shape recognition range. To eliminate the effect of steps and errors, etc., set a large value. To enable sufficiently deceleration, set a value.

(This corresponds to the machining parameter "#8091 StdLength".)

**[Data unit, range]**

Set with a value that is half of the machine constant input unit. The setting range is 0 to 200000.

If 0 is set, the same operation as when 2000 is set will take place.

**[Precaution]**

This parameter is validated immediately after setting (writing).

However, if it is changed during the high-speed high-accuracy II modal while SSS control is valid, the operation will not be guaranteed.

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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<b>1-172</b>	<b>ClampCoeff</b>
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**[Data definition]**

This parameter adjusts the clamp speed at the curved sections configured of fine segments.  
Coefficient =  $\sqrt{\text{setting value}}$   
(This corresponds to the machining parameter speed "#8092 ClampCoeff".)

**[Data unit, range]**

Set within the range of 1 to 100.

**[Precaution]**

This parameter is validated immediately after setting (writing).  
However, if it is changed during the high-speed high-accuracy II modal while SSS control is valid, the operation will not be guaranteed.

<b>1-173</b>	<b>StepLeng</b>
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**[Data definition]**

Set width of the step at which the speed is not to be decelerated (approximately the same as the CAM path difference [Tolerance].) If a minus value is set, the speed will decelerate at all fine steps.  
(This corresponds to the machining parameter "#8093 StepLeng".)

**[Data unit, range]**

Set with a value that is half of the machine constant input unit. The setting range is -1 to 200.  
When 0 is set, the standard value 10 will be applied.

**[Precaution]**

This parameter is validated immediately after setting (writing).  
However, if it is changed during the high-speed high-accuracy II modal while SSS control is valid, the operation will not be guaranteed.

<b>1-174</b>	<b>DccWaitAdd</b>
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**[Data definition]**

This parameter sets the time to wait for deceleration when the speed feedback does not drop to the clamp speed.  
(This corresponds to the machining parameter "#8094 DccWaitAdd".)

**[Data unit, range]**

Set with a ms unit within the range of 0 to 100.

**[Precaution]**

This parameter is validated immediately after setting (writing).  
However, if it is changed during the high-speed high-accuracy II modal while SSS control is valid, the operation will not be guaranteed.



**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

<b>1-175</b>	<b>Tolerance</b>
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**[Data definition]**

Set the tolerable error when the error between the commanded path and tool path is large. The error will decrease when a smaller value is set, but the machining time will increase. The error will not be adjusted when 0 is set.

(This corresponds to the machining parameter "#8095 Tolerance".)

**[Data unit, range]**

Set with a value that is half of the machine constant input unit. The setting range is 0 to 200000.

**[Precaution]**

This parameter is validated immediately after setting (writing).

However, if it is changed during the high-speed high-accuracy II modal while SSS control is valid, the operation will not be guaranteed.

<b>1-200</b>	<b>Position switches [1] to [24] (System 1, 2)</b>
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**[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 24 switches can be set per system.

This switch can be used after the zero point is established.

(This corresponds to the setup parameter, position switches "#7\*\*1 axis", "#7\*\*2 dog1" and "#7\*\*3 dog2".)

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.

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

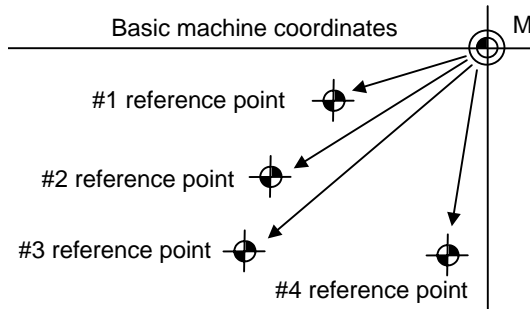
TP : Position loop time constant (  $\frac{1}{PGN}$  [s] )

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

<b>2-10</b>	<b>Axis n</b>	<b>1st to 4th reference point coordinates</b>
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**[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 "#2037 G53ofs" to "#2040 #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.

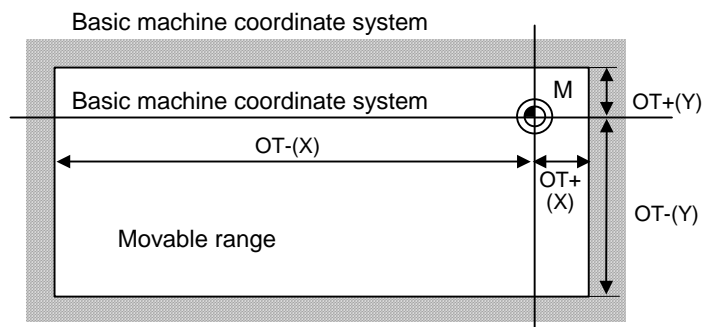
**[Precaution]**

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

<b>2-11</b>	<b>Axis n</b>	<b>Stored stroke limit I (+), (-) ..... For machine maker</b>
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**[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 "#2013 OT-" and "#2014 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**  
**5.3 Explanation of data details**

<b>2-20</b>	<b>Axis n</b>	<b>Movement control parameters</b>
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**[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 "#1016 iout".)

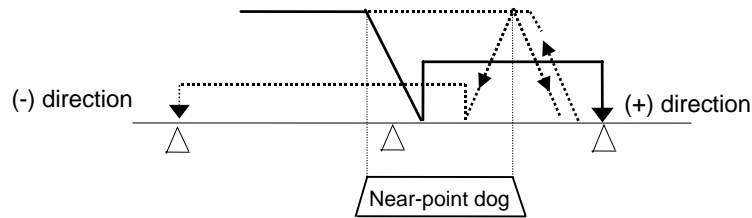
- 0 : When the machine side detectors (ball screw and detectors) are metric specifications.)
- 1 : When the machine side detectors (ball screw and detectors) are inch specifications.)

**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 "#1064 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

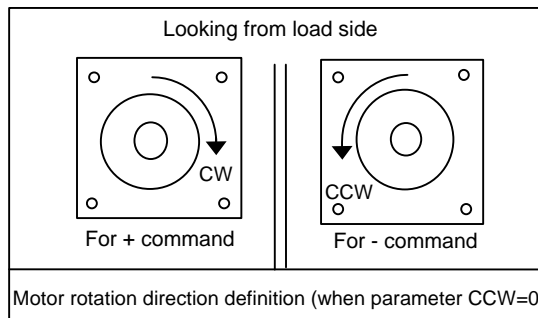
(This corresponds to the setup parameter, basic specification parameter "#1017 rot".)

**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 "#1018 ccw".)



**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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**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 "#2031 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.

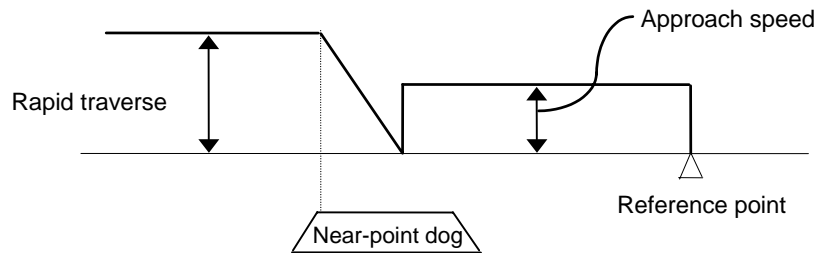
(This corresponds to the setup parameter, basic specification parameter "#1019 dia".)

<b>2-30</b>	<b>Axis n</b>	<b>Reference point return approach speed</b>
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**[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 "#2026 G28crp".)



**[Data unit, range]**

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

**[Precaution]**

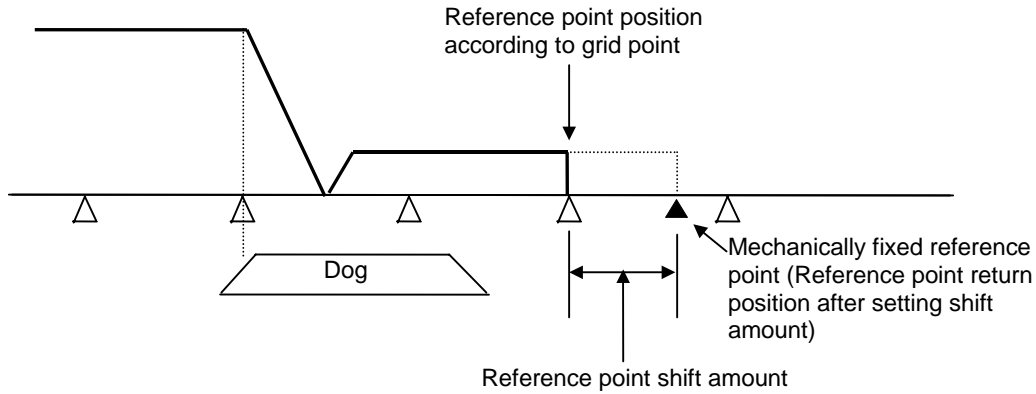
This setting is validated immediately after setting (writing).

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

<b>2-35</b>	<b>Axis n</b>	<b>Reference point return shift amount</b>
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**[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 "#2027 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).

<b>2-36</b>	<b>Axis n</b>	<b>Rapid traverse backlash amount</b>
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**[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 "#2011 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).

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

<b>2-37</b>	<b>Axis n</b>	<b>Cutting feed backlash amount</b>
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**[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 "#2012 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]**

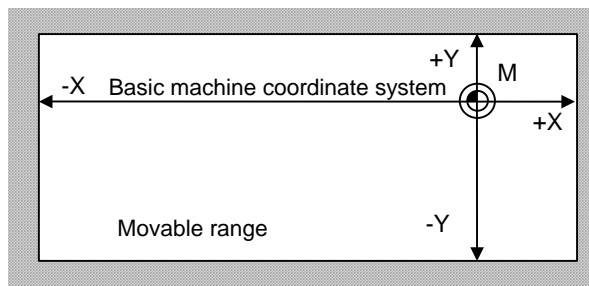
This setting is validated immediately after setting (writing).

<b>2-40</b>	<b>Axis n</b>	<b>Stored stroke limit II (+), (-) ..... For user</b>
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**[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 user parameter, axis parameters "#8204 OT-CHECK-N" and "#8205 OT-CHECK-P".)



**[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**  
**5.3 Explanation of data details**

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<b>2-50</b>	<b>Axis n</b>	<b>Cutting feed time constant G1t</b>
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**[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 "#2008 G1t1".)

**[Data unit, range]**

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

**[Precaution]**

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

<b>2-51</b>	<b>Axis n</b>	<b>Current limit value 2</b>
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**[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 – directions.) To make 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 "#2214 SV014".)

**[Data unit, range]**

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

**[Precaution]**

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

<b>2-52</b>	<b>Axis n</b>	<b>Current limit value 1</b>
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**[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 for both the + and - directions.) To use to the driver's maximum torque, set "500". This can be set for each axis with the parameters.

(This corresponds to the setup parameter, servo parameter "#2213 SV013".)

**[Data unit, range]**

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

**[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**  
**5.3 Explanation of data details**

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<b>2-60</b>	<b>Positive direction sensor of tool setter</b>
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**[Data definition]**

Set up the sensor position in the positive direction when using the tool setter.  
(This corresponds to the setup parameter, axis specification parameter "#2016 tlm+".)

**[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).

<b>2-61</b>	<b>Negative direction sensor of tool setter or TLM standard length</b>
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**[Data definition]**

Set up the sensor position in the negative direction when using the tool setter.  
When the TLM is used, set up the distance of a tool replacement point (reference point) for measuring the tool length from the zero point to the measurement reference point (surface).  
(This corresponds to the setup parameter, axis specification parameter "#2015 tlm-".)

**[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).

<b>2-62</b>	<b>Axis n      Feed forward gain</b>
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**[Data definition]**

This parameter sets the feed forward gain for the pre-interpolation acceleration/deceleration.  
The larger the set value, the smaller the theoretical control error will be. However, if a mechanical vibration occurs, the set value must be reduced.  
(This corresponds to the setup parameter, axis specification parameter "#2010 fwd\_g".)

**[Data unit, range]**

Set with a % unit within the range of 0 to 100.

**[Precaution]**

This setting is validated immediately after setting (writing).



**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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<b>2-70</b>	<b>Axis n Minimum corner deceleration speed</b>
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**[Data definition]**

This parameter sets the minimum clamp speed for corner deceleration during the high-accuracy control mode.

(This corresponds to the setup parameter, axis specification parameter "#2096 crncsp".)

**[Data unit, range]**

Set with a mm/min unit within the range of 0 to 1000000.

**[Precaution]**

This setting is validated immediately after setting (writing).

This value is invalid during SSS control.

<b>2-80</b>	<b>Rapid traverse rate</b>
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**[Data definition]**

Set the rapid traverse rate for each axis.

Note that the maximum value to be set differs according to the mechanical systems.

(This corresponds to the setup parameter, axis specification parameter "#2001 rapid".)

**[Data unit, range]**

The data unit is mm/min, inch/min, and the setting range is 1 to 999999.

**[Precaution]**

This setting is validated immediately after setting (writing).

<b>2-90</b>	<b>G28 rapid traverse rate</b>
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**[Data definition]**

Set the rapid traverse rate for dog type reference point return command.

Note that the maximum value to be set differs according to the mechanical systems.

(This corresponds to the setup parameter, zero point return parameter "#2025 G28rap".)

**[Data unit, range]**

The data unit is mm/min, inch/min, and the setting range is 1 to 999999.

**[Precaution]**

This setting is validated immediately after setting (writing).

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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<b>3-10</b>	<b>Compensation basic axis number</b>
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**[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 2-system, set "system No. + axis name".  
(This corresponds to the setup parameter, machine compensation parameter "#4001 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.)

<b>3-11</b>	<b>Compensation direction axis number</b>
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**[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 2-system, set "system No. + axis name".  
(This corresponds to the setup parameter, machine compensation parameter "#4002 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.)

<b>3-12</b>	<b>Division point number at reference position</b>
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**[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 "#4003 rdvno".)

**[Data unit, range]**

The setting range is 4101 to 5124 (binary).

**[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**  
**5.3 Explanation of data details**

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<b>3-13</b>	<b>Division point number at the most negative side</b>
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**[Data definition]**

Set the compensation data No. that is on the farthest negative side.  
(This corresponds to the setup parameter, machine compensation parameter "#4004 mdvno".)

**[Data unit, range]**

The setting range is 4101 to 5124 (binary).

**[Precaution]**

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

<b>3-14</b>	<b>Division point number at the most positive side</b>
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**[Data definition]**

Set the compensation data No. that is on the farthest positive side.  
(This corresponds to the setup parameter, machine compensation parameter "#4005 pdvno".)

**[Data unit, range]**

The setting range is 4101 to 5124 (binary).

**[Precaution]**

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

<b>3-15</b>	<b>Compensation scale factor</b>
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**[Data definition]**

Set the compensation amount's scale.  
(This corresponds to the setup parameter, machine compensation parameter "#4006 sc".)

**[Data unit, range]**

The setting range is 0 to 99 (binary).

**[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**  
**5.3 Explanation of data details**

<b>3-16</b>	<b>Division interval</b>
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**[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 "#4007 spcdv".)

**[Data unit, range]**

The setting range is 1 to 9999999 (binary).

**[Precaution]**

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

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

**[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/compensation 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 °
D	0.000005 mm	/	0.000005 °

Range: (-99999999 to +99999999) × 2 (binary)

**[Precautions]**

- (1) The "external workpiece coordinate system offset input" option is required to read or write these data with the MELDASMAGIC 64.
- (2) This setting is valid after the data is rewritten and the next workpiece coordinate changeover is commanded.

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

<b>4-16</b>	<b>Axis n External workpiece coordinate system offset</b>
-------------	---

**[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/compensation 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 °
D	0.000005 mm		0.000005 °

Range: (-99999999 to +99999999) × 2 (binary)

**[Precautions]**

- (1) The "external workpiece coordinate offset system input" option is required to read or write this data with the MELDASMAGIC 64.
- (2) This setting is valid after the data is rewritten and the next workpiece coordinate changeover is commanded.

<b>4-17</b>	<b>Axis n Extended workpiece coordinate system offset [1 to 48]</b>
-------------	---

**[Data definition]**

This is the G54.1 P1 to 48 workpiece offset amount of the nth axis (n : 1 to No. of control axes).  
 (This corresponds to the tool/compensation amount workpiece coordinate offset G54.1 P1 to 48.)

**[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 °
D	0.000005 mm		0.000005 °

Range: -199999998 to +199999998

**[Precautions]**

- (1) The "external workpiece coordinate system offset input" option is required to read or write this data with the MELDASMAGIC 64.
- (2) This setting is valid after the data is rewritten and the next workpiece coordinate changeover is commanded.

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

<b>5-30</b>	<b>Servo alarm No.</b>
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**[Data definition]**

This indicates that an error has occurred in the servo system.  
 When an error occurs, the NC alarm 2 (AL2: X211) 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)	(hexadecimal)
22	Alarm No. sub 2 (2-byte)	

**(2) Alarm contents**

Alarm No. Main	Alarm No. Sub 1	Alarm No. Sub 2	Alarm contents
1	10	Axis No. is set	Insufficient voltage
1	11		Axis selection error
1	12		Memory error 1
1	13		Software processing error 1
1	14		Software processing error 2
1	15		Memory error 2
1	16		Magnetic pole position detection error
1	17		A/D converter error
1	18		Motor side detector: Initial communication error
1	19		Detector communication error in synchronous control
1	1A		Machine side detector: Initial communication error
1	1B		Machine side detector: CPU error 1
1	1C		Machine side detector: EEPROM/LED error
1	1D		Machine side detector: Data error
1	1E		Machine side detector: Memory error
1	1F		Machine side detector: Communication error
1	20		Motor side detector: No signal
1	21		Machine side detector: No signal
1	22		LSI error
1	23		Excessive speed error 1
1	24		Grounding
1	25		Absolute position data lost
1	26		Unused axis error
1	27		Machine side detector: CPU error 2
1	28		Machine side detector: Overspeed
1	29		Machine side detector: Absolute position data error

(Continued on next page)

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

Alarm No. Main	Alarm No. Sub 1	Alarm No. Sub 2	Alarm contents
1	2A	Axis No. is set	Machine side detector: Relative position data error
1	2B		Motor side detector: CPU error 1
1	2C		Motor side detector: EEPROM/LED error
1	2D		Motor side detector: Data error
1	2E		Motor side detector: Memory error
1	2F		Motor side detector: Communication error
1	30		Over regeneration
1	31		Overspeed
1	32		Power module overcurrent
1	33		Overvoltage
1	34		NC-DRV communication: CRC error
1	35		NC command error
1	36		NC-DRV communication: Communication error
1	37		Initial parameter error
1	38		NC-DRV communication: Protocol Error 1
1	39		NC-DRV communication: Protocol Error 2
1	3A		Overcurrent
1	3B		Power module overheat
1	3C		Regeneration circuit error
1	3D		Spindle speed blocked
1	3E		Spindle speed overrun
1	3F		Excessive speed error 2
1	40		Detector selection unit switching error
1	41		Detector selection unit communication error
1	42		Feedback error 1
1	43		Feedback error 2
1	44		Inappropriate coil selected for C axis
1	45		Fan stop
1	46		Motor overheat
1	47		Regenerative resistor overheat
1	48		Motor side detector: CPU error 2
1	49		Motor side detector: Overspeed
1	4A		Motor side detector: Absolute position data error
1	4B		Motor side detector: Relative position data error
1	4C		Current error at magnetic pole detection
1	4E		NC command mode error
1	4F		Instantaneous power interruption

(Continued on next page)

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

Alarm No. Main	Alarm No. Sub 1	Alarm No. Sub 2	Alarm contents
1	50	Axis No. is set	Overload 1
1	51		Overload 2
1	52		Excessive error 1
1	53		Excessive error 2
1	54		Excessive error 3
1	55		External emergency stop error
1	57		Option error
1	58		Collision detection 1: G0
1	59		Collision detection 1: G1
1	5A		Collision detection 2
1	5C		Orientation feedback error
1	5D		Speed monitoring: Input mismatch
2	5E		Speed monitoring: Feedback speed error
1	5F		External contactor welding
1	61		Power module overcurrent
1	62		Frequency error
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
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	7F		Drive unit power supply restart request

(Continued on next page)



**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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Alarm No. Main	Alarm No. Sub 1	Alarm No. Sub 2	Alarm contents
1	80	Axis No. is set	Detector converting unit 1: Connection error
1	81		Detector converting unit 1: Communication error
1	83		Detector converting unit 1: Judgment error
1	84		Detector converting unit 1: CPU error
1	85		Detector converting unit 1: Data error
1	86		Detector converting unit 1: Magnetic pole error
1	88		Watchdog
1	89		Detector converting unit 2: Connection error
1	8A		Detector converting unit 2: Communication error
1	8B		Detector converting unit 2: Automatic tuning error
1	8C		Detector converting unit 2: Judgment error
1	8D		Detector converting unit 2: CPU error
1	8E		Detector converting unit 2: Data error

**(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**  
**5.3 Explanation of data details**

<b>5-90</b>	<b>Servo warning No.</b>
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**[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)	(hexadecimal)
70	Alarm No. sub 2 (2-byte)	

**(2) Alarm contents**

Alarm No. Main	Alarm No. Sub 1	Alarm No. Sub 2	Alarm contents
2	90	Axis No. is set.	Detector : Initial communication error
2	91		Detector : Communication error
2	92		Detector : Protocol error
2	93		Initial absolute position fluctuation
2	96		Scale feedback error
2	97		Scale offset error
2	9B		Detector converting unit: Magnetic pole shift warning
2	9C		Detector converting unit: Magnetic pole warning
2	9E		Absolute position detector : Revolution counter error
2	9F		Battery voltage drop
2	A6		Fan stop warning
2	A8		Turret indexing warning
2	A9		Orientation feedback warning
2	E0		Over regeneration warning
2	E1		Overload warning
2	E2		Continuous high-speed revolution warning
2	E3		Absolute position counter warning
2	E4		Set parameter warning
2	E6		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**  
**5.3 Explanation of data details**

5-130	Operation error No.
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**[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: X213) will turn ON.

**(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 No.	Dog overrun
1	2	Alarm axis No.	Z-axis not cross
1	3	Alarm axis No.	Invalid return
1	4	Alarm axis No.	External interlock
1	5	Alarm axis No.	Internal interlock
1	6	Alarm axis No.	H/W stroke end
1	7	Alarm axis No.	S/W stroke end
1	8	—	Chuck/tail-stock barrier stroke end axis found
1	9	—	Reference point return number illegal
1	19	—	Sensor signal illegal No.
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	50	—	Chopping axis reference point return incomplete
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
1	110	—	Cutting block start interlock

(Continued on next page)

## 5. Explanation of Read/Write Data

### 5.3 Explanation of data details

Alarm No. Main	Alarm No. Sub 1	Alarm No. Sub 2	Alarm contents
1	111	—	Restart switch ON
1	112	—	Program check mode
1	113	—	Automatic start during buffer correction
1	115	—	Resetting
1	117	—	Play back not possible
1	118	—	Block seams turning stop during normal line control
1	120	—	Synchronization correction mode ON
1	121	—	No synchronous control option
1	123	—	Computer link B
1	124	Alarm axis No.	Simultaneous axes movement prohibition when the incline axis control is valid
1	126	Alarm axis No.	Program restart machine lock
1	150	—	Chopping override zero
1	151	Alarm axis No.	Chopping axis conflict
1	153	—	Chopping stroke zero
1	154	Alarm axis No.	Chopping axis handle selection axis
1	160	Alarm axis No.	Axis with no maximum speed set for the outside of the soft limit range
1	1005	—	Execution of G114.* during G114.*
1	1007	—	Spindle busy in synchronous tap
1	1026	—	Spindle C axis and other position controls commanded simultaneously
1	1030	—	Synchronization mismatch
1	1031	—	C axis selection signal changed when several C axis selection is impossible
1	1032	—	Tap return spindle selection illegal in multi-spindle
1	1033	—	Cutting feed waited until synchronization complete
1	1034	—	Cross machining command illegal
1	1035	—	Cross machining control impossible modal
1	1036	—	Synchronous control designation impossible
1	1037	—	Synchronous control start/ synchronous control start in the state that cancellation is impossible/cancellation command
1	1038	—	Movement command to synchronous axis during synchronous control
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

### 5.3 Explanation of data details

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<b>5-140</b>	<b>Automatic stop code</b>
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#### [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
108	Alarm No. sub 1 (2-byte)
110	Alarm No. sub 2 (2-byte)

(hexadecimal)

#### (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	—	Tape search execution
1	111	—	Program restart search execution
1	112	—	Program restart position not returned
1	113	—	Thermal alarm
1	115	—	Communicating with host
1	138	—	Disabled start during absolute position detection alarm
1	139	—	Disabled start during zero point initialization
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

(Continued on next page)

## 5. Explanation of Read/Write Data

### 5.3 Explanation of data details

Alarm No. Main	Alarm No. Sub 1	Alarm No. Sub 2	Alarm contents
3	303	—	Mode change
3	304	—	MDI completion
3	305	—	Block start interlock
3	306	—	Cutting block start interlock
3	310	—	Offset change of inclined Z-axis during program operation
4	401	—	Verify stop
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	Dwelling
0		
1		x
8	x	
9	x	x

Alarm No.	Door open	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				
1		x	1				x
8	x		2			x	
9	x	x	3			x	x
			4		x		
			5		x		x
			6		x	x	
			7		x	x	x
			8	x			
			9	x			x
			A	x		x	
			B	x		x	x
			C	x	x		
			D	x	x		x
			E	x	x	x	
			F	x	x	x	x

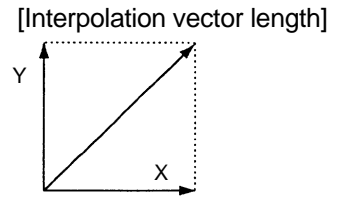
**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

<b>11/15-10</b>	<b>Interpolation vector length</b>
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**[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, range]**

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 °
D	0.000005 mm		0.000005 °

**[Precaution]**

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

<b>11/15-20</b>	<b>Movement mode</b>
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**[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 position verification
14	G27_P2 2nd reference position verification
15	G27_P3 3rd reference position verification
16	G27_P4 4th reference position verification
17	G28 Automatic reference position return
18	G29 Return from automatic reference position
19	G30_P2 2nd reference position return
20	G30_P3 3rd reference position return
21	G30_P4 4th reference position 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**  
**5.3 Explanation of data details**

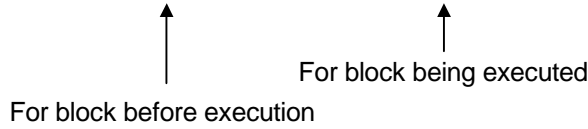
<b>12/16-10</b>	<b>Axis direction movement amount</b>
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**[Data definition]**

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, range]**

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 °
D	0.000005 mm	/	0.000005 °

**[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**  
**5.3 Explanation of data details**

<b>13/17-10</b>	<b>Interpolation mode (G code group 1)</b>
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**[Data definition]**

The current movement modal (group 1) is indicated.

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

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

**[Data definition]**

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

Data	Machining center system	Lathe system					
		Series 2	Series 3	Series 4	Series 5	Series 6	Series 7
0	G17	G17	G17	G17	G17	G17	G17
1	G18	G18	G18	G18	G18	G18	G18
2	G19	G19	G19	G19	G19	G19	G19

<b>13/17-12</b>	<b>Feed mode (G code group 5)</b>
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**[Data definition]**

The current feed modal (group 5) is indicated.

Data	Machining center system	Lathe system					
		Series 2	Series 3	Series 4	Series 5	Series 6	Series 7
0	—	—	—	—	—	—	—
1	G94	G98	G94	G98	G94	G98	G94
2	G95	G99	G95	G99	G95	G99	G95

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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

**[Data definition]**

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

Data	Machining center system	Lathe system					
		Series 2	Series 3	Series 4	Series 5	Series 6	Series 7
0	G40	G40	G40	G40	G40	G40	G40
1	G41	G41	G41	G41	G41	G41	G41
2	G42	G42	G42	G42	G42	G42	G42
3	—	G46	G46	G46	G46	G46	G46

<b>13/17-14</b>	<b>Fixed cycle modal (G code group 9)</b>
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**[Data definition]**

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

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

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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

**[Data definition]**

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

Data	Machining center system	Lathe system					
		Series 2	Series 3	Series 4	Series 5	Series 6	Series 7
0	G54	G54	G54	G54	G54	G54	G54
1	G55	G55	G55	G55	G55	G55	G55
2	G56	G56	G56	G56	G56	G56	G56
3	G57	G57	G57	G57	G57	G57	G57
4	G58	G58	G58	G58	G58	G58	G58
5	G59	G59	G59	G59	G59	G59	G59

<b>13/17-16</b>	<b>Cutting mode (G code group 13)</b>
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**[Data definition]**

The current cutting modal (group 13) is indicated.

Data	Machining center system	Lathe system					
		Series 2	Series 3	Series 4	Series 5	Series 6	Series 7
0	G61	G61	G61	G61	G61	G61	G61
1	G62	G62	G62	G62	G62	G62	G62
2	G63	G63	G63	G63	G63	G63	G63
3	G64	G64	G64	G64	G64	G64	G64

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

**[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

<b>13/17-20</b>	<b>Block No.</b>
-----------------	------------------

**[Data definition]**

The current block No. is indicated.

**[Data unit, range]**

The setting range is 0 to 99.

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

<b>13/17-30</b>	<b>Shape compensation No.</b>
-----------------	-------------------------------

**[Data definition]**

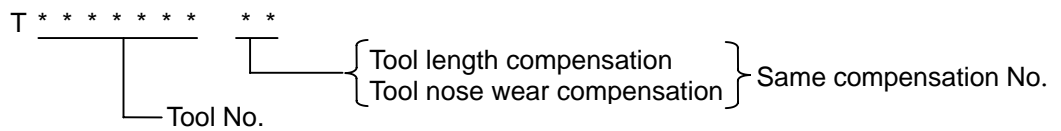
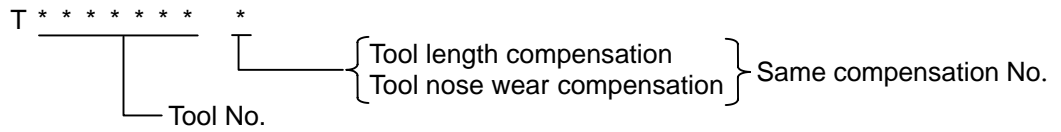
**(1) Machining center system**

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

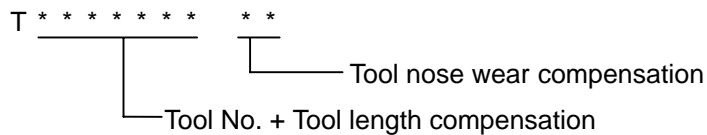
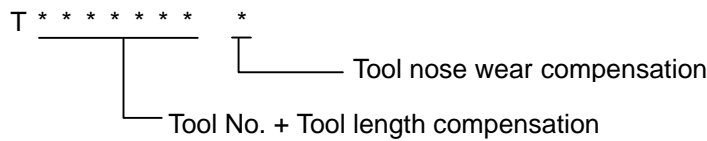
**(2) Lathe system**

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.

<b>13/17-31</b>	<b>Wear compensation No.</b>
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**[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**  
**5.3 Explanation of data details**

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

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

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

**[Data definition]**

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

<b>13/17-42</b>	<b>Tool function (T) code (BCD)</b>
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**[Data definition]**

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

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

**[Data definition]**

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

<b>13/17-44</b>	<b>Program No.</b>
-----------------	--------------------

**[Data definition]**

The current program No. (modal) is indicated.

**[Data unit, range]**

The setting range is 1 to 99999999 (binary).

<b>13/17-45</b>	<b>Sequence No.</b>
-----------------	---------------------

**[Data definition]**

The current sequence No. is indicated.

**[Data unit, range]**

The setting range is 1 to 99999 (binary).

<b>13/17-50</b>	<b>Tool radius compensation amount and nose R compensation amount</b>
-----------------	---

**[Data definition]**

The current tool radius compensation amount (nose R compensation amount) is indicated.

The plane selection 1st axis, 2nd axis and 3rd axis apply in the order that parameters #1026 Base\_I, #1027 Base\_J and #1028 Base\_K are set.

**[Data unit]**

The unit is one half of the machine constant input unit.

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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<b>14/18-10</b>	<b>Tool length compensation No.</b>
-----------------	-------------------------------------

**[Data definition]**

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

**[Data unit, range]**

The setting range is 0 to the maximum compensation No. (binary).

**(Note)** This is valid only for the machining center system.

<b>14/18-20</b>	<b>Axis n Workpiece offset amount</b>
-----------------	---------------------------------------

**[Data definition]**

The currently applied work offset amount is indicated.

**[Data unit]**

The unit is one half of the machine constant input unit.

<b>14/18-21</b>	<b>Axis n Tool length compensation amount (M)</b>
-----------------	---

**[Data definition]**

The currently applied tool length compensation amount is indicated.

**[Data unit]**

The unit is one half of the machine constant input unit.

<b>14/18-22</b>	<b>Axis n Tool shape offset amount (L)</b>
-----------------	--

**[Data definition]**

The currently applied tool shape compensation amount is indicated.

**[Data unit]**

The unit is one half of the machine constant input unit.

<b>14/18-23</b>	<b>Axis n Tool length compensation amount (L)</b>
-----------------	---

**[Data definition]**

The currently applied tool length compensation amount is indicated.

**[Data unit]**

The unit is one half of the machine constant input unit.

<b>14/18-24</b>	<b>Axis n Tool wear compensation amount (L)</b>
-----------------	---

**[Data definition]**

The current tool wear compensation amount is indicated.

**[Data unit]**

The unit is one half of the machine constant input unit.

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

<b>20-10</b>	<b>Automatic effective feedrate</b>
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**[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	$1 \times 2^{-10}$ mm/min	$0.1 \times 2^{-10}$ inch/min
C	$0.1 \times 2^{-10}$ mm/min	$0.01 \times 2^{-10}$ inch/min
D	$0.01 \times 2^{-10}$ mm/min	—

<b>20-11</b>	<b>Manual effective feedrate</b>
--------------	----------------------------------

**[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.

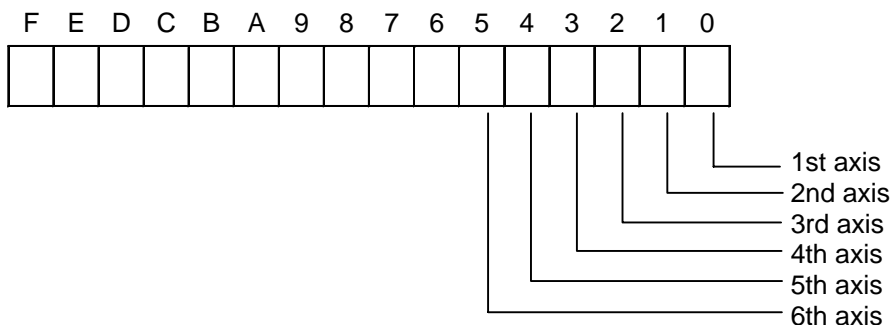
**[Data unit]**

Input unit system (iunit)	Input unit (metric)	Input unit (inch)
B	$1 \times 2^{-10}$ mm/min	$0.1 \times 2^{-10}$ inch/min
C	$0.1 \times 2^{-10}$ mm/min	$0.01 \times 2^{-10}$ inch/min
D	$0.01 \times 2^{-10}$ mm/min	—

<b>20-20</b>	<b>In-position</b>
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**[Data definition]**

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



**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

<b>21-10</b>	<b>Current position in machine coordinate system</b>
--------------	--

**[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 °
D	0.000005 mm		0.000005 °

<b>21-12</b>	<b>Manual interrupt amount (1) (Manual absolute switch OFF)</b>
--------------	---

**[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 °
D	0.000005 mm		0.000005 °

<b>21-13</b>	<b>Manual interrupt amount (2) (Manual absolute switch ON)</b>
--------------	--

**[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 °
D	0.000005 mm		0.000005 °



**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

<b>21-20</b>	<b>Current position in workpiece coordinate system</b>
--------------	--

**[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 °
D	0.000005 mm		0.000005 °

<b>21-30</b>	<b>Current position in workpiece coordinate system during skip ON</b>
--------------	---

**[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 °
D	0.000005 mm		0.000005 °

<b>21-31</b>	<b>Current position in machine coordinate system during skip ON</b>
--------------	---

**[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 °
D	0.000005 mm		0.000005 °

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

<b>21-32</b>	<b>Remaining distance during skip ON</b>
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**[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 °
D	0.000005 mm		0.000005 °

<b>21-33</b>	<b>Current position in machine coordinate system during manual skip ON</b>
--------------	--

**[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 °
D	0.000005 mm		0.000005 °

<b>21-34</b>	<b>Command position in machine coordinate system</b>
--------------	--

**[Data definition]**

Command position in the machine coordinate system to be output to the drive unit is indicated.

**[Data unit]**

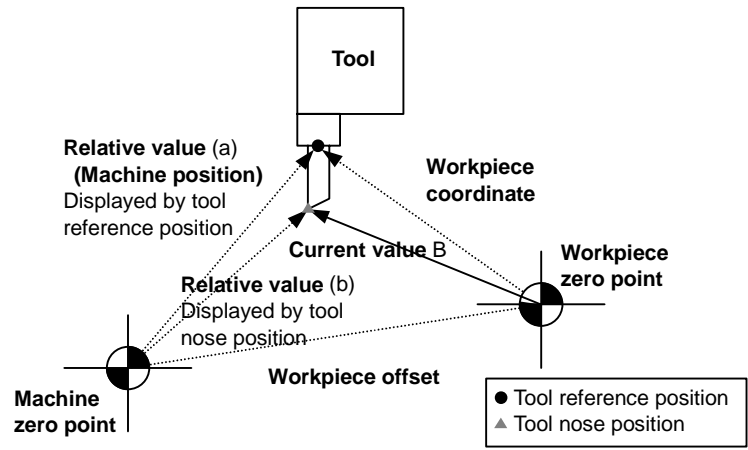
Input unit system (iunit)	Linear axis		Rotary axis
	Input unit (metric)	Input unit (inch)	
B	0.0005 mm	0.00005 inch	0.0005 °
C	0.00005 mm	0.000005 inch	0.00005 °
D	0.000005 mm		0.000005 °

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

21-40	Axis n	Relative coordinate value
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**[Data definition]**

The coordinate position using the machine zero point as a reference is indicated. Whether the tool reference position (figure below (a)) or the current position of the tool nose position (figure below (b)) that considers offset, such as tool length offset amount and tool diameter compensation amount in the tool reference position is applied to data details can be selected with the parameter.



(The relation of the data details and parameters is shown below.)

<M60 series>

#1287 ext23/bit3	0	1
#1221 aux05/bit7	0	1
0	Relative value (figure (a))	Relative value (figure (b)) The compensation amount is considered according to #1287 ext23/bit4, 5 contents.
1	Relative value (figure (a))	The current value B is used with the M64A/64 lathe system. The relative value (figure (b)) is used with the M64A/64 (machining system)/65/66.

<M60S series>

#1221 aux05/bit7	0	Relative value The compensation amount is considered according to #1287 ext23/bit4,5 contents.
	1	Current value B

**[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 °
D	0.000005 mm	0.0000005 inch	0.000005 °

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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<b>21-41</b>	<b>Axis n</b>	<b>Current value B</b>
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**[Data definition]**

Tool nose position coordinate that is considered tool length offset and tool diameter compensation can be displayed in workpiece coordinate. Tool length offset and tool diameter compensation that are considered depend on tool (T) designation or the currently selected tool No. that is input from the external source.

**[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 °
D	0.000005 mm		0.000005 °

<b>21-42</b>	<b>Axis n</b>	<b>Axis name</b>
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**[Data definition]**

Axis name address for each axis.

**[Data unit]**

This is a hexadecimal ASCII data. Example: "A" is read as 41, and "X" is read as 58.

<b>21-43</b>	<b>Axis n</b>	<b>Increment command axis name</b>
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**[Data definition]**

This is the incremental command axis name address for designating absolute or incremental for the program movement amount.

**[Data unit]**

This is a hexadecimal ASCII data. Example: "U" is read as 55.

<b>21-44</b>	<b>Axis n</b>	<b>2nd axis name</b>
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**[Data definition]**

This is the 2-character axis name displayed on the screen.

**[Data unit]**

This is a hexadecimal ASCII data. Example: "X1" is read as 5831, "C2" is read as 4332 and "Z" is read as 205A.

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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<b>22-10</b>	<b>Emergency stop causes</b>
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**[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 R69 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 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 "FROM-TO" command not executed**

The external PLC "FROM-TO" command is not executed.

**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 Renewal error**

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

**22-10-4) Control unit EMG connector Emergency stop state**

This indicates that the 24V has not supplied to the control unit emergency stop input because the emergency stop switch was pressed, etc.

**22-10-6) Built-in PLC Software emergency stop output device Y29F is "1".**

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

The PLC device "Y29F" 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**  
**5.3 Explanation of data details**

<b>23-10</b>	<b>Spindle command speed (Effective value)</b>
--------------	--

**[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.

**[Data unit, range]**

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

<b>24-1</b>	<b>Power ON time</b>
-------------	----------------------

**[Data definition]**

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

**[Data unit, range]**

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).

$$\text{Time (second)} = \boxed{\text{DDB read data}} \times \frac{512}{9000}$$

The reverse calculation is carried out to write the data.

$$\boxed{\text{DDB write data}} = \frac{9000}{512} \times \text{time}$$

<b>24-2</b>	<b>Automatic operation time</b>
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**[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, range]**

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).

$$\text{Time (second)} = \boxed{\text{DDB read data}} \times \frac{512}{9000}$$

The reverse calculation is carried out to write the data.

$$\boxed{\text{DDB write data}} = \frac{9000}{512} \times \text{time}$$

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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<b>24-3</b>	<b>Automatic start up time</b>
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**[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, range]**

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).

$$\text{Time (second)} = \boxed{\text{DDB read data}} \times \frac{512}{9000}$$

The reverse calculation is carried out to write the data.

$$\boxed{\text{DDB write data}} = \frac{9000}{512} \times \text{time}$$

<b>24-4</b>	<b>External cumulative time 1</b>
<b>24-5</b>	<b>External cumulative time 2</b>

**[Data definition]**

This counts and displays the total cumulative time that the designated signal (Y234, Y235) is ON with the user PLC. The signals are assigned in the following manner.

24-4 External cumulative time 1: Y234

24-5 External cumulative time 2: Y235

**[Data unit, range]**

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).

$$\text{Time (second)} = \boxed{\text{DDB read data}} \times \frac{512}{9000}$$

The reverse calculation is carried out to write the data.

$$\boxed{\text{DDB write data}} = \frac{9000}{512} \times \text{time}$$

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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<b>26-10</b>	<b>Spindle Motor real speed</b>
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**[Data definition]**

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

**[Data unit, range]**

The data unit is r/min.

**[Precaution]**

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

<b>26-20</b>	<b>Spindle Motor load</b>
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**[Data definition]**

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

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



<b>27-10</b>	<b>Smoothing status, servo status</b>
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**[Data definition]**

The various servo related information is expressed in bit units.

**27-10-0) Ready ON**

If the drive amplifier 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 remain 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.

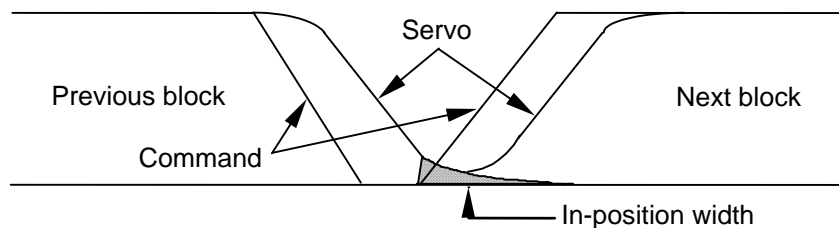
The CNC will determine the reference point return position, etc., based on this signal.

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 "INP" (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.



**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)**

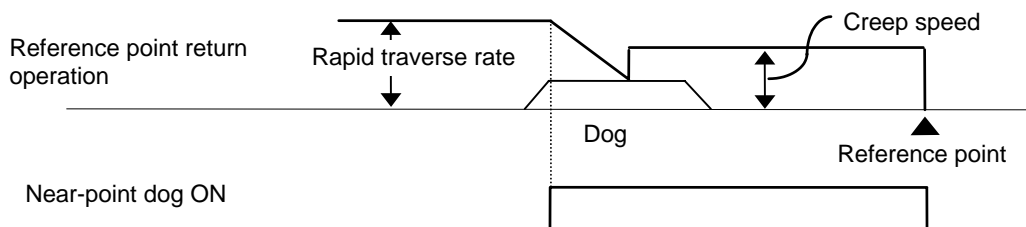
This indicates that the stroke end (+) signal was input for an axis moving in the (+) direction. Once the conditions are met, the signal will turn ON and the axis will move in the (-) direction. And when the stroke end (+) signal is no longer input, this signal will turn OFF.

**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 amplifier 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**  
**5.3 Explanation of data details**

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<b>27-20</b>	<b>Servo delay amount</b>
--------------	---------------------------

**[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.

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

<b>27-30</b>	<b>Feed axis motor load A (%)</b>
--------------	-----------------------------------

**[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.

<b>27-31</b>	<b>Feed axis motor load B (%)</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).

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

**[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**  
**5.3 Explanation of data details**

<b>29/32-10</b>	<b>Variable command (common variable values 1, 2)</b>
-----------------	---

**[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.

Type		No.		Function
Common variable		Common variable 1	Common variable 2	These can be used in the main, sub and each macro program.
1-system	100 sets	500 to 549	100 to 149	
	200 sets	500 to 599	100 to 199	
	300 sets	500 to 699	100 to 199	
	600 sets	500 to 999	100 to 199	
2-system	50+ 50 sets	500 to 549	100 to 149 *2	
	100+100 sets	500 to 599	100 to 199 *2	

**[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 executed (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".

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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<b>30-10</b>	<b>Local variables (level 0)</b>
--------------	----------------------------------

**[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:

(1) The data is not effective on a block that has already been calculated.

(2) The variable is cleared to a blank when the macro is called.

(2) The substitute command is executed when the command block is executed (ACT).

<b>30-11</b>	<b>Local variables (level 1)</b>
--------------	----------------------------------

**[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.

**[Precaution]**

These are the same as the local variables (level 0).

<b>30-12</b>	<b>Local variables (level 2)</b>
--------------	----------------------------------

**[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.

**[Precaution]**

These are the same as the local variables (level 0).

<b>30-13</b>	<b>Local variables (level 3)</b>
--------------	----------------------------------

**[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.

**[Precaution]**

These are the same as the local variables (level 0).

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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<b>31-10</b>	<b>Tool compensation amount 1</b>
--------------	-----------------------------------

**[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 $\mu$ m, or 0.05 $\mu$ 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.

<b>31-20</b>	<b>Tool compensation amount 2</b>
--------------	-----------------------------------

**[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 $\mu$ m, or 0.05 $\mu$ 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.

<b>31-30</b>	<b>Tool compensation amount 3</b>
--------------	-----------------------------------

**[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.

<b>31-40</b>	<b>Tool compensation amount 4</b>
--------------	-----------------------------------

**[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.

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

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<b>31-100</b>	<b>X axis tool length compensation amount</b>
---------------	---

**[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 $\mu$ m, or 0.05 $\mu$ 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.

<b>31-110</b>	<b>X axis wear compensation amount</b>
---------------	--

**[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 $\mu$ m, or 0.05 $\mu$ 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.

<b>31-120</b>	<b>3rd axis tool length compensation amount</b>
---------------	---

**[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.

<b>31-130</b>	<b>3rd axis wear compensation amount</b>
---------------	--

**[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.

**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

<b>31-140</b>	<b>Z axis tool length compensation amount</b>
---------------	---

**[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.

<b>31-150</b>	<b>Z axis wear compensation amount</b>
---------------	--

**[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.

<b>31-160</b>	<b>Nose R compensation amount</b>
---------------	-----------------------------------

**[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.

<b>31-170</b>	<b>Nose R wear compensation amount</b>
---------------	--

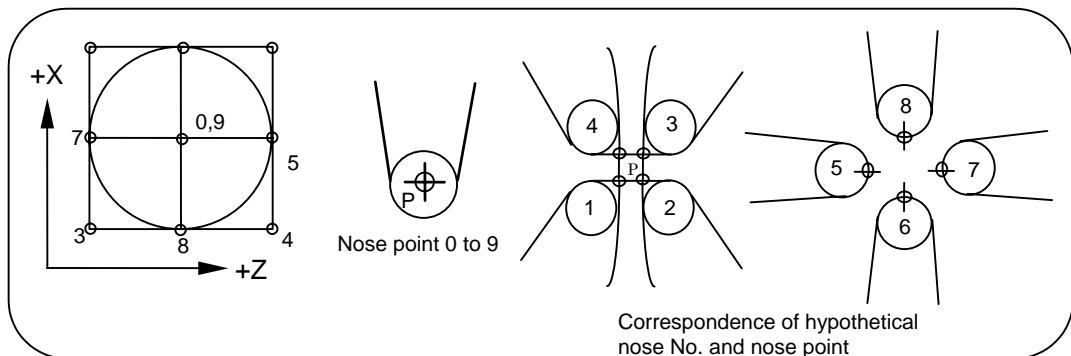
**[Data definition]**

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.

<b>31-180</b>	<b>Hypothetical nose No.</b>
---------------	------------------------------

**[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.



**5. Explanation of Read/Write Data**  
**5.3 Explanation of data details**

<b>180-10 to 180-26</b>	<b>J2-CT parameter</b>
-------------------------	------------------------

**[Data definition]**

Refer to the list of parameters in the "MR-J2-CT Series Specifications and Instruction Manual" for the definitions of the J2-CT (auxiliary axis) parameters.

**[Data unit, range]**

Refer to the list of parameters in the "MR-J2-CT Series Specifications and Instruction Manual".

**[Precaution]**

Multiple J2-CT axes (up to the number of auxiliary axes) can be read with one DDB.

The parameters can be written for only one axis with one DDB.

Before writing the parameters, always confirm that the "writing J2-CT parameter status" and "requesting J2-CT parameter write flag" on the "J2-CT status" (section No. 180, sub-section No. 655326) are OFF.

<b>180-40</b>	<b>J2-CT status</b>
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**[Data definition]**

The J2-CT status is the status indicating the command to the J2-CT and command state from the J2-CT.

The J2-CT status is common data regardless of the system or axis.

The meanings of the J2-CT status bits are shown below. Statuses with an "-" in the following table are invalid.

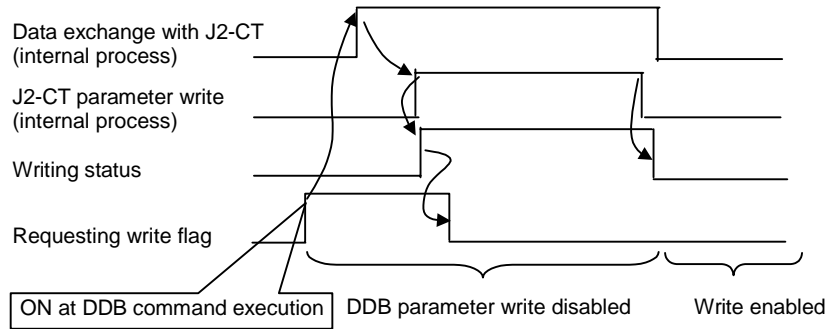
bit	Rn+6	Rn+7
0	-	-
1	J2-CT parameter Writing status <b>(Note 1)</b>	J2-CT parameter Requesting write flag <b>(Note 2)</b>
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
A	-	-
B	-	-
C	-	-
D	-	-
E	-	-
F	-	-

**(Note 1)** The J2-CT parameter Writing status is turned ON by the internal process while the parameters are being written to the J2-CT.

**(Note 2)** The J2-CT parameter Requesting write flag is turned ON when the DDB command is executed, and remains ON while parameter writing is requested to the J2-CT. It turns OFF when the writing status turns ON.

## 5. Explanation of Read/Write Data

### 5.3 Explanation of data details

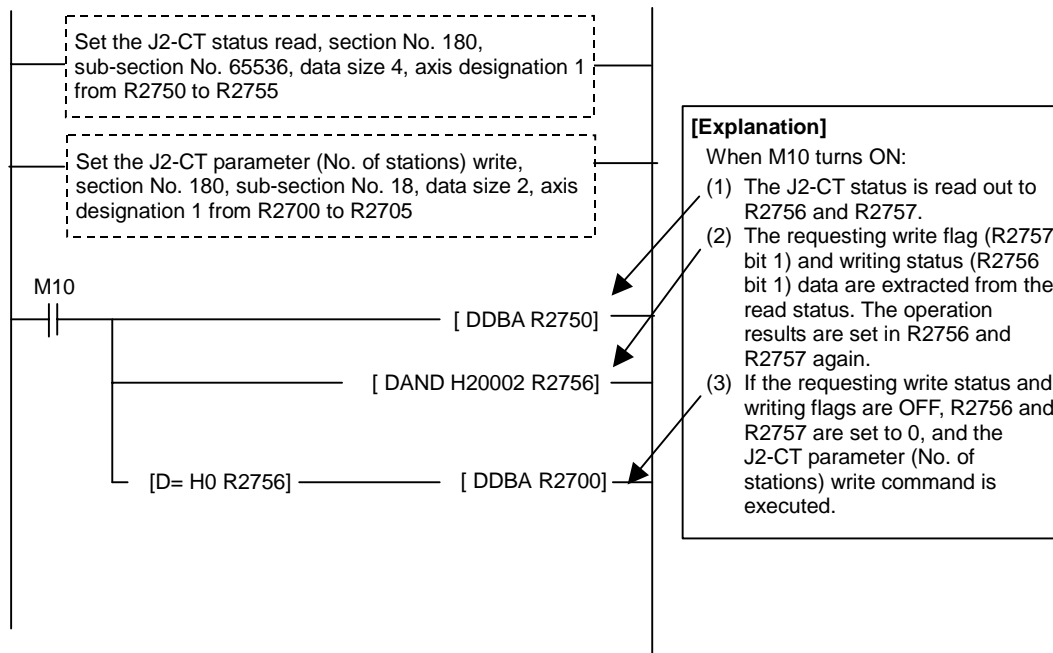


#### [Precaution]

- (1) The J2-CT status must be read as the 1st system, axis No.1 data.
- (2) Set the data size to Long (4-byte).
- (3) The J2-CT status cannot be written.
- (4) Always write the J2-CT parameters after confirming that the writing J2-CT parameter status and requesting J2-CT parameter write flag are OFF.

#### [Examples of using J2-CT status]

An example of using J2-CT parameter write (No. of stations) is shown below.  
(Refer to the PLC Programming Manual for details on the DDBA I/F.)



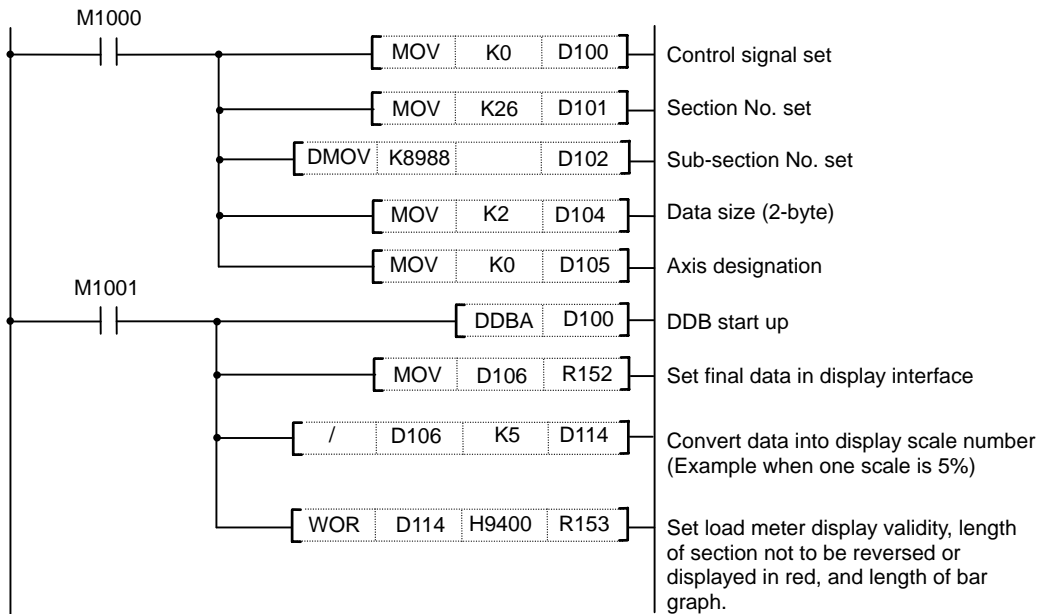
## 6. Example of DDB with Ladder Circuit

An example when the PLC4B is used is shown below.

### (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	

About M1000 and M1001 of example described above

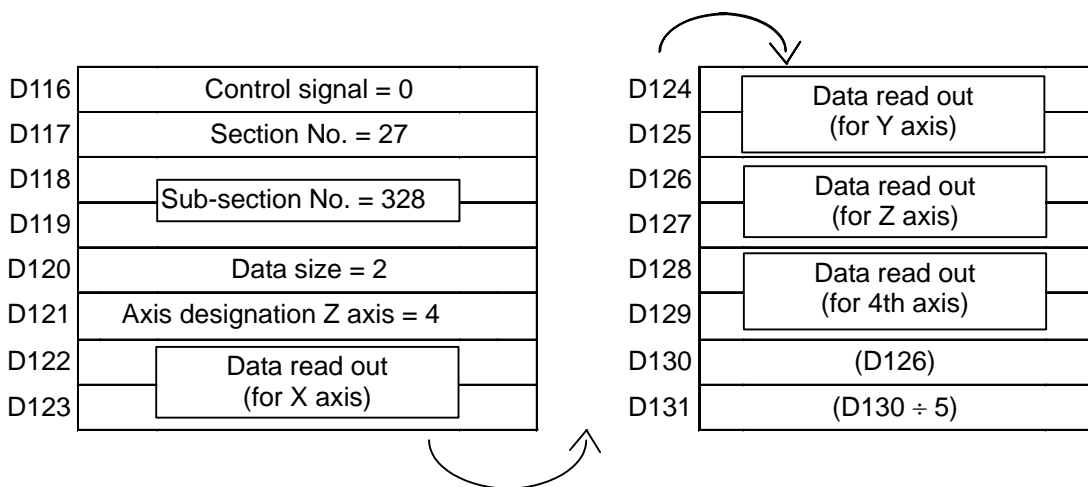
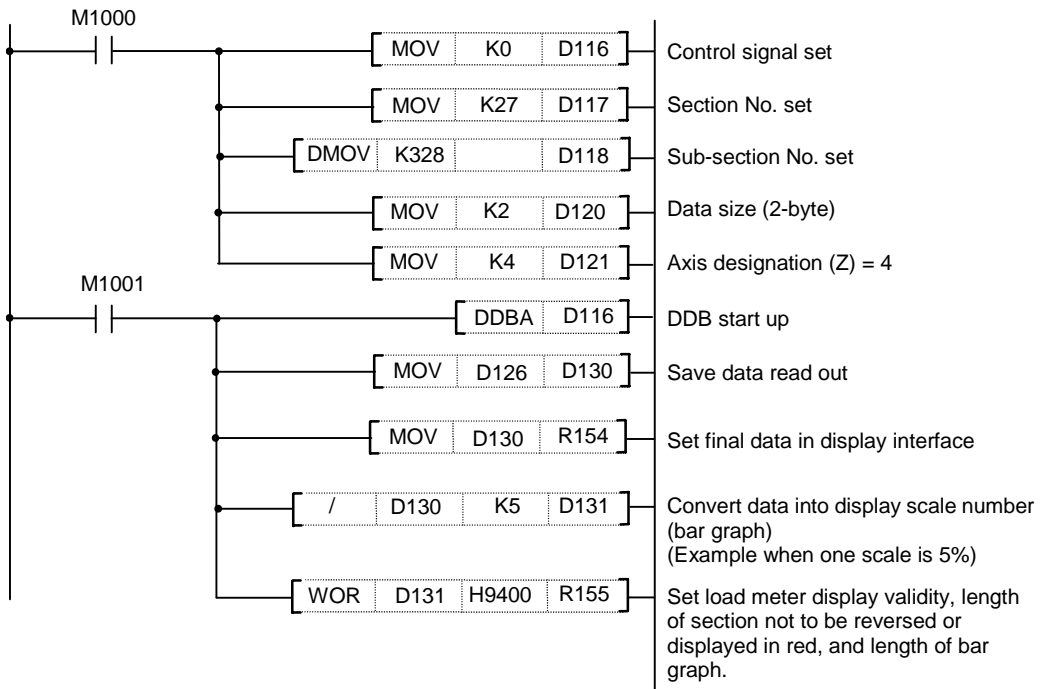
M1000: Controlled by the ladder so as to turn ON when the DDB data is set.

M1001: Controlled by the ladder so as to turn ON when the DDB is started.

## 6. Example of DDB with Ladder Circuit

### (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.



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.

About M1000 and M1001 of example described above

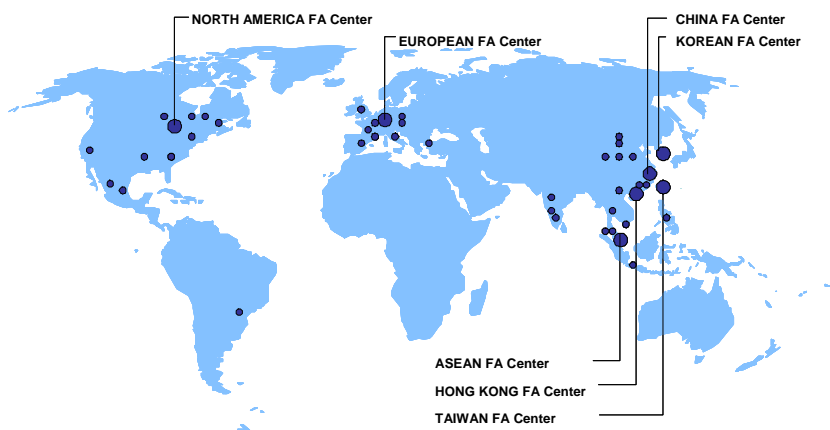
M1000: Controlled by the ladder so as to turn ON when the DDB data is set.

M1001: Controlled by the ladder so as to turn ON when the DDB is started.

## Revision History

Date of revision	Manual No.	Revision details
Feb. 1998	BNP-B2214*	First edition created.
Jan. 2003	BNP-B2214C	<ul style="list-style-type: none"> <li>• DDB data was added and changed.</li> <li>• Design of the cover and the back cover were changed.</li> <li>• The manual name "MELDAS 64 MELDASMAGIC 64 DDB Interface Manual" was changed to "MELDAS 60/60S Series MELDASMAGIC 64 DDB Interface Manual".</li> <li>• MODEL, MODELCODE and MANUAL No. were added on the back cover.</li> <li>• The following DDB data were added.               <ul style="list-style-type: none"> <li>• 1-90 Display language</li> <li>• 1-91 Edit type</li> <li>• 2-60 Positive direction sensor of tool setter</li> <li>• 2-61 Negative direction sensor of tool setter or TLM standard length.</li> </ul> </li> <li>• Miswrite is corrected.</li> </ul>
May 2004	BNP-B2214D	Revised for compliance to M60S system software versions C0, C1
Feb. 2006	BNP-B2214E	<p>Revised for compliance to M60S system software version C7.</p> <ul style="list-style-type: none"> <li>• "2.2.7 Precautions" was added.</li> <li>• The following DDB data was added.               <ul style="list-style-type: none"> <li>• 1-15 Monitor speed for speed monitoring</li> <li>• 1-54 Method selection parameter (5)</li> <li>• 1-55 Method selection parameter (6)</li> <li>• 1-80 Alternate M code valid</li> <li>• 1-81 G0 non-interpolation</li> <li>• 2-80 Rapid traverse rate</li> <li>• 2-90 G28 rapid traverse rate</li> <li>• 21-34 Command position in machine coordinate system</li> </ul> </li> <li>• The existing search Nos. were changed as follows.               <ul style="list-style-type: none"> <li>• 1-70 → 1-52 Method selection parameter (3)</li> <li>• 1-80 → 1-53 Method selection parameter (4)</li> <li>• 1-100 → 1-200 Position switch</li> </ul> </li> <li>• Number of position switches was changed from 9 to 24. (1-200)</li> <li>• Variable command 600 sets was added. (29-10,32-10)</li> <li>• Other mistakes were corrected.</li> </ul>

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## **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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