CNC

MELDAS 60/60S Series
MELDAS MAGIC64

DDB INTERFACE MANUAL
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.

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

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

⚠️ CAUTION
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.
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

<table>
<thead>
<tr>
<th>Set control data with MOV command, etc.</th>
<th>ACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDBA</td>
<td>Rn/Dn</td>
</tr>
</tbody>
</table>

(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

<table>
<thead>
<tr>
<th>Rn</th>
<th>(Dn)</th>
<th>Control signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rn+1</td>
<td>(Dn+1)</td>
<td>Section No.</td>
</tr>
<tr>
<td>Rn+2</td>
<td>(Dn+2)</td>
<td>Sub-section No.</td>
</tr>
<tr>
<td>Rn+4</td>
<td>(Dn+4)</td>
<td>Data size</td>
</tr>
<tr>
<td>Rn+5</td>
<td>(Dn+5)</td>
<td>Read/write designated axis, system designation</td>
</tr>
<tr>
<td>Rn+6</td>
<td>(Dn+6)</td>
<td>Read/write data (for 1st axis)</td>
</tr>
<tr>
<td>Rn+8</td>
<td>(Dn+8)</td>
<td></td>
</tr>
<tr>
<td>Rn+10</td>
<td>(Dn+10)</td>
<td>(for 2nd axis)</td>
</tr>
<tr>
<td>Rn+12</td>
<td>(Dn+12)</td>
<td>(for 3rd axis)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(for 4th axis)</td>
</tr>
</tbody>
</table>

(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

2.2.1 Control signals (Rn or Dn)

<table>
<thead>
<tr>
<th>bits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Error occurrence</td>
</tr>
<tr>
<td>E</td>
<td>Write protect</td>
</tr>
<tr>
<td>D</td>
<td>Section/sub-section No. error</td>
</tr>
<tr>
<td>C</td>
<td>Number of axes illegal</td>
</tr>
<tr>
<td>B</td>
<td>Size over</td>
</tr>
<tr>
<td>A</td>
<td>No option</td>
</tr>
<tr>
<td>9</td>
<td>Error during chopping</td>
</tr>
<tr>
<td>8</td>
<td>Warning output *</td>
</tr>
<tr>
<td>7</td>
<td>Set by controller at completion of DDB command</td>
</tr>
<tr>
<td>6</td>
<td>Last four digits of the data during reading/writing of variables corresponds to the decimal place</td>
</tr>
<tr>
<td>5</td>
<td>0: Decimal point invalid</td>
</tr>
<tr>
<td>4</td>
<td>1: Decimal point valid</td>
</tr>
<tr>
<td>3</td>
<td>0: Added input</td>
</tr>
<tr>
<td>2</td>
<td>1: Direct input</td>
</tr>
<tr>
<td>1</td>
<td>0: Read designation</td>
</tr>
<tr>
<td>0</td>
<td>1: Write designation</td>
</tr>
</tbody>
</table>

Set by ladder program before DDB command execution

*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.
2.2.5  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.

\[
\begin{array}{cccccccccc}
F & E & D & C & B & A & 9 & 8 & 7 & 6 & 5 & 4 & 3 & 2 & 1 & 0 \\
\end{array}
\]

- **System designation (Note 1)**
  - 0: 1st system
  - 1: 2nd system

1st axis
2nd axis
3rd axis
4th axis
5th axis
6th axis

*(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.

- **1-byte data**
- **2-byte data**
- **4-byte data**

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

<table>
<thead>
<tr>
<th>Section No.</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Parameters common to each axis Possible (partially not possible)</td>
</tr>
<tr>
<td>2</td>
<td>Axis independent parameters Possible (partially not possible)</td>
</tr>
<tr>
<td>3</td>
<td>Machine error compensation information Not possible (partially possible)</td>
</tr>
<tr>
<td>4</td>
<td>Workpiece coordinate system offset, external workpiece coordinate system offset Possible</td>
</tr>
<tr>
<td>5</td>
<td>Alarm information Not possible</td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Axis common non-modal information in block being executed Not possible</td>
</tr>
<tr>
<td>12</td>
<td>Axis independent non-modal information in block being executed Not possible</td>
</tr>
<tr>
<td>13</td>
<td>Axis common modal information in block being executed Not possible</td>
</tr>
<tr>
<td>14</td>
<td>Axis independent modal information in block being executed Not possible</td>
</tr>
<tr>
<td>15</td>
<td>Axis common non-modal information in next block Not possible</td>
</tr>
<tr>
<td>16</td>
<td>Axis independent non-modal information in next block Not possible</td>
</tr>
<tr>
<td>17</td>
<td>Axis common modal information in next block Not possible</td>
</tr>
<tr>
<td>18</td>
<td>Axis independent modal information in next block Not possible</td>
</tr>
<tr>
<td>19</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Axis common machine control information 1 Not possible</td>
</tr>
<tr>
<td>21</td>
<td>Axis independent machine control information 1 Not possible</td>
</tr>
<tr>
<td>22</td>
<td>Information input from PLC to controller Not possible</td>
</tr>
<tr>
<td>23</td>
<td>Information output from controller to PLC Not possible</td>
</tr>
<tr>
<td>24</td>
<td>Cumulative time data Possible</td>
</tr>
<tr>
<td>25</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Axis common machine control information 2 Not possible</td>
</tr>
<tr>
<td>27</td>
<td>Axis independent machine control information 2 Not possible</td>
</tr>
<tr>
<td>28</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Common variable value 1 Possible</td>
</tr>
<tr>
<td>30</td>
<td>Local variable value Possible</td>
</tr>
<tr>
<td>31</td>
<td>Tool compensation amount Possible</td>
</tr>
<tr>
<td>32</td>
<td>Common variable value 2 Possible</td>
</tr>
<tr>
<td>180</td>
<td>J2-CT parameter Possible (partially not possible)</td>
</tr>
</tbody>
</table>

(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

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.

<table>
<thead>
<tr>
<th>Search No.</th>
<th>Data type</th>
<th>Sub-section No.</th>
<th>Size (bytes)</th>
<th>Write</th>
<th>System/axis designation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>Maximum spindle speed (Gear 1st step)</td>
<td>8960</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum spindle speed (Gear 2nd step)</td>
<td>8964</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum spindle speed (Gear 3rd step)</td>
<td>8968</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum spindle speed (Gear 4th step)</td>
<td>8972</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
</tbody>
</table>

### 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 based on this value and the commanded S command.

During tapping, the maximum speed will be the spindle tap speed.

(Note) This is not the sub-section No.
### Sub-section No. list

<table>
<thead>
<tr>
<th>Search No.</th>
<th>Data type</th>
<th>Sub-section No.</th>
<th>Size (bytes)</th>
<th>Write</th>
<th>System/axis designation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>Maximum spindle speed (Gear 1st step)</td>
<td>8960</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum spindle speed (Gear 2nd step)</td>
<td>8964</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum spindle speed (Gear 3rd step)</td>
<td>8968</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum spindle speed (Gear 4th step)</td>
<td>8972</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td>1-11</td>
<td>Spindle limit speed (Gear 1st step)</td>
<td>8976</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spindle limit speed (Gear 2nd step)</td>
<td>8980</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spindle limit speed (Gear 3rd step)</td>
<td>8984</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spindle limit speed (Gear 4th step)</td>
<td>8988</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td>1-13</td>
<td>Spindle shift speed (Gear 1st step)</td>
<td>9008</td>
<td>2</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spindle shift speed (Gear 2nd step)</td>
<td>9010</td>
<td>2</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spindle shift speed (Gear 3rd step)</td>
<td>9012</td>
<td>2</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spindle shift speed (Gear 4th step)</td>
<td>9014</td>
<td>2</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td>1-15</td>
<td>Monitor speed for speed monitoring (Spindle 1)</td>
<td>50223</td>
<td>2</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monitor speed for speed monitoring (Spindle 2)</td>
<td>51223</td>
<td>2</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monitor speed for speed monitoring (Spindle 3)</td>
<td>52223</td>
<td>2</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monitor speed for speed monitoring (Spindle 4)</td>
<td>53223</td>
<td>2</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td>1-20</td>
<td>Spindle orient speed</td>
<td>9024</td>
<td>2</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td>1-21</td>
<td>Minimum spindle speed</td>
<td>9026</td>
<td>2</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td>1-50</td>
<td>Method selection parameter (1)</td>
<td></td>
<td>195</td>
<td>1</td>
<td>Not possible</td>
<td>Invalid/Invalid</td>
</tr>
<tr>
<td></td>
<td>BIT0 :</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIT1 :</td>
<td></td>
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<tr>
<td></td>
<td>BIT2 :</td>
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<td>BIT3 :</td>
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<td>BIT4 :</td>
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<td></td>
<td>BIT5 :</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>BIT6 : Synchronous tapping</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIT7 :</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-52</td>
<td>Method selection parameter (3)</td>
<td></td>
<td>130</td>
<td>1</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
</tr>
<tr>
<td></td>
<td>BIT0 :</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIT1 : Tool compensation method (Tabsmv)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIT2 :</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIT3 :</td>
<td></td>
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<td></td>
<td>BIT4 :</td>
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<tr>
<td></td>
<td>BIT5 :</td>
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<td></td>
<td>BIT6 :</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>BIT7 :</td>
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<td>Extended workpiece coordinate system offset [45]</td>
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### Section No. 5

#### Alarm information

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### Section No. ACT 11 PCB 15

Axis common non-modal information in block being executed (ACT) and in next block (PCB)

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<td>3 : Circular interpolation (CW)</td>
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<td>22 : Skip function</td>
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<td>29 : Coordinate system setting</td>
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### Section No. ACT 12 PCB 16

Axis independent non-modal information in block being executed (ACT) and in next block (PCB)

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4. Sub-section No. List

Axis common modal information in block being executed (ACT) and in next block (PCB)

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### 4. Sub-section No. List

**Section No. ACT 14 PCB 18**

Axis independent modal information in block being executed (ACT) and in next block (PCB)

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<th>Remarks</th>
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<td>Workpiece offset amount</td>
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<td>Tool length shape offset amount</td>
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**Section No. 20**

Axis common machine control information 1

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<td>20-10</td>
<td>Automatic effective feedrate</td>
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<td>Valid/Invalid</td>
<td>Effective speed of feed direction</td>
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<td>20-11</td>
<td>Manual effective feedrate</td>
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<td>Valid/Invalid</td>
<td>Effective speed of axis direction</td>
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<td>In-position</td>
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## Axis independent machine control information 1

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<th>Remarks</th>
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<tr>
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<td>Current position in machine coordinate system (Machine position)</td>
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<td>Valid/Valid</td>
<td>When manual ABS switch is OFF</td>
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<td>Manual interrupt amount (1)</td>
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<td>Manual interrupt amount (2)</td>
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<td>21-20</td>
<td>Current position in workpiece coordinate system</td>
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<td>Not possible</td>
<td>Valid/Valid</td>
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<td>21-30</td>
<td>Current position in workpiece coordinate system during skip ON</td>
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<td>Valid/Valid</td>
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<td>21-31</td>
<td>Current position in machine coordinate system during skip ON</td>
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<td>Remaining distance during skip ON</td>
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<td>Current position in machine coordinate system during manual skip ON</td>
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<td>Command position in machine coordinate system</td>
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<td>4</td>
<td>Not possible</td>
<td>Valid/Valid</td>
<td></td>
</tr>
<tr>
<td>21-41</td>
<td>Current value B</td>
<td>20003</td>
<td>4</td>
<td>Not possible</td>
<td>Valid/Valid</td>
<td></td>
</tr>
<tr>
<td>21-42</td>
<td>Axis name</td>
<td>20004</td>
<td>4</td>
<td>Not possible</td>
<td>Valid/Valid</td>
<td>Designate ASCII code with a hexadecimal</td>
</tr>
<tr>
<td>21-43</td>
<td>Increment command axis name</td>
<td>20005</td>
<td>4</td>
<td>Not possible</td>
<td>Valid/Valid</td>
<td>Designate ASCII code with a hexadecimal</td>
</tr>
<tr>
<td>21-44</td>
<td>2nd axis name</td>
<td>20006</td>
<td>4</td>
<td>Not possible</td>
<td>Valid/Valid</td>
<td>Designate ASCII code with a hexadecimal</td>
</tr>
</tbody>
</table>
### Section No. 22
**Information input from PLC to controller**

<table>
<thead>
<tr>
<th>Search No.</th>
<th>Data type</th>
<th>Sub-section No.</th>
<th>Size (bytes)</th>
<th>Write</th>
<th>System/axis designation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>22-10</td>
<td>Emergency stop causes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIT0 : Built-in PLC Stop state</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIT1 : External PLC &quot;FROM,TO&quot; command not executed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIT2 : External PLC Not ready</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIT3 : External PLC Renewal error</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIT4 : Control unit EMG connector Emergency stop state</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIT5 :</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIT6 : Built-in PLC Software emergency stop output device Y29F is &quot;1&quot;.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIT7 :</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>BIT8 :</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>BIT9 :</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BITA :</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>BITB : User PLC Illegal codes exist.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>BITC : PLC high-speed processing error</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BITD : Door interlock, dog/OT arbitrary allocation device illegal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BITE : Spindle drive unit emergency stop output</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BITF : Servo drive unit emergency stop output</td>
<td></td>
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</tr>
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</table>

### Section No. 23
**Information output from controller to PLC**

<table>
<thead>
<tr>
<th>Search No.</th>
<th>Data type</th>
<th>Sub-section No.</th>
<th>Size (bytes)</th>
<th>Write</th>
<th>System/axis designation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>23-10</td>
<td>Spindle command speed (effective value)</td>
<td>48</td>
<td>4</td>
<td>Not possible</td>
<td>Valid/Invalid</td>
<td>Including override</td>
</tr>
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</table>

### Section No. 24
**Cumulative time data**

<table>
<thead>
<tr>
<th>Search No.</th>
<th>Data type</th>
<th>Sub-section No.</th>
<th>Size (bytes)</th>
<th>Write</th>
<th>System/axis designation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>24-1</td>
<td>Power ON time</td>
<td>0</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td>24-2</td>
<td>Automatic operation time</td>
<td>4</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td>24-3</td>
<td>Automatic start up time</td>
<td>8</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td>24-4</td>
<td>External cumulative time 1</td>
<td>12</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
<tr>
<td>24-5</td>
<td>External cumulative time 2</td>
<td>16</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td></td>
</tr>
</tbody>
</table>
### Axis common machine control information 2

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

### Axis independent machine control information 2

<table>
<thead>
<tr>
<th>Search No.</th>
<th>Data type</th>
<th>Sub-section No.</th>
<th>Size (bytes)</th>
<th>Write</th>
<th>System/axis designation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>27-10</td>
<td>Smoothing status, servo status</td>
<td>74</td>
<td>2</td>
<td>Not possible</td>
<td>Valid/Valid</td>
<td></td>
</tr>
<tr>
<td>27-20</td>
<td>Servo delay amount</td>
<td>308</td>
<td>4</td>
<td>Not possible</td>
<td>Valid/Valid</td>
<td></td>
</tr>
<tr>
<td>27-30</td>
<td>Feed axis motor load A (%)</td>
<td>328</td>
<td>2</td>
<td>Not possible</td>
<td>Valid/Valid</td>
<td></td>
</tr>
<tr>
<td>27-31</td>
<td>Feed axis motor load B (%)</td>
<td>330</td>
<td>2</td>
<td>Not possible</td>
<td>Valid/Valid</td>
<td></td>
</tr>
<tr>
<td>27-33</td>
<td>Feed axis motor speed (r/min)</td>
<td>312</td>
<td>2</td>
<td>Not possible</td>
<td>Valid/Valid</td>
<td></td>
</tr>
</tbody>
</table>
### Section No. 29: Common variable value 1

<table>
<thead>
<tr>
<th>Search No.</th>
<th>Data type</th>
<th>Sub-section No.</th>
<th>Size (bytes)</th>
<th>Write</th>
<th>System/axis designation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>29-10</td>
<td>Variable command 100 sets</td>
<td>500 to 549</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td>System common variables</td>
</tr>
<tr>
<td></td>
<td>Variable command 200 sets</td>
<td>500 to 599</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td>System common variables</td>
</tr>
<tr>
<td></td>
<td>Variable command 300 sets</td>
<td>500 to 699</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td>System common variables</td>
</tr>
<tr>
<td></td>
<td>Variable command 600 sets</td>
<td>500 to 999</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td>System common variables</td>
</tr>
<tr>
<td></td>
<td>(2-system) Variable command $50 + 50\times 2$ sets</td>
<td>500 to 549</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td>System common variables</td>
</tr>
<tr>
<td></td>
<td>(2-system) Variable command $100 + 100\times 2$ sets</td>
<td>500 to 599</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
<td>System common variables</td>
</tr>
</tbody>
</table>

### Section No. 30: Local variable value

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

### Section No. 31: Tool compensation amount

<table>
<thead>
<tr>
<th>Search No.</th>
<th>Data type</th>
<th>Sub-section No.</th>
<th>Size (bytes)</th>
<th>Write</th>
<th>System/axis designation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>31-10</td>
<td>Tool compensation amount 1</td>
<td>1 to 400</td>
<td>4</td>
<td>Possible</td>
<td>Valid/Invalid</td>
<td>The contents will differ according to the type of tool offset memory.</td>
</tr>
<tr>
<td>31-20</td>
<td>Tool compensation amount 2</td>
<td>1001 to 1400</td>
<td>4</td>
<td>Possible</td>
<td>Valid/Invalid</td>
<td></td>
</tr>
<tr>
<td>31-30</td>
<td>Tool compensation amount 3</td>
<td>6001 to 6400</td>
<td>4</td>
<td>Possible</td>
<td>Valid/Invalid</td>
<td></td>
</tr>
<tr>
<td>31-40</td>
<td>Tool compensation amount 4</td>
<td>7001 to 7400</td>
<td>4</td>
<td>Possible</td>
<td>Valid/Invalid</td>
<td></td>
</tr>
<tr>
<td>31-100</td>
<td>X axis tool length compensation amount</td>
<td>1 to 40</td>
<td>4</td>
<td>Possible</td>
<td>Valid/Invalid</td>
<td>The contents will differ according to the type of tool offset memory.</td>
</tr>
<tr>
<td>31-110</td>
<td>X axis wear compensation amount</td>
<td>1001 to 1040</td>
<td>4</td>
<td>Possible</td>
<td>Valid/Invalid</td>
<td></td>
</tr>
<tr>
<td>31-120</td>
<td>3rd axis tool length compensation amount</td>
<td>2001 to 2040</td>
<td>4</td>
<td>Possible</td>
<td>Valid/Invalid</td>
<td></td>
</tr>
<tr>
<td>31-130</td>
<td>3rd axis wear compensation amount</td>
<td>3001 to 3040</td>
<td>4</td>
<td>Possible</td>
<td>Valid/Invalid</td>
<td></td>
</tr>
<tr>
<td>31-140</td>
<td>Z axis tool length compensation amount</td>
<td>4001 to 4040</td>
<td>4</td>
<td>Possible</td>
<td>Valid/Invalid</td>
<td></td>
</tr>
<tr>
<td>31-150</td>
<td>Z axis wear compensation amount</td>
<td>5001 to 5040</td>
<td>4</td>
<td>Possible</td>
<td>Valid/Invalid</td>
<td></td>
</tr>
<tr>
<td>31-160</td>
<td>Nose R compensation amount</td>
<td>6001 to 6040</td>
<td>4</td>
<td>Possible</td>
<td>Valid/Invalid</td>
<td></td>
</tr>
<tr>
<td>31-170</td>
<td>Nose R wear compensation amount</td>
<td>7001 to 7040</td>
<td>4</td>
<td>Possible</td>
<td>Valid/Invalid</td>
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<tr>
<td>31-180</td>
<td>Hypothetical nose No.</td>
<td>8001 to 8040</td>
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### Section No. 32

**Common variable value 2**

<table>
<thead>
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<th>Size (bytes)</th>
<th>Write</th>
<th>System/axis designation</th>
<th>Remarks</th>
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<tbody>
<tr>
<td></td>
<td>Variable command 100 sets</td>
<td>100 to 149</td>
<td>4</td>
<td>Possible</td>
<td>Valid/Invalid</td>
</tr>
<tr>
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<td>Variable command 200 sets</td>
<td>100 to 199</td>
<td>4</td>
<td>Possible</td>
<td>Valid/Invalid</td>
</tr>
<tr>
<td></td>
<td>Variable command 300 sets</td>
<td>100 to 199</td>
<td>4</td>
<td>Possible</td>
<td>Valid/Invalid</td>
</tr>
<tr>
<td></td>
<td>Variable command 600 sets</td>
<td>100 to 199</td>
<td>4</td>
<td>Possible</td>
<td>Valid/Invalid</td>
</tr>
<tr>
<td></td>
<td>(2-system) Variable command 50 + 50*2 sets</td>
<td>100 to 149</td>
<td>4</td>
<td>Possible</td>
<td>Valid/Invalid</td>
</tr>
<tr>
<td></td>
<td>(2-system) Variable command 100 + 100*2 sets</td>
<td>100 to 199</td>
<td>4</td>
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<td>Valid/Invalid</td>
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### Section No. 180

**J2-CT parameter**

<table>
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<tr>
<th>Search No.</th>
<th>Sub-section No.</th>
<th>Size (bytes)</th>
<th>Write</th>
<th>System/axis designation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>180-10</td>
<td>station: No. of indexing stations</td>
<td>18</td>
<td>2</td>
<td>Possible</td>
<td>Invalid /Valid</td>
</tr>
<tr>
<td>180-11</td>
<td>Cont1: Control parameter 1</td>
<td>2</td>
<td>2</td>
<td>Possible</td>
<td>Invalid /Valid</td>
</tr>
<tr>
<td>180-12</td>
<td>Cont2: Control parameter 2</td>
<td>1</td>
<td>1</td>
<td>Possible</td>
<td>Invalid /Valid</td>
</tr>
<tr>
<td>180-13</td>
<td>Emgcont: Emergency stop control</td>
<td>10</td>
<td>1</td>
<td>Possible</td>
<td>Invalid /Valid</td>
</tr>
<tr>
<td>180-14</td>
<td>tleng: Linear axis stroke length</td>
<td>36</td>
<td>4</td>
<td>Possible</td>
<td>Invalid /Valid</td>
</tr>
<tr>
<td>180-15</td>
<td>ZRNspeed: Reference point return speed</td>
<td>64</td>
<td>4</td>
<td>Possible</td>
<td>Invalid /Valid</td>
</tr>
<tr>
<td>180-16</td>
<td>EZRNcreep: Reference point return creep speed</td>
<td>26</td>
<td>2</td>
<td>Possible</td>
<td>Invalid /Valid</td>
</tr>
<tr>
<td>180-17</td>
<td>grid mask: Grid mask</td>
<td>24</td>
<td>2</td>
<td>Possible</td>
<td>Invalid /Valid</td>
</tr>
<tr>
<td>180-18</td>
<td>grspc: Grid spacing</td>
<td>13</td>
<td>1</td>
<td>Possible</td>
<td>Invalid /Valid</td>
</tr>
<tr>
<td>180-19</td>
<td>ZRNahift: Reference point shift amount</td>
<td>30</td>
<td>2</td>
<td>Possible</td>
<td>Invalid /Valid</td>
</tr>
<tr>
<td>180-20</td>
<td>ST.offset: Station offset</td>
<td>60</td>
<td>4</td>
<td>Possible</td>
<td>Invalid /Valid</td>
</tr>
<tr>
<td>180-21</td>
<td>ABSBase: Absolute position zero point</td>
<td>52</td>
<td>4</td>
<td>Possible</td>
<td>Invalid /Valid</td>
</tr>
<tr>
<td>180-22</td>
<td>Limit(+): Soft limit (+)</td>
<td>44</td>
<td>4</td>
<td>Possible</td>
<td>Invalid /Valid</td>
</tr>
</tbody>
</table>
## 4. Sub-section No. List

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

**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

<table>
<thead>
<tr>
<th>Section No.</th>
<th>Parameters common to each axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Search No.</th>
<th>Data type</th>
<th>Sub-section No.</th>
<th>Size (bytes)</th>
<th>Write</th>
<th>System/axis designation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) 1-10</td>
<td>Maximum spindle speed (Gear 1st step)</td>
<td>(1)</td>
<td>8960</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
</tr>
<tr>
<td></td>
<td>Maximum spindle speed (Gear 2nd step)</td>
<td></td>
<td>8964</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
</tr>
<tr>
<td></td>
<td>Maximum spindle speed (Gear 3rd step)</td>
<td></td>
<td>8968</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
</tr>
<tr>
<td></td>
<td>Maximum spindle speed (Gear 4th step)</td>
<td></td>
<td>8972</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
</tr>
<tr>
<td>1-11</td>
<td>Spindle limit speed (Gear 1st step)</td>
<td></td>
<td>8976</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
</tr>
<tr>
<td></td>
<td>Spindle limit speed (Gear 2nd step)</td>
<td></td>
<td>8980</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
</tr>
<tr>
<td></td>
<td>Spindle limit speed (Gear 3rd step)</td>
<td></td>
<td>8984</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
</tr>
<tr>
<td></td>
<td>Spindle limit speed (Gear 4th step)</td>
<td></td>
<td>8988</td>
<td>4</td>
<td>Possible</td>
<td>Invalid/Invalid</td>
</tr>
</tbody>
</table>

---

### 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.
5.2 Data unit system

The unit system indicated in this manual is shown below.

<table>
<thead>
<tr>
<th>Unit system</th>
<th>B (1 µm system)</th>
<th>C (0.1 µm system)</th>
<th>D (0.01 µm system)</th>
<th>Selection parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input unit</td>
<td>mm</td>
<td>0.001</td>
<td>0.00001</td>
<td>Setup parameter</td>
</tr>
<tr>
<td></td>
<td>inch</td>
<td>0.0001</td>
<td>0.00001</td>
<td>Basic specification parameter #1041 I_inch = 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output unit</td>
<td>mm</td>
<td>0.0005</td>
<td>0.00005</td>
<td>Setup parameter</td>
</tr>
<tr>
<td>(Detection unit)</td>
<td>inch</td>
<td>0.00005</td>
<td>0.000005</td>
<td>Basic specification parameter #1061 iout = 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machine constant</td>
<td>mm</td>
<td>0.001</td>
<td>0.0001</td>
<td>Setup parameter</td>
</tr>
<tr>
<td>input unit</td>
<td>inch</td>
<td>0.0001</td>
<td>0.00001</td>
<td>Basic specification parameter #1040 M_inch = 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(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.

<table>
<thead>
<tr>
<th>1-10</th>
<th>Maximum spindle speed (Gear 1st step to gear 4th step)</th>
</tr>
</thead>
</table>

**[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.

<table>
<thead>
<tr>
<th>1-11</th>
<th>Spindle limit speed (Gear 1st step to gear 4th step)</th>
</tr>
</thead>
</table>

**[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.

\[
\text{Spindle speed data} = \frac{S_d_1d_2d_3d_4}{\text{slimt } n} \times \frac{\text{SOVR}}{100}
\]

- \( \text{slimt } n \): Spindle limit speed of corresponding gear step determined with spindle gear selection input (n: 1~4)
- \( S_d_1d_2d_3d_4 \): Spindle speed (S) command
- \( \text{SOVR} \): 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

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

[Data definition]
When changing the spindle gears, the spindle motor is run slowly at a constant speed to make the changeover operation smooth. This parameter is used to designate the speed at that time. (This corresponds to the setup parameter, spindle parameter "#3009 ssift1" to "#3012 ssift4".) The CNC determines the corresponding spindle shift speed with the spindle gear selection input (Y…) output from the PLC.

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

- \(\text{slimt } n\): Spindle limit speed of corresponding gear step determined with spindle gear selection input (n: 1~4)
- \(\text{ssift } n\): 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).

1-15 Monitor speed for speed monitoring (Spindle 1 to 4)

[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).

1-20 Spindle orient speed

[Data definition]
This parameter is used to rotate the spindle at a slow constant speed when carrying out spindle orientation (orient position stop). (This corresponds to the setup parameter, spindle parameter "#3021 sori".)

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

- \(\text{sori}\): Spindle orient speed
- \(\text{slimt } n\): 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

1-21 Minimum spindle speed

[Data definition]
This parameter specifies the minimum spindle speed value.
If the S command issued is a spindle speed lower than this parameter value or if the results of the spindle override are lower than this parameter value, the spindle will be rotated at this minimum spindle speed.
(This corresponds to the setup parameter, spindle parameter "#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).

1-50 Method selection parameter (1)

[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").

1-52 Method selection parameter (3)

[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

<table>
<thead>
<tr>
<th>1-53</th>
<th>Method selection parameter (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>[Data definition]</strong></td>
<td>The following parameters are set in bit units.</td>
</tr>
<tr>
<td><strong>[Data unit, range]</strong></td>
<td>The setting range is 0 to 255 (binary). The set data could affect the other bits, so take care when setting.</td>
</tr>
</tbody>
</table>

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".)

<table>
<thead>
<tr>
<th>1-54</th>
<th>Method selection parameter (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>[Data definition]</strong></td>
<td>The following parameters are set in bit units.</td>
</tr>
<tr>
<td><strong>[Data unit, range]</strong></td>
<td>The setting range is 0 to 255 (binary). The set data could affect the other bits, so take care when setting.</td>
</tr>
</tbody>
</table>

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".)

<table>
<thead>
<tr>
<th>1-55</th>
<th>Method selection parameter (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>[Data definition]</strong></td>
<td>The following parameters are set in bit units.</td>
</tr>
<tr>
<td><strong>[Data unit, range]</strong></td>
<td>The setting range is 0 to 255 (binary). The set data could affect the other bits, so take care when setting.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>1-80</th>
<th>Alternate M code valid</th>
</tr>
</thead>
</table>

**[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").

<table>
<thead>
<tr>
<th>1-81</th>
<th>G0 non-interpolation</th>
</tr>
</thead>
</table>

**[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").

<table>
<thead>
<tr>
<th>1-90</th>
<th>Display language</th>
</tr>
</thead>
</table>

**[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 (Precaution (1)) (Option)
- 3: Fourth language displayed (Precaution (1)) (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

1-91 Edit type

[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).

1-110 Input setting unit

[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: 1µm, C: 0.1µm, D: 10nm
Set as a hexadecimal ASCII code.

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

1-120 R COMP

[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.
### 1-121 DCC ANGLE

**[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.

![Diagram](https://via.placeholder.com/150)

If the set value is smaller than \( \theta \), the speed goes down to optimize the corner.

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

**[Data unit, range]**
Set with a degree(°) 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.

### 1-122 COMP CHANGE

**[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.

### 1-123 CORNER COMP

**[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

1-124  CURVE COMP

[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  SPLINE ON

[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  CANCEL ANG.

[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.
### 1-127 Toler-1

**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 µm) 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.

### 1-128 Toler-2

**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 µm) 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.

### 1-129 MINUTE LENGTH

**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.
### 1-130 Fairing parameters

**[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").

### 1-131 CorJudgeL

**[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.

### 1-132 FairingL

**[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

<table>
<thead>
<tr>
<th>1-140</th>
<th>Pre-interpolation acceleration/deceleration maximum speed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>[Data definition]</strong></td>
<td>This parameter sets the cutting feedrate for the pre-interpolation acceleration/deceleration. (This corresponds to the setup parameter, basic specification parameter &quot;#1206 G1bF&quot;).</td>
</tr>
<tr>
<td><strong>[Data unit, range]</strong></td>
<td>Set with a mm/min unit within the range of 1 to 999999.</td>
</tr>
<tr>
<td><strong>[Precaution]</strong></td>
<td>This parameter is validated immediately after setting (writing). However, if it is changed during the high-accuracy modal, the operation will not be guaranteed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1-141</th>
<th>Pre-interpolation acceleration/deceleration time constant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>[Data definition]</strong></td>
<td>This parameter sets the cutting feed time constant for pre-interpolation acceleration/deceleration.</td>
</tr>
<tr>
<td><img src="speed_time.png" alt="Diagram" /></td>
<td>Speed G1bF G1btL Time</td>
</tr>
<tr>
<td><strong>(This corresponds to the setup parameter, basic specification parameter &quot;#1207 G1btL&quot;).</strong></td>
<td></td>
</tr>
<tr>
<td><strong>[Data unit, range]</strong></td>
<td>Set with a ms unit within the range of 1 to 5000.</td>
</tr>
<tr>
<td><strong>[Precaution]</strong></td>
<td>This parameter is validated immediately after setting (writing). However, if it is changed during the high-accuracy modal, the operation will not be guaranteed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1-150</th>
<th>Arc command overlap</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>[Data definition]</strong></td>
<td>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.</td>
</tr>
<tr>
<td>0 :</td>
<td>Do not overlap arc command blocks.</td>
</tr>
<tr>
<td>1 :</td>
<td>Overlap arc command blocks. (Eliminate the speed fluctuation) (This corresponds to the setup parameter, basic specification parameter &quot;#1572 Cirorp&quot;).</td>
</tr>
<tr>
<td><strong>[Data unit, range]</strong></td>
<td>Set within the range of 0 to 1.</td>
</tr>
<tr>
<td><strong>[Precaution]</strong></td>
<td>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.</td>
</tr>
</tbody>
</table>
5. Explanation of Read/Write Data
5.3  Explanation of data details

1-160  Feed forward filter

[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).

1-170  SSS control parameters

[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").

1-171  StdLength

[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.
### 5.3 Explanation of data details

#### 1-172 ClampCoeff

**[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 "#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.

#### 1-173 StepLeng

**[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.

#### 1-174 DccWaitAdd

**[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

<table>
<thead>
<tr>
<th>1-175</th>
<th>Tolerance</th>
</tr>
</thead>
</table>

[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.

<table>
<thead>
<tr>
<th>1-200</th>
<th>Position switches [1] to [24] (System 1, 2)</th>
</tr>
</thead>
</table>

[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.

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

TP : Position loop time constant (\(\frac{1}{\text{PGN}}\) [s])
2-10  Axis n  1st to 4th reference point coordinates

[Data definition]
The 1st reference point, 2nd reference point, 3rd reference point and 4th reference point using 0 of
the basic machine coordinates as the base point can be set for each axis with these parameters.
(This corresponds to the setup parameter, reference point return parameters "#2037 G53ofs" to
"#2040 #4_rfp").

![Diagram of basic machine coordinates with reference points]

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

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

2-11  Axis n  Stored stroke limit I (+), (-) ..... For machine maker

[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+").

![Diagram of basic machine coordinate system with OT- and OT+]

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

[Precaution]
This setting is validated immediately after setting (writing). (Note that this is only when the axis
movement is stopped.)
5. Explanation of Read/Write Data
5.3 Explanation of data details

<table>
<thead>
<tr>
<th>2-20</th>
<th>Axis n</th>
<th>Movement control parameters</th>
</tr>
</thead>
</table>

[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").
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").

<table>
<thead>
<tr>
<th>2-30</th>
<th>Axis n</th>
<th>Reference point return approach speed</th>
</tr>
</thead>
</table>

[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

<table>
<thead>
<tr>
<th>2-35</th>
<th>Axis n</th>
<th>Reference point return shift amount</th>
</tr>
</thead>
</table>

[**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).

<table>
<thead>
<tr>
<th>2-36</th>
<th>Axis n</th>
<th>Rapid traverse backlash amount</th>
</tr>
</thead>
</table>

[**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

<table>
<thead>
<tr>
<th>2-37</th>
<th>Axis n</th>
<th>Cutting feed backlash amount</th>
</tr>
</thead>
</table>

[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).

<table>
<thead>
<tr>
<th>2-40</th>
<th>Axis n</th>
<th>Stored stroke limit II (+), (-) .... For user</th>
</tr>
</thead>
</table>

[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").

![Basic machine coordinate system]

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

[Precaution]
This setting is validated immediately after setting (writing). (Note that this is only when the axis movement is stopped.)
### 2-50 Axis n Cutting feed time constant G1t

**[Data definition]**
Set up the primary-delay time constant for the acceleration and deceleration in the cutting feed mode. This can be set for each axis with the parameter. (This corresponds to the setup parameter, axis specifications parameter G1t1. When acceleration or deceleration by software is selected, the second stage time constant is used in "#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.)

### 2-51 Axis n Current limit value 2

**[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 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.)

### 2-52 Axis n Current limit value 1

**[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

2-60 Positive direction sensor of tool setter

[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 tlml+".)

[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).

2-61 Negative direction sensor of tool setter or TLM standard length

[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 tlml-".)

[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).

2-62 Axis n Feed forward gain

[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).
### 2-70 Axis n Minimum corner deceleration speed

**[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.

### 2-80 Rapid traverse rate

**[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).

### 2-90 G28 rapid traverse rate

**[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).
### 3-10 Compensation basic axis number

**[Data definition]**
- Specify the basic axis address for machine error compensation.
- For pitch error compensation, set the name of the axis to be compensated.
- For relative position compensation, set the name of the axis to be the base axis.
- In the 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.)

### 3-11 Compensation direction axis number

**[Data definition]**
- Specify the compensation axis address for machine error compensation.
- For pitch error compensation, set the same axis name as #4001 cmpax.
- For relative position compensation, set the name of the axis to be actually compensated.
- In the 2-system, set "system No. + axis name".
  (This corresponds to the setup parameter, machine compensation parameter "#4002 drcax").

**[Data unit, range]**
- Set the axis address of X, Y, Z, U, V, W, A, B, or C etc.

**[Precaution]**
- This setting is validated immediately after setting (writing). (Note that this is only when the axis movement is stopped.)

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

**[Data definition]**
- Set the compensation data No. corresponding to the reference point position. The reference point is actually the base, so there is no compensation No. Set the number that is decremented by 1.
  (This corresponds to the setup parameter, machine compensation parameter "#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

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-13</td>
<td>Division point number at the most negative side</td>
</tr>
</tbody>
</table>

**[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.)

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-14</td>
<td>Division point number at the most positive side</td>
</tr>
</tbody>
</table>

**[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.)

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-15</td>
<td>Compensation scale factor</td>
</tr>
</tbody>
</table>

**[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

| 3-16 | Division interval |

[Data definition]
Set the interval to divide the basic axis. Each compensation data will be the compensation amount for each of these intervals. (This corresponds to the setup parameter, machine compensation parameter "#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.)

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

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

[Data unit, range]

<table>
<thead>
<tr>
<th>Input unit system</th>
<th>Linear axis</th>
<th>Rotary axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input unit (metric)</td>
<td>Input unit (inch)</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>0.0005 mm</td>
<td>0.00005 inch</td>
</tr>
<tr>
<td>C</td>
<td>0.00005 mm</td>
<td>0.000005 inch</td>
</tr>
<tr>
<td>D</td>
<td>0.000005 mm</td>
<td>0.0000005 inch</td>
</tr>
</tbody>
</table>

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

4-16 Axis n External workpiece coordinate system offset

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

[Data unit, range]

<table>
<thead>
<tr>
<th>Input unit system</th>
<th>Linear axis</th>
<th>Rotary axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>(iunit)</td>
<td>Input unit (metric)</td>
<td>Input unit (inch)</td>
</tr>
<tr>
<td>B</td>
<td>0.0005 mm</td>
<td>0.00005 inch</td>
</tr>
<tr>
<td>C</td>
<td>0.00005 mm</td>
<td>0.000005 inch</td>
</tr>
<tr>
<td>D</td>
<td>0.000005 mm</td>
<td>0.000005 °</td>
</tr>
</tbody>
</table>

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.

4-17 Axis n Extended workpiece coordinate system offset [1 to 48]

[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]

<table>
<thead>
<tr>
<th>Input unit system</th>
<th>Linear axis</th>
<th>Rotary axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>(iunit)</td>
<td>Input unit (metric)</td>
<td>Input unit (inch)</td>
</tr>
<tr>
<td>B</td>
<td>0.0005 mm</td>
<td>0.00005 inch</td>
</tr>
<tr>
<td>C</td>
<td>0.00005 mm</td>
<td>0.000005 inch</td>
</tr>
<tr>
<td>D</td>
<td>0.000005 mm</td>
<td>0.000005 °</td>
</tr>
</tbody>
</table>

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

[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

<table>
<thead>
<tr>
<th>Sub-section No.</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Alarm No. main (2-byte)</td>
</tr>
<tr>
<td>18</td>
<td>Alarm attribute (2-byte) bit F 0: No alarm 1: Alarm has occurred</td>
</tr>
<tr>
<td>20</td>
<td>Alarm No. sub 1 (2-byte)</td>
</tr>
<tr>
<td>22</td>
<td>Alarm No. sub 2 (2-byte)</td>
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(2) Alarm contents

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

(Continued on next page)
## 5. Explanation of Read/Write Data
### 5.3  Explanation of data details

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

(Continued on next page)
### 5. Explanation of Read/Write Data

#### 5.3  Explanation of data details

<table>
<thead>
<tr>
<th>Alarm No. Main</th>
<th>Alarm No. Sub 1</th>
<th>Alarm No. Sub 2</th>
<th>Alarm contents</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>50</td>
<td></td>
<td>Overload 1</td>
</tr>
<tr>
<td>1</td>
<td>51</td>
<td></td>
<td>Overload 2</td>
</tr>
<tr>
<td>1</td>
<td>52</td>
<td></td>
<td>Excessive error 1</td>
</tr>
<tr>
<td>1</td>
<td>53</td>
<td></td>
<td>Excessive error 2</td>
</tr>
<tr>
<td>1</td>
<td>54</td>
<td></td>
<td>Excessive error 3</td>
</tr>
<tr>
<td>1</td>
<td>55</td>
<td></td>
<td>External emergency stop error</td>
</tr>
<tr>
<td>1</td>
<td>57</td>
<td></td>
<td>Option error</td>
</tr>
<tr>
<td>1</td>
<td>58</td>
<td></td>
<td>Collision detection 1: G0</td>
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<tr>
<td>1</td>
<td>59</td>
<td></td>
<td>Collision detection 1: G1</td>
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<tr>
<td>1</td>
<td>5A</td>
<td></td>
<td>Collision detection 2</td>
</tr>
<tr>
<td>1</td>
<td>5C</td>
<td></td>
<td>Orientation feedback error</td>
</tr>
<tr>
<td>1</td>
<td>5D</td>
<td></td>
<td>Speed monitoring: Input mismatch</td>
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<tr>
<td>2</td>
<td>5E</td>
<td></td>
<td>Speed monitoring: Feedback speed error</td>
</tr>
<tr>
<td>1</td>
<td>5F</td>
<td></td>
<td>External contactor welding</td>
</tr>
<tr>
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<td>61</td>
<td></td>
<td>Power module overcurrent</td>
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<tr>
<td>1</td>
<td>62</td>
<td></td>
<td>Frequency error</td>
</tr>
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<td>1</td>
<td>63</td>
<td></td>
<td>Supplementary regeneration error</td>
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<tr>
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<td>65</td>
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<td>Rush relay error</td>
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<td>1</td>
<td>67</td>
<td></td>
<td>Phase interruption</td>
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<td>1</td>
<td>68</td>
<td></td>
<td>Watchdog</td>
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<td>1</td>
<td>69</td>
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<td>Grounding</td>
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<td>6A</td>
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<td>External contactor welding</td>
</tr>
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<td>6B</td>
<td></td>
<td>Rush relay welding</td>
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<tr>
<td>1</td>
<td>6C</td>
<td></td>
<td>Main circuit error</td>
</tr>
<tr>
<td>1</td>
<td>6D</td>
<td></td>
<td>Parameter error</td>
</tr>
<tr>
<td>1</td>
<td>6E</td>
<td></td>
<td>Memory error</td>
</tr>
<tr>
<td>1</td>
<td>6F</td>
<td></td>
<td>Power supply error</td>
</tr>
<tr>
<td>1</td>
<td>71</td>
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<td>Instantaneous power interruption</td>
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<tr>
<td>1</td>
<td>73</td>
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<td>Over regeneration</td>
</tr>
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<td>1</td>
<td>74</td>
<td></td>
<td>Regenerative resistor overheat</td>
</tr>
<tr>
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<td>75</td>
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<td>Overvoltage</td>
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<td>76</td>
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<td>External emergency stop setting error</td>
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<tr>
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<td>77</td>
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<td>Power module overheat</td>
</tr>
<tr>
<td>1</td>
<td>7F</td>
<td></td>
<td>Drive unit power supply restart request</td>
</tr>
</tbody>
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(Continued on next page)
## 5. Explanation of Read/Write Data
### 5.3 Explanation of data details

<table>
<thead>
<tr>
<th>Alarm No. Main</th>
<th>Alarm No. Sub 1</th>
<th>Alarm No. Sub 2</th>
<th>Alarm contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>80</td>
<td></td>
<td>Detector converting unit 1: Connection error</td>
</tr>
<tr>
<td>1</td>
<td>81</td>
<td></td>
<td>Detector converting unit 1: Communication error</td>
</tr>
<tr>
<td>1</td>
<td>83</td>
<td></td>
<td>Detector converting unit 1: Judgment error</td>
</tr>
<tr>
<td>1</td>
<td>84</td>
<td></td>
<td>Detector converting unit 1: CPU error</td>
</tr>
<tr>
<td>1</td>
<td>85</td>
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<td>Detector converting unit 1: Data error</td>
</tr>
<tr>
<td>1</td>
<td>86</td>
<td></td>
<td>Detector converting unit 1: Magnetic pole error</td>
</tr>
<tr>
<td>1</td>
<td>88</td>
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<td>Watchdog</td>
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<tr>
<td>1</td>
<td>89</td>
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<td>Detector converting unit 2: Connection error</td>
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<td>1</td>
<td>8A</td>
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<td>Detector converting unit 2: Communication error</td>
</tr>
<tr>
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<td>8B</td>
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<td>Detector converting unit 2: Automatic tuning error</td>
</tr>
<tr>
<td>1</td>
<td>8C</td>
<td></td>
<td>Detector converting unit 2: Judgment error</td>
</tr>
<tr>
<td>1</td>
<td>8D</td>
<td></td>
<td>Detector converting unit 2: CPU error</td>
</tr>
<tr>
<td>1</td>
<td>8E</td>
<td></td>
<td>Detector converting unit 2: Data error</td>
</tr>
</tbody>
</table>

**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

5-90 Servo warning No.

[Data definition]
This indicates that a warning alarm has occurred in the servo system.

(1) Data configuration

<table>
<thead>
<tr>
<th>Sub-section No.</th>
<th>Details</th>
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<tbody>
<tr>
<td>64</td>
<td>Alarm No. main (2-byte)</td>
</tr>
<tr>
<td>66</td>
<td>Alarm attribute (2-byte) bit F</td>
</tr>
<tr>
<td></td>
<td>0: No alarm</td>
</tr>
<tr>
<td></td>
<td>1: Alarm has occurred</td>
</tr>
<tr>
<td>(hexadecimal)</td>
<td></td>
</tr>
<tr>
<td>68</td>
<td>Alarm No. sub 1 (2-byte)</td>
</tr>
<tr>
<td>70</td>
<td>Alarm No. sub 2 (2-byte)</td>
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</table>

(2) Alarm contents

<table>
<thead>
<tr>
<th>Alarm No. Main</th>
<th>Alarm No. Sub 1</th>
<th>Alarm No. Sub 2</th>
<th>Alarm contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>90</td>
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<td>Detector : Initial communication error</td>
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<tr>
<td>2</td>
<td>91</td>
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<td>Detector : Communication error</td>
</tr>
<tr>
<td>2</td>
<td>92</td>
<td></td>
<td>Detector : Protocol error</td>
</tr>
<tr>
<td>2</td>
<td>93</td>
<td></td>
<td>Initial absolute position fluctuation</td>
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<tr>
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<td>96</td>
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<td>Scale feedback error</td>
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<td>97</td>
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<td>Scale offset error</td>
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<td>2</td>
<td>9B</td>
<td></td>
<td>Detector converting unit: Magnetic pole shift warning</td>
</tr>
<tr>
<td>2</td>
<td>9C</td>
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<td>Detector converting unit: Magnetic pole warning</td>
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<tr>
<td>2</td>
<td>9E</td>
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<td>Absolute position detector : Revolution counter error</td>
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<td>2</td>
<td>9F</td>
<td></td>
<td>Battery voltage drop</td>
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<td>2</td>
<td>A6</td>
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<td>Fan stop warning</td>
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<tr>
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<td>A8</td>
<td></td>
<td>Turret indexing warning</td>
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<tr>
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<td>A9</td>
<td></td>
<td>Orientation feedback warning</td>
</tr>
<tr>
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<td>E0</td>
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<td>Over regeneration warning</td>
</tr>
<tr>
<td>2</td>
<td>E1</td>
<td></td>
<td>Overload warning</td>
</tr>
<tr>
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<td>E2</td>
<td></td>
<td>Continuous high-speed revolution warning</td>
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<td>2</td>
<td>E3</td>
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<td>Absolute position counter warning</td>
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<td>E4</td>
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<td>Set parameter warning</td>
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<td>E6</td>
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<td>Control axis detachment warning</td>
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<td></td>
<td>In NC emergency stop state</td>
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<tr>
<td>2</td>
<td>E8</td>
<td></td>
<td>Excessive supplementary regeneration frequency</td>
</tr>
<tr>
<td>2</td>
<td>E9</td>
<td></td>
<td>Instantaneous power interruption warning</td>
</tr>
<tr>
<td>2</td>
<td>EA</td>
<td></td>
<td>In external emergency stop state</td>
</tr>
<tr>
<td>2</td>
<td>EB</td>
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<td>Over regeneration warning</td>
</tr>
</tbody>
</table>

(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.
**5-130 Operation error No.**

**[Data definition]**
This indicates that the axis cannot move, etc., due to the operation or machine side conditions. When an error occurs, the NC alarm 4 (AL4: X213) will turn ON.

(1) **Data configuration**

<table>
<thead>
<tr>
<th>Sub-section No.</th>
<th>Details</th>
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<tbody>
<tr>
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<tr>
<td>98</td>
<td>Alarm attribute (2-byte) bit F 0: No alarm 1: Alarm has occurred</td>
</tr>
<tr>
<td>100</td>
<td>Alarm No. sub 1 (2-byte)</td>
</tr>
<tr>
<td>102</td>
<td>Alarm No. sub 2 (2-byte)</td>
</tr>
</tbody>
</table>

(2) **Alarm contents**

<table>
<thead>
<tr>
<th>Alarm No. Main</th>
<th>Alarm No. Sub 1</th>
<th>Alarm No. Sub 2</th>
<th>Alarm contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td></td>
<td>Alarm axis No. Dog overrun</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td></td>
<td>Alarm axis No. Z-axis not cross</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td></td>
<td>Alarm axis No. Invalid return</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td></td>
<td>Alarm axis No. External interlock</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td></td>
<td>Alarm axis No. Internal interlock</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td></td>
<td>Alarm axis No. H/W stroke end</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
<td></td>
<td>Alarm axis No. S/W stroke end</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td></td>
<td>Chuck/tail-stock barrier stroke end axis found</td>
</tr>
<tr>
<td>1</td>
<td>9</td>
<td></td>
<td>Reference point return number illegal</td>
</tr>
<tr>
<td>1</td>
<td>19</td>
<td></td>
<td>Sensor signal illegal No.</td>
</tr>
<tr>
<td>1</td>
<td>20</td>
<td></td>
<td>Reference point return illegal</td>
</tr>
<tr>
<td>1</td>
<td>24</td>
<td></td>
<td>Reference point return disabled during absolute position detection alarm</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td></td>
<td>Reference point return disabled during zero point initialization</td>
</tr>
<tr>
<td>1</td>
<td>50</td>
<td></td>
<td>Chopping axis reference point return incomplete</td>
</tr>
<tr>
<td>1</td>
<td>51</td>
<td></td>
<td>Synchronization error too large</td>
</tr>
<tr>
<td>1</td>
<td>101</td>
<td></td>
<td>Not operation mode</td>
</tr>
<tr>
<td>1</td>
<td>102</td>
<td></td>
<td>Override zero</td>
</tr>
<tr>
<td>1</td>
<td>103</td>
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<td>External feedrate zero</td>
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<tr>
<td>1</td>
<td>104</td>
<td></td>
<td>F1-digit speed zero</td>
</tr>
<tr>
<td>1</td>
<td>105</td>
<td></td>
<td>Spindle stop</td>
</tr>
<tr>
<td>1</td>
<td>106</td>
<td></td>
<td>Handle feed axis No. illegal</td>
</tr>
<tr>
<td>1</td>
<td>107</td>
<td></td>
<td>Spindle speed excessive</td>
</tr>
<tr>
<td>1</td>
<td>108</td>
<td></td>
<td>Fixed point mode feed axis No. illegal</td>
</tr>
<tr>
<td>1</td>
<td>109</td>
<td></td>
<td>Block start interlock</td>
</tr>
<tr>
<td>1</td>
<td>110</td>
<td></td>
<td>Cutting block start interlock</td>
</tr>
</tbody>
</table>

(Continued on next page)
## 5. Explanation of Read/Write Data
### 5.3  Explanation of data details

<table>
<thead>
<tr>
<th>Alarm No. Main</th>
<th>Alarm No. Sub 1</th>
<th>Alarm No. Sub 2</th>
<th>Alarm contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>111</td>
<td>—</td>
<td>Restart switch ON</td>
</tr>
<tr>
<td>1</td>
<td>112</td>
<td>—</td>
<td>Program check mode</td>
</tr>
<tr>
<td>1</td>
<td>113</td>
<td>—</td>
<td>Automatic start during buffer correction</td>
</tr>
<tr>
<td>1</td>
<td>115</td>
<td>—</td>
<td>Resetting</td>
</tr>
<tr>
<td>1</td>
<td>117</td>
<td>—</td>
<td>Play back not possible</td>
</tr>
<tr>
<td>1</td>
<td>118</td>
<td>—</td>
<td>Block seams turning stop during normal line control</td>
</tr>
<tr>
<td>1</td>
<td>120</td>
<td>—</td>
<td>Synchronization correction mode ON</td>
</tr>
<tr>
<td>1</td>
<td>121</td>
<td>—</td>
<td>No synchronous control option</td>
</tr>
<tr>
<td>1</td>
<td>123</td>
<td>—</td>
<td>Computer link B</td>
</tr>
<tr>
<td>1</td>
<td>124</td>
<td>Alarm axis No.</td>
<td>Simultaneous axes movement prohibition when the incline axis control is valid</td>
</tr>
<tr>
<td>1</td>
<td>126</td>
<td>Alarm axis No.</td>
<td>Program restart machine lock</td>
</tr>
<tr>
<td>1</td>
<td>150</td>
<td>—</td>
<td>Chopping override zero</td>
</tr>
<tr>
<td>1</td>
<td>151</td>
<td>Alarm axis No.</td>
<td>Chopping axis conflict</td>
</tr>
<tr>
<td>1</td>
<td>153</td>
<td>—</td>
<td>Chopping stroke zero</td>
</tr>
<tr>
<td>1</td>
<td>154</td>
<td>Alarm axis No.</td>
<td>Chopping axis handle selection axis</td>
</tr>
<tr>
<td>1</td>
<td>160</td>
<td>Alarm axis No.</td>
<td>Axis with no maximum speed set for the outside of the soft limit range</td>
</tr>
<tr>
<td>1</td>
<td>1005</td>
<td>—</td>
<td>Execution of G114.* during G114.*</td>
</tr>
<tr>
<td>1</td>
<td>1007</td>
<td>—</td>
<td>Spindle busy in synchronous tap</td>
</tr>
<tr>
<td>1</td>
<td>1026</td>
<td>—</td>
<td>Spindle C axis and other position controls commanded simultaneously</td>
</tr>
<tr>
<td>1</td>
<td>1030</td>
<td>—</td>
<td>Synchronization mismatch</td>
</tr>
<tr>
<td>1</td>
<td>1031</td>
<td>—</td>
<td>C axis selection signal changed when several C axis selection is impossible</td>
</tr>
<tr>
<td>1</td>
<td>1032</td>
<td>—</td>
<td>Tap return spindle selection illegal in multi-spindle</td>
</tr>
<tr>
<td>1</td>
<td>1033</td>
<td>—</td>
<td>Cutting feed waited until synchronization complete</td>
</tr>
<tr>
<td>1</td>
<td>1034</td>
<td>—</td>
<td>Cross machining command illegal</td>
</tr>
<tr>
<td>1</td>
<td>1035</td>
<td>—</td>
<td>Cross machining control impossible modal</td>
</tr>
<tr>
<td>1</td>
<td>1036</td>
<td>—</td>
<td>Synchronous control designation impossible</td>
</tr>
<tr>
<td>1</td>
<td>1037</td>
<td>—</td>
<td>Synchronous control start/ synchronous control start in the state that cancellation is impossible/cancellation command</td>
</tr>
<tr>
<td>1</td>
<td>1038</td>
<td>—</td>
<td>Movement command to synchronous axis during synchronous control</td>
</tr>
<tr>
<td>1</td>
<td>1106</td>
<td>—</td>
<td>Spindle synchronization phase calculation illegal</td>
</tr>
</tbody>
</table>

(Nota 1) Refer to the alarm No. when the alarm attribute bit F is set to 1.
5-140  **Automatic stop code**

[Data definition]
This indicates the cause of automatic stop or block stop.

(1) **Data configuration**

<table>
<thead>
<tr>
<th>Sub-section No.</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>104</td>
<td>Alarm No. main (2-byte)</td>
</tr>
<tr>
<td>106</td>
<td>Alarm attribute (2-byte) bit F 0: No alarm 1: Alarm has occurred (hexadecimal)</td>
</tr>
<tr>
<td>108</td>
<td>Alarm No. sub 1 (2-byte)</td>
</tr>
<tr>
<td>110</td>
<td>Alarm No. sub 2 (2-byte)</td>
</tr>
</tbody>
</table>

(2) **Alarm contents**

<table>
<thead>
<tr>
<th>Alarm No.</th>
<th>Alarm No. Sub 1</th>
<th>Alarm No. Sub 2</th>
<th>Alarm contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>101</td>
<td></td>
<td>Axis in motion</td>
</tr>
<tr>
<td>1</td>
<td>102</td>
<td></td>
<td>Ready off</td>
</tr>
<tr>
<td>1</td>
<td>103</td>
<td></td>
<td>Reset on</td>
</tr>
<tr>
<td>1</td>
<td>104</td>
<td></td>
<td>Automatic operation stop signal &quot;ON&quot;</td>
</tr>
<tr>
<td>1</td>
<td>105</td>
<td></td>
<td>H/W stroke end axis</td>
</tr>
<tr>
<td>1</td>
<td>106</td>
<td></td>
<td>S/W stroke end axis</td>
</tr>
<tr>
<td>1</td>
<td>107</td>
<td></td>
<td>No operation mode</td>
</tr>
<tr>
<td>1</td>
<td>108</td>
<td></td>
<td>Operation mode duplicated</td>
</tr>
<tr>
<td>1</td>
<td>109</td>
<td></td>
<td>Operation mode shift</td>
</tr>
<tr>
<td>1</td>
<td>110</td>
<td></td>
<td>Tape search execution</td>
</tr>
<tr>
<td>1</td>
<td>111</td>
<td></td>
<td>Program restart search execution</td>
</tr>
<tr>
<td>1</td>
<td>112</td>
<td></td>
<td>Program restart position not returned</td>
</tr>
<tr>
<td>1</td>
<td>113</td>
<td></td>
<td>Thermal alarm</td>
</tr>
<tr>
<td>1</td>
<td>115</td>
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<td>Communicating with host</td>
</tr>
<tr>
<td>1</td>
<td>138</td>
<td></td>
<td>Disabled start during absolute position detection alarm</td>
</tr>
<tr>
<td>1</td>
<td>139</td>
<td></td>
<td>Disabled start during zero point initialization</td>
</tr>
<tr>
<td>1</td>
<td>190</td>
<td></td>
<td>Automatic start disabled</td>
</tr>
<tr>
<td>1</td>
<td>191</td>
<td></td>
<td>Automatic start disabled</td>
</tr>
<tr>
<td>2</td>
<td>201</td>
<td></td>
<td>H/W stroke end axis</td>
</tr>
<tr>
<td>2</td>
<td>202</td>
<td></td>
<td>S/W stroke end axis</td>
</tr>
<tr>
<td>2</td>
<td>203</td>
<td></td>
<td>Reset signal on</td>
</tr>
<tr>
<td>2</td>
<td>204</td>
<td></td>
<td>Automatic operation stop</td>
</tr>
<tr>
<td>2</td>
<td>205</td>
<td></td>
<td>Automatic mode change</td>
</tr>
<tr>
<td>2</td>
<td>206</td>
<td></td>
<td>Acceleration and deceleration time constant too large</td>
</tr>
<tr>
<td>2</td>
<td>215</td>
<td></td>
<td>Absolute position detection alarm stop</td>
</tr>
<tr>
<td>3</td>
<td>301</td>
<td></td>
<td>Single block on</td>
</tr>
<tr>
<td>3</td>
<td>302</td>
<td></td>
<td>User macro stop</td>
</tr>
</tbody>
</table>

(Continued on next page)
### 5. Explanation of Read/Write Data
#### 5.3 Explanation of data details

<table>
<thead>
<tr>
<th>Alarm No. Main</th>
<th>Alarm No. Sub 1</th>
<th>Alarm No. Sub 2</th>
<th>Alarm contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>303</td>
<td>—</td>
<td>Mode change</td>
</tr>
<tr>
<td>3</td>
<td>304</td>
<td>—</td>
<td>MDI completion</td>
</tr>
<tr>
<td>3</td>
<td>305</td>
<td>—</td>
<td>Block start interlock</td>
</tr>
<tr>
<td>3</td>
<td>306</td>
<td>—</td>
<td>Cutting block start interlock</td>
</tr>
<tr>
<td>3</td>
<td>310</td>
<td>—</td>
<td>Offset change of inclined Z-axis during program operation</td>
</tr>
<tr>
<td>4</td>
<td>401</td>
<td>—</td>
<td>Verify stop</td>
</tr>
<tr>
<td>10</td>
<td>(Note 2)</td>
<td>—</td>
<td>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.</td>
</tr>
</tbody>
</table>

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

(Note 2) 

<table>
<thead>
<tr>
<th>Alarm No.</th>
<th>Waiting for unclamp signal</th>
<th>Waiting for spindle position to be looped</th>
<th>Waiting for spindle orientation complete</th>
<th>Waiting for cutting speed deceleration</th>
<th>Waiting for rapid traverse deceleration</th>
<th>Waiting for MSTB completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>×</td>
<td>1</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>8</td>
<td>×</td>
<td>2</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>9</td>
<td>×</td>
<td>3</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>4</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>5</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>6</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>7</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>8</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>9</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>A</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>B</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>C</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>D</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>E</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>F</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>

0
### 5.3 Explanation of data details

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

**[Data definition]**

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

\[ \sqrt{\sum \text{(Remaining movement distance of each axis)}} \]

**[Interpolation vector length] [Image]**

#### Data unit, range

<table>
<thead>
<tr>
<th>Input unit system (unit)</th>
<th>Linear axis</th>
<th>Rotary axis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Input unit (metric)</td>
<td>Input unit (inch)</td>
</tr>
<tr>
<td>B</td>
<td>0.0005 mm</td>
<td>0.00005 inch</td>
</tr>
<tr>
<td>C</td>
<td>0.00005 mm</td>
<td>0.000005 inch</td>
</tr>
<tr>
<td>D</td>
<td>0.000005 mm</td>
<td>0.000005 °</td>
</tr>
</tbody>
</table>

**[Precaution]**

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

#### 11/15-20 Movement mode

**[Data definition]**

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

12/16-10  Axis direction movement amount

[Data definition]
The remaining movement distance of each axis in the block being executed is indicated.

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

For block being executed

For block before execution

[Data unit, range]

<table>
<thead>
<tr>
<th>Input unit system (iunit)</th>
<th>Linear axis</th>
<th>Rotary axis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Input unit (metric)</td>
<td>Input unit (inch)</td>
</tr>
<tr>
<td>B</td>
<td>0.0005 mm</td>
<td>0.00005 inch</td>
</tr>
<tr>
<td>C</td>
<td>0.00005 mm</td>
<td>0.000005 inch</td>
</tr>
<tr>
<td>D</td>
<td>0.000005 mm</td>
<td></td>
</tr>
</tbody>
</table>

[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

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

**[Data definition]**
The current movement modal (group 1) is indicated.

<table>
<thead>
<tr>
<th>Data</th>
<th>Machining center system</th>
<th>Lathe system</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Series 2</td>
</tr>
<tr>
<td>0</td>
<td>G00</td>
<td>G00</td>
</tr>
<tr>
<td>1</td>
<td>G01</td>
<td>G01</td>
</tr>
<tr>
<td>2</td>
<td>G02</td>
<td>G02</td>
</tr>
<tr>
<td>3</td>
<td>G03</td>
<td>G03</td>
</tr>
<tr>
<td>4</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>5</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>6</td>
<td>G33</td>
<td>G32</td>
</tr>
<tr>
<td>7</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>8</td>
<td>—</td>
<td>G34</td>
</tr>
</tbody>
</table>

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

**[Data definition]**
The current plane selection modal (group 2) is indicated.

<table>
<thead>
<tr>
<th>Data</th>
<th>Machining center system</th>
<th>Lathe system</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Series 2</td>
</tr>
<tr>
<td>0</td>
<td>G17</td>
<td>G17</td>
</tr>
<tr>
<td>1</td>
<td>G18</td>
<td>G18</td>
</tr>
<tr>
<td>2</td>
<td>G19</td>
<td>G19</td>
</tr>
</tbody>
</table>

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

**[Data definition]**
The current feed modal (group 5) is indicated.

<table>
<thead>
<tr>
<th>Data</th>
<th>Machining center system</th>
<th>Lathe system</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Series 2</td>
</tr>
<tr>
<td>0</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1</td>
<td>G94</td>
<td>G98</td>
</tr>
<tr>
<td>2</td>
<td>G95</td>
<td>G99</td>
</tr>
</tbody>
</table>
### 13/17-13 Radius compensation modal (G code group 7)

**[Data definition]**
The current radius compensation modal (group 7) is indicated.

<table>
<thead>
<tr>
<th>Data</th>
<th>Machining center system</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>G40</td>
</tr>
<tr>
<td>1</td>
<td>G41</td>
</tr>
<tr>
<td>2</td>
<td>G42</td>
</tr>
<tr>
<td>3</td>
<td>—</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Lathe system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series 2</td>
<td>G40</td>
</tr>
<tr>
<td>Series 3</td>
<td>G41</td>
</tr>
<tr>
<td></td>
<td>G42</td>
</tr>
<tr>
<td></td>
<td>G46</td>
</tr>
</tbody>
</table>

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

**[Data definition]**
The current fixed cycle modal (group 9) is indicated.

<table>
<thead>
<tr>
<th>Data</th>
<th>Machining center system</th>
<th>Lathe system</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>—</td>
<td>G80</td>
</tr>
<tr>
<td>1</td>
<td>—</td>
<td>G81</td>
</tr>
<tr>
<td>2</td>
<td>—</td>
<td>G82</td>
</tr>
<tr>
<td>3</td>
<td>—</td>
<td>G83</td>
</tr>
<tr>
<td>4</td>
<td>—</td>
<td>G84</td>
</tr>
<tr>
<td>5</td>
<td>—</td>
<td>G85</td>
</tr>
<tr>
<td>6</td>
<td>—</td>
<td>G86</td>
</tr>
<tr>
<td>7</td>
<td>—</td>
<td>G87</td>
</tr>
<tr>
<td>8</td>
<td>G88</td>
<td>G88</td>
</tr>
<tr>
<td>9</td>
<td>G89</td>
<td>G89</td>
</tr>
<tr>
<td>10</td>
<td>G82</td>
<td>—</td>
</tr>
<tr>
<td>11</td>
<td>G83</td>
<td>G83</td>
</tr>
<tr>
<td>12</td>
<td>G84</td>
<td>G84</td>
</tr>
<tr>
<td>13</td>
<td>G85</td>
<td>G85</td>
</tr>
<tr>
<td>14</td>
<td>G86</td>
<td>—</td>
</tr>
<tr>
<td>15</td>
<td>G87</td>
<td>G87</td>
</tr>
<tr>
<td>16</td>
<td>G88</td>
<td>G88</td>
</tr>
<tr>
<td>17</td>
<td>G89</td>
<td>G89</td>
</tr>
<tr>
<td>18</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>19</td>
<td>—</td>
<td>G70</td>
</tr>
<tr>
<td>20</td>
<td>—</td>
<td>G71</td>
</tr>
<tr>
<td>21</td>
<td>G73</td>
<td>—</td>
</tr>
<tr>
<td>22</td>
<td>G74</td>
<td>—</td>
</tr>
<tr>
<td>23</td>
<td>G76</td>
<td>G83.2</td>
</tr>
</tbody>
</table>
13/17-15 Workpiece coordinate system modal (G code group 12)

[Data definition]
The current workpiece coordinate system modal (group 12) is indicated.

<table>
<thead>
<tr>
<th>Data</th>
<th>Machining center system</th>
<th>Lathe system</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>G54</td>
<td>G54 G54 G54 G54 G54 G54</td>
</tr>
<tr>
<td>1</td>
<td>G55</td>
<td>G55 G55 G55 G55 G55 G55</td>
</tr>
<tr>
<td>2</td>
<td>G56</td>
<td>G56 G56 G56 G56 G56 G56</td>
</tr>
<tr>
<td>3</td>
<td>G57</td>
<td>G57 G57 G57 G57 G57 G57</td>
</tr>
<tr>
<td>4</td>
<td>G58</td>
<td>G58 G58 G58 G58 G58 G58</td>
</tr>
<tr>
<td>5</td>
<td>G59</td>
<td>G59 G59 G59 G59 G59 G59</td>
</tr>
</tbody>
</table>

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

[Data definition]
The current cutting modal (group 13) is indicated.

<table>
<thead>
<tr>
<th>Data</th>
<th>Machining center system</th>
<th>Lathe system</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>G61</td>
<td>G61 G61 G61 G61 G61 G61</td>
</tr>
<tr>
<td>2</td>
<td>G63</td>
<td>G63 G63 G63 G63 G63 G63</td>
</tr>
<tr>
<td>3</td>
<td>G64</td>
<td>G64 G64 G64 G64 G64 G64</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>bit7</th>
<th>bit6</th>
<th>bit5</th>
<th>bit4</th>
<th>bit3</th>
<th>bit2</th>
<th>*bit1</th>
<th>bit0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 18</td>
<td>Group 17</td>
<td>Group 10</td>
<td>Group 6</td>
<td>Group 4</td>
<td>Group 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>G15</td>
<td>G96</td>
<td>G99</td>
<td>G20</td>
<td>G22</td>
<td>G90</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>G14</td>
<td>G97</td>
<td>G98</td>
<td>G21</td>
<td>G23</td>
<td>G91</td>
<td></td>
</tr>
</tbody>
</table>

* Lathe system

13/17-20 Block No.

[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

13/17-30 Shape compensation No.

[Data definition]

(1) **Machining center system**
    The tool compensation No. commanded with address D in the nose radius compensation (G41, G42) or 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.

   \[
   \begin{align*}
   T & * * * * * \quad * \\
   & \text{Tool length compensation} \\
   & \text{Tool nose wear compensation} \\
   & \text{Same compensation No.} \\
   \end{align*}
   \\
   \begin{align*}
   T & * * * * * \quad * \\
   & \text{Tool length compensation} \\
   & \text{Tool nose wear compensation} \\
   & \text{Same compensation No.} \\
   \end{align*}

   Tool No.

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

   \[
   \begin{align*}
   T & * * * * * \quad * \\
   & \text{Tool nose wear compensation} \\
   & \text{Tool No. + Tool length compensation} \\
   \end{align*}
   \\
   \begin{align*}
   T & * * * * * \quad * \\
   & \text{Tool nose wear compensation} \\
   & \text{Tool No. + Tool length compensation} \\
   \end{align*}

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

13/17-31 Wear compensation No.

[Data definition]

(1) **Machining center system**
    This is the same as the shape compensation No.

(2) **Lathe system**
    The tool nose wear No. commanded with the tool function code (T) is indicated.
### 5. Explanation of Read/Write Data
#### 5.3 Explanation of data details

<table>
<thead>
<tr>
<th>Code</th>
<th>Data Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>13/17-40</td>
<td><strong>Miscellaneous function (M) code (BCD)</strong></td>
</tr>
<tr>
<td></td>
<td>[Data definition] The miscellaneous function No. commanded with the miscellaneous function code (M) is indicated.</td>
</tr>
<tr>
<td>13/17-41</td>
<td><strong>Spindle function (S) code (BIN)</strong></td>
</tr>
<tr>
<td></td>
<td>[Data definition] The spindle speed commanded with the spindle function code (S) is indicated.</td>
</tr>
<tr>
<td>13/17-42</td>
<td><strong>Tool function (T) code (BCD)</strong></td>
</tr>
<tr>
<td></td>
<td>[Data definition] The tool No. commanded with the tool function code (T) is indicated.</td>
</tr>
<tr>
<td>13/17-43</td>
<td><strong>2nd miscellaneous function (B) code (BCD)</strong></td>
</tr>
<tr>
<td></td>
<td>[Data definition] The data commanded with the 2nd miscellaneous function code (B, A or C) is indicated.</td>
</tr>
<tr>
<td>13/17-44</td>
<td><strong>Program No.</strong></td>
</tr>
<tr>
<td></td>
<td>[Data definition] The current program No. (modal) is indicated.</td>
</tr>
<tr>
<td></td>
<td>[Data unit, range] The setting range is 1 to 99999999 (binary).</td>
</tr>
<tr>
<td>13/17-45</td>
<td><strong>Sequence No.</strong></td>
</tr>
<tr>
<td></td>
<td>[Data definition] The current sequence No. is indicated.</td>
</tr>
<tr>
<td></td>
<td>[Data unit, range] The setting range is 1 to 9999 (binary).</td>
</tr>
<tr>
<td>13/17-50</td>
<td><strong>Tool radius compensation amount and nose R compensation amount</strong></td>
</tr>
<tr>
<td></td>
<td>[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.</td>
</tr>
<tr>
<td></td>
<td>[Data unit] The unit is one half of the machine constant input unit.</td>
</tr>
</tbody>
</table>
5. Explanation of Read/Write Data
5.3 Explanation of data details

<table>
<thead>
<tr>
<th>14/18-10</th>
<th>Tool length compensation No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Data definition] The tool length compensation No. of that axis is indicated.</td>
<td></td>
</tr>
<tr>
<td>[Data unit, range] The setting range is 0 to the maximum compensation No. (binary).</td>
<td></td>
</tr>
<tr>
<td>[Note] This is valid only for the machining center system.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14/18-20</th>
<th>Axis n Workpiece offset amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Data definition] The currently applied work offset amount is indicated.</td>
<td></td>
</tr>
<tr>
<td>[Data unit] The unit is one half of the machine constant input unit.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14/18-21</th>
<th>Axis n Tool length compensation amount (M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Data definition] The currently applied tool length compensation amount is indicated.</td>
<td></td>
</tr>
<tr>
<td>[Data unit] The unit is one half of the machine constant input unit.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14/18-22</th>
<th>Axis n Tool shape offset amount (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Data definition] The currently applied tool shape compensation amount is indicated.</td>
<td></td>
</tr>
<tr>
<td>[Data unit] The unit is one half of the machine constant input unit.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14/18-23</th>
<th>Axis n Tool length compensation amount (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Data definition] The currently applied tool length compensation amount is indicated.</td>
<td></td>
</tr>
<tr>
<td>[Data unit] The unit is one half of the machine constant input unit.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14/18-24</th>
<th>Axis n Tool wear compensation amount (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Data definition] The current tool wear compensation amount is indicated.</td>
<td></td>
</tr>
<tr>
<td>[Data unit] The unit is one half of the machine constant input unit.</td>
<td></td>
</tr>
</tbody>
</table>
5. Explanation of Read/Write Data
5.3  Explanation of data details

---

### 20-10  Automatic effective feedrate

**[Data definition]**
The actual feedrate in the automatic mode is indicated.
(This includes the speed change conditions such as override.)

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

**[Data unit]**

<table>
<thead>
<tr>
<th>Input unit system (iunit)</th>
<th>Input unit (metric)</th>
<th>Input unit (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>$1 \times 2^{-10}$ mm/min</td>
<td>$0.1 \times 2^{-10}$ inch/min</td>
</tr>
<tr>
<td>C</td>
<td>$0.1 \times 2^{-10}$ mm/min</td>
<td>$0.01 \times 2^{-10}$ inch/min</td>
</tr>
<tr>
<td>D</td>
<td>$0.01 \times 2^{-10}$ mm/min</td>
<td>–</td>
</tr>
</tbody>
</table>

---

### 20-11  Manual effective feedrate

**[Data definition]**
The actual feedrate in the manual mode is indicated.
(This includes the speed change conditions such as override.)
The speed of the fastest axis among the axes moving simultaneously is indicated.

**[Data unit]**

<table>
<thead>
<tr>
<th>Input unit system (iunit)</th>
<th>Input unit (metric)</th>
<th>Input unit (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>$1 \times 2^{-10}$ mm/min</td>
<td>$0.1 \times 2^{-10}$ inch/min</td>
</tr>
<tr>
<td>C</td>
<td>$0.1 \times 2^{-10}$ mm/min</td>
<td>$0.01 \times 2^{-10}$ inch/min</td>
</tr>
<tr>
<td>D</td>
<td>$0.01 \times 2^{-10}$ mm/min</td>
<td>–</td>
</tr>
</tbody>
</table>

---

### 20-20  In-position

**[Data definition]**
This indicates that the control axes which belong to each system are in the state of in-position.

A  B  C  D  E  F  0  1  2  3  4  5  6  7  8  9

1st axis
2nd axis
3rd axis
4th axis
5th axis
6th axis
5. Explanation of Read/Write Data
5.3 Explanation of data details

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

**[Data definition]**
The current position of the axis in the machine coordinate system is indicated.

**[Data unit]**

<table>
<thead>
<tr>
<th>Input unit system (iunit)</th>
<th>Linear axis (metric)</th>
<th>Linear axis (inch)</th>
<th>Rotary axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>0.0005 mm</td>
<td>0.00005 inch</td>
<td>0.0005 °</td>
</tr>
<tr>
<td>C</td>
<td>0.00005 mm</td>
<td>0.000005 inch</td>
<td>0.00005 °</td>
</tr>
<tr>
<td>D</td>
<td>0.000005 mm</td>
<td></td>
<td>0.000005 °</td>
</tr>
</tbody>
</table>

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

**[Data definition]**
The total of the movement amount in the manual mode with the manual absolute switch OFF is indicated.
The program coordinate system is shifted by the distance corresponding to this data.

**[Data unit]**

<table>
<thead>
<tr>
<th>Input unit system (iunit)</th>
<th>Linear axis (metric)</th>
<th>Linear axis (inch)</th>
<th>Rotary axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>0.0005 mm</td>
<td>0.00005 inch</td>
<td>0.0005 °</td>
</tr>
<tr>
<td>C</td>
<td>0.00005 mm</td>
<td>0.000005 inch</td>
<td>0.00005 °</td>
</tr>
<tr>
<td>D</td>
<td>0.000005 mm</td>
<td></td>
<td>0.000005 °</td>
</tr>
</tbody>
</table>

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

**[Data definition]**
The total of the movement amount in the manual mode with the manual absolute switch ON is indicated.
This data is cleared in the following cases:
1. When calculation of the buffer is started during automatic starting, or when automatic startup is executed.
2. When the reset signal is input.

**[Data unit]**

<table>
<thead>
<tr>
<th>Input unit system (iunit)</th>
<th>Linear axis (metric)</th>
<th>Linear axis (inch)</th>
<th>Rotary axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>0.0005 mm</td>
<td>0.00005 inch</td>
<td>0.0005 °</td>
</tr>
<tr>
<td>C</td>
<td>0.00005 mm</td>
<td>0.000005 inch</td>
<td>0.00005 °</td>
</tr>
<tr>
<td>D</td>
<td>0.000005 mm</td>
<td></td>
<td>0.000005 °</td>
</tr>
</tbody>
</table>
5. Explanation of Read/Write Data

5.3  Explanation of data details

---

21-20  Current position in workpiece coordinate system

[Data definition]
The current position in the currently selected workpiece coordinate system is indicated.

[Data unit]

<table>
<thead>
<tr>
<th>Input unit system (iunit)</th>
<th>Linear axis</th>
<th>Rotary axis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Input unit (metric)</td>
<td>Input unit (inch)</td>
</tr>
<tr>
<td>B</td>
<td>0.0005 mm</td>
<td>0.00005 inch</td>
</tr>
<tr>
<td>C</td>
<td>0.00005 mm</td>
<td>0.000005 inch</td>
</tr>
<tr>
<td>D</td>
<td>0.000005 mm</td>
<td></td>
</tr>
</tbody>
</table>

---

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

[Data definition]
The current position in the workpiece coordinate system when the skip signal is input during the G31 command is indicated.
This corresponds to the macro variables #5061, #5062 ....

[Data unit]

<table>
<thead>
<tr>
<th>Input unit system (iunit)</th>
<th>Linear axis</th>
<th>Rotary axis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Input unit (metric)</td>
<td>Input unit (inch)</td>
</tr>
<tr>
<td>B</td>
<td>0.0005 mm</td>
<td>0.00005 inch</td>
</tr>
<tr>
<td>C</td>
<td>0.00005 mm</td>
<td>0.000005 inch</td>
</tr>
<tr>
<td>D</td>
<td>0.000005 mm</td>
<td></td>
</tr>
</tbody>
</table>

---

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

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

[Data unit]

<table>
<thead>
<tr>
<th>Input unit system (iunit)</th>
<th>Linear axis</th>
<th>Rotary axis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Input unit (metric)</td>
<td>Input unit (inch)</td>
</tr>
<tr>
<td>B</td>
<td>0.0005 mm</td>
<td>0.00005 inch</td>
</tr>
<tr>
<td>C</td>
<td>0.00005 mm</td>
<td>0.000005 inch</td>
</tr>
<tr>
<td>D</td>
<td>0.000005 mm</td>
<td></td>
</tr>
</tbody>
</table>
5. Explanation of Read/Write Data

5.3 Explanation of data details

### 21-32 Remaining distance during skip ON

[Data definition]
The remaining commanded distance when the skip signal is input during the G31 command is indicated.

[Data unit]

<table>
<thead>
<tr>
<th>Input unit system (in unit)</th>
<th>Linear axis</th>
<th>Rotary axis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Input unit (metric)</td>
<td>Input unit (inch)</td>
</tr>
<tr>
<td>B</td>
<td>0.0005 mm</td>
<td>0.00005 inch</td>
</tr>
<tr>
<td>C</td>
<td>0.00005 mm</td>
<td>0.000005 inch</td>
</tr>
<tr>
<td>D</td>
<td>0.000005 mm</td>
<td>0.000005 inch</td>
</tr>
</tbody>
</table>

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

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

[Data unit]

<table>
<thead>
<tr>
<th>Input unit system (in unit)</th>
<th>Linear axis</th>
<th>Rotary axis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Input unit (metric)</td>
<td>Input unit (inch)</td>
</tr>
<tr>
<td>B</td>
<td>0.0005 mm</td>
<td>0.00005 inch</td>
</tr>
<tr>
<td>C</td>
<td>0.00005 mm</td>
<td>0.000005 inch</td>
</tr>
<tr>
<td>D</td>
<td>0.000005 mm</td>
<td>0.000005 inch</td>
</tr>
</tbody>
</table>

### 21-34 Command position in machine coordinate system

[Data definition]
Command position in the machine coordinate system to be output to the drive unit is indicated.

[Data unit]

<table>
<thead>
<tr>
<th>Input unit system (in unit)</th>
<th>Linear axis</th>
<th>Rotary axis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Input unit (metric)</td>
<td>Input unit (inch)</td>
</tr>
<tr>
<td>B</td>
<td>0.0005 mm</td>
<td>0.00005 inch</td>
</tr>
<tr>
<td>C</td>
<td>0.00005 mm</td>
<td>0.000005 inch</td>
</tr>
<tr>
<td>D</td>
<td>0.000005 mm</td>
<td>0.000005 inch</td>
</tr>
</tbody>
</table>
5. Explanation of Read/Write Data
5.3 Explanation of data details

[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>

<table>
<thead>
<tr>
<th>#1287 ext23/bit3</th>
<th>0</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1221 aux05/bit7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>Relative value (figure (a))</td>
<td>Relative value (figure (b))&lt;br&gt;The compensation amount is considered according to #1287 ext23/bit4, 5 contents.</td>
</tr>
<tr>
<td>1</td>
<td>Relative value (figure (a))</td>
<td>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.</td>
</tr>
</tbody>
</table>

<M60S series>

<table>
<thead>
<tr>
<th>#1221 aux05/bit7</th>
<th>0</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Relative value&lt;br&gt;The compensation amount is considered according to #1287 ext23/bit4,5 contents.</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Current value B</td>
<td></td>
</tr>
</tbody>
</table>

[Data unit]

<table>
<thead>
<tr>
<th>Input unit system (iunit)</th>
<th>Linear axis</th>
<th>Rotary axis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Input unit (metric)</td>
<td>Input unit (inch)</td>
</tr>
<tr>
<td>B</td>
<td>0.0005 mm</td>
<td>0.00005 inch</td>
</tr>
<tr>
<td>C</td>
<td>0.00005 mm</td>
<td>0.000005 inch</td>
</tr>
<tr>
<td>D</td>
<td>0.000005 mm</td>
<td></td>
</tr>
</tbody>
</table>
### 5. Explanation of Read/Write Data

#### 5.3 Explanation of data details

<table>
<thead>
<tr>
<th>21-41</th>
<th>Axis n</th>
<th>Current value B</th>
</tr>
</thead>
</table>

**[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]**

<table>
<thead>
<tr>
<th>Input unit system (iunit)</th>
<th>Linear axis</th>
<th>Rotary axis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Input unit (metric)</td>
<td>Input unit (inch)</td>
</tr>
<tr>
<td>B</td>
<td>0.0005 mm</td>
<td>0.00005 inch</td>
</tr>
<tr>
<td>C</td>
<td>0.00005 mm</td>
<td>0.000005 inch</td>
</tr>
<tr>
<td>D</td>
<td>0.000005 mm</td>
<td>0.000005 °</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>21-42</th>
<th>Axis n</th>
<th>Axis name</th>
</tr>
</thead>
</table>

**[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.

<table>
<thead>
<tr>
<th>21-43</th>
<th>Axis n</th>
<th>Increment command axis name</th>
</tr>
</thead>
</table>

**[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.

<table>
<thead>
<tr>
<th>21-44</th>
<th>Axis n</th>
<th>2nd axis name</th>
</tr>
</thead>
</table>

**[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.
### 22-10 Emergency stop causes

**[Data definition]**
The cause of why the CNC entered the emergency stop state is indicated.
This data can also be referred to with the file register 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.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
</table>
| 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. |
5.3  Explanation of data details

23-10  Spindle command speed (Effective value)

**[Data definition]**
This is not the spindle function (S) command value, but instead is the commanded speed that is obtained by adding the conditions such as spindle override, spindle stop and spindle gear shift to the S command.

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

24-1  Power ON time

**[Data definition]**
This is the total cumulative time from when the controller power is turned ON to when it is turned OFF.

**[Data unit, 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).

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

The reverse calculation is carried out to write the data.

\[
\text{DDB write data} = \frac{9000}{512} \times \text{time}
\]

24-2  Automatic operation time

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

**[Data unit, 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).

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

The reverse calculation is carried out to write the data.

\[
\text{DDB write data} = \frac{9000}{512} \times \text{time}
\]
5. Explanation of Read/Write Data

5.3 Explanation of data details

24-3 Automatic start up time

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

[Data unit, 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).

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

The reverse calculation is carried out to write the data.

\[
\text{DDB write data} = \frac{9000}{512} \times \text{time}
\]

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

[Data definition]
This counts and displays the total cumulative time that the designated signal (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).

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

The reverse calculation is carried out to write the data.

\[
\text{DDB write data} = \frac{9000}{512} \times \text{time}
\]
### 26-10 Spindle Motor real speed

[Data definition]
This is the real speed of the spindle motor detected by the encoder built into the motor.

[Data unit, range]
The data unit is r/min.

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

### 26-20 Spindle Motor load

[Data definition]
This is the load (torque current) of the spindle motor.

Spindle motor load (%) = Read data (An absolute value is retrieved.)
5. Explanation of Read/Write Data

5.3 Explanation of data details

| 27-10 | Smoothing status, servo status |

[Data definition]
The various servo related information is expressed in bit units.

27-10-0) Ready ON
If the drive 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. \( \overline{7} \) 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.
(\textbf{Note 1}) This may turn ON when the machine is moving at an extremely low speed.
(\textbf{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).
(\textbf{Note 1}) This may turn OFF when the machine is moving at an extremely low speed.
(\textbf{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).
(\textbf{Note 1}) This may turn OFF when the machine is moving at an extremely low speed.
(\textbf{Note 2}) This state is equivalent to the minus motion (-) signal (MVMn) 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.
27-20  Servo delay amount

[Data definition]
This is an amount that indicates the difference of the actual machine position from the commanded position. (With code (+) or (-).)
The servo delay amount will be the same as the droop on the diagnosis screen's servo monitor, according to the following equation.

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

27-30  Feed axis motor load A (%)

[Data definition]
This is the load of the feed axis motor.
The data read with the DDB has a code (+ or -).

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

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

27-31  Feed axis motor load B (%)

[Data definition]
This is the load (current) of the feed axis motor.

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

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

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

[Data definition]
This is the speed of the feed axis motor.
The data read with the DDB has a code (+ or -).

$$\text{Feed axis motor speed} \text{ (r/min)} = \text{Read data}$$ (An absolute value is retrieved.)
5. Explanation of Read/Write Data

5.3  Explanation of data details

**[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.

<table>
<thead>
<tr>
<th>Type</th>
<th>No.</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-system</td>
<td>100 sets 500 to 549</td>
<td>Common variable 1 Common variable 2</td>
</tr>
<tr>
<td></td>
<td>200 sets 500 to 599</td>
<td>100 to 149</td>
</tr>
<tr>
<td></td>
<td>300 sets 500 to 699</td>
<td>100 to 199</td>
</tr>
<tr>
<td></td>
<td>600 sets 500 to 999</td>
<td>100 to 199</td>
</tr>
<tr>
<td>2-system</td>
<td>50+ 50 sets 500 to 549</td>
<td>100 to 149 *2</td>
</tr>
<tr>
<td></td>
<td>100+100 sets 500 to 599</td>
<td>100 to 199 *2</td>
</tr>
</tbody>
</table>

**[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

30-10 Local variables (level 0)

[Data definition]
These are the local variables for the main program (macro level 0).
The sub-section No. of the DDB uses the same value as the local variable No. to be read or written.

[Precautions]
(1) When data is changed during operation:
   (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).

30-11 Local variables (level 1)

[Data definition]
These are the same as the local variables (level 0), and are the local variables in macro level 1.
Note that the sub-section No. used by the DDB is the value which 100 has been added to the local variable No.

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

30-12 Local variables (level 2)

[Data definition]
These are the same as the local variables (level 1), and are the local variables in macro level 2.
Note that the sub-section No. used by the DDB is the value which 200 has been added to the local variable No.

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

30-13 Local variables (level 3)

[Data definition]
These are the same as the local variables (level 2), and are the local variables in macro level 3.
Note that the sub-section No. used by the DDB is the value which 300 has been added to the local variable No.

[Precaution]
These are the same as the local variables (level 0).
### 5.3 Explanation of data details

#### 31-10  Tool compensation amount 1

**[Data definition]**
This is the tool offset and differs according to the distinction of shape and wear.
- Without shape/wear distinction : Tool compensation amount
- With shape/wear distinction : Tool length shape compensation amount
The sub-section No. used by the DDB corresponds to the tool offset No.

**[Data unit, range]**
- Unit : 1/2 of the input unit (Either 0.5µm, or 0.05µm)
- 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.

#### 31-20  Tool compensation amount 2

**[Data definition]**
This is the tool length wear compensation amount.
(This is valid only when there is a shape/wear distinction in the tool offset.)
The sub-section No. used by the DDB is the value which 1000 has been added to the tool offset No.

**[Data unit, range]**
- Unit : 1/2 of the input unit (Either 0.5µm, or 0.05µm)
- Data range : -9999 to +9999 (binary)

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

#### 31-30  Tool compensation amount 3

**[Data definition]**
This is the tool radius shape compensation amount.
(This is valid only when there is a shape/wear distinction in the tool offset.)
The sub-section No. used by the DDB is the value which 6000 has been added to the tool offset No. The following is the same as tool compensation amount 1.

#### 31-40  Tool compensation amount 4

**[Data definition]**
This is the tool radius wear compensation amount.
(This is valid only when there is a shape/wear distinction in the tool offset.)
The sub-section No. used by the DDB is the value which 7000 has been added to the tool offset No. The following is the same as the tool compensation amount 2.
### 31-100  
**X axis tool length compensation amount**

**[Data definition]**  
This is the X axis tool length compensation amount.  
The sub-section No. used by the DDB corresponds to the tool offset No.

**[Data unit, range]**  
- **Unit**: 1/2 of the input unit. (Either 0.5µm, or 0.05µm)  
- **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.

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

**[Data definition]**  
This is the X axis wear compensation amount.  
The sub-section No. used by the DDB is the value which 1000 has been added to the tool offset No.

**[Data unit, range]**  
- **Unit**: 1/2 of the input unit. (Either 0.5µm, or 0.05µm)  
- **Data range**: 0 to 99999 (binary)

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

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

**[Data definition]**  
This is the 3rd tool length compensation amount.  
The sub-section No. used by the DDB is the value which 2000 has been added to the tool offset No.  
The following is the same as the X axis tool length compensation amount.

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

**[Data definition]**  
This is the 3rd axis wear compensation amount.  
The sub-section No. used by the DDB is the value which 3000 has been added to the tool offset No.  
The following is the same as the X axis wear compensation amount.
5. Explanation of Read/Write Data

5.3 Explanation of data details

31-140 Z axis tool length compensation amount

[Data definition]
This is the Z axis tool length compensation amount.
The sub-section No. used by the DDB is the value which 4000 has been added to the tool offset No.
The following is the same as the X axis tool length compensation amount.

31-150 Z axis wear compensation amount

[Data definition]
This is the Z axis wear compensation amount.
The sub-section No. used by the DDB is the value which 5000 has been added to the tool offset No.
The following is the same as the X axis wear compensation amount.

31-160 Nose R compensation amount

[Data definition]
This is the nose R compensation amount.
The sub-section No. used by the DDB is the value which 6000 has been added to the tool offset No.
The following is the same as the X axis tool length compensation amount.

31-170 Nose R wear compensation amount

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

31-180 Hypothetical nose No.

[Data definition]
This is the hypothetical nose No.
(1) Nose point
Generally, the tool nose is rounded, so the nose position in the program is aligned to point P as shown in the following example.
With nose R compensation, select one point from the points shown below for each tool No., and preset this position relation.
(In the G46 mode, 1 to 8 are selected, and in the G41/G42 mode, 0 to 9 are selected.)

The sub-section No. used by the DDB is the value which 8000 has been added to the tool offset No.
5. Explanation of Read/Write Data

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### 180-10 to 180-26 J2-CT parameter

**[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.

### 180-40 J2-CT status

**[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.

<table>
<thead>
<tr>
<th>bit</th>
<th>Rn+6</th>
<th>Rn+7</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1</td>
<td>J2-CT parameter Writing status (Note 1)</td>
<td>J2-CT parameter Requesting write flag (Note 2)</td>
</tr>
<tr>
<td>2</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>3</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>–</td>
<td>–</td>
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<tr>
<td>5</td>
<td>–</td>
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<tr>
<td>6</td>
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<td>8</td>
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<td>9</td>
<td>–</td>
<td>–</td>
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<td>A</td>
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<tr>
<td>E</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>F</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

(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.)

| Set the J2-CT status read, section No. 180, sub-section No. 65536, data size 4, axis designation 1 from R2750 to R2755 |
| Set the J2-CT parameter (No. of stations) write, section No. 180, sub-section No. 18, data size 2, axis designation 1 from R2700 to R2705 |

[M10]
[ DDBA R2750]
[ DAND H20002 R2756]
[D= H0 R2756] [ DDBA R2700]

[Explanation]
When M10 turns ON:
1. The J2-CT status is read out to R2756 and R2757.
2. The requesting write flag (R2757 bit 1) and writing status (R2756 bit 1) data are extracted from the read status. The operation results are set in R2756 and R2757 again.
3. If the requesting write status and writing flags are OFF, R2756 and R2757 are set to 0, and the J2-CT parameter (No. of stations) write command is executed.
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.

![Diagram of ladder circuit]

- **M1000**: Control signal set
  - MOV K0 D100
  - MOV K26 D101
  - MOV K8988 D102
- **M1001**: Section No. set
  - MOV K2 D104
  - MOV K0 D105
  - DDBA D100
- **D102**: Data size (2-byte)
- **D103**: Sub-section No. set
- **D104**: Axis designation
- **D105**: Data read out
- **D106**: Control signal = 0
- **D107**: Section No. = 26
- **D108**: Sub-section No. = 8988
- **D109**: Data size = 2
- **D110**: Axis designation = insignificant
- **D111**: Data read out

- **D112**: Convert data into display scale number
  (Example when one scale is 5%)
- **D113**: Set load meter display validity, length of section not to be reversed or displayed in red, and length of bar graph.

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.
(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.
<table>
<thead>
<tr>
<th>Date of revision</th>
<th>Manual No.</th>
<th>Revision details</th>
</tr>
</thead>
</table>
| Jan. 2003       | BNP-B2214C   | • DDB data was added and changed.  
                    • Design of the cover and the back cover were changed.  
                    • The manual name “MELDAS 64 MELDASMAGIC 64 DDB Interface Manual” was changed to “MELDAS 60/60S Series MELDASMAGIC 64 DDB Interface Manual”.  
                    • MODEL, MODELCODE and MANUAL No. were added on the back cover.  
                    • The following DDB data were added.  
                      • 1-90 Display language  
                      • 1-91 Edit type  
                      • 2-60 Positive direction sensor of tool setter  
                      • 2-61 Negative direction sensor of tool setter or TLM standard length.  
                    • Miswrite is corrected.                                                                                                                                 |
| May 2004        | BNP-B2214D   | Revised for compliance to M60S system software versions C0, C1.                                                                                                                                               |
                    • “2.2.7 Precautions” was added.  
                    • The following DDB data was added.  
                      • 1-15 Monitor speed for speed monitoring  
                      • 1-54 Method selection parameter (5)  
                      • 1-55 Method selection parameter (6)  
                      • 1-80 Alternate M code valid  
                      • 1-81 G0 non-interpolation  
                      • 2-80 Rapid traverse rate  
                      • 2-90 G28 rapid traverse rate  
                      • 21-34 Command position in machine coordinate system  
                    • The existing search Nos. were changed as follows.  
                      • 1-70 → 1-52 Method selection parameter (3)  
                      • 1-80 → 1-53 Method selection parameter (4)  
                      • 1-100 → 1-200 Position switch  
                    • Number of position switches was changed from 9 to 24. (1-200)  
                    • Variable command 600 sets was added. (29-10,32-10)  
                    • Other mistakes were corrected.                                                                                                                                 |
Notice

Every effort has been made to keep up with software and hardware revisions in the contents described in this manual. However, please understand that in some unavoidable cases simultaneous revision is not possible.
Please contact your Mitsubishi Electric dealer with any questions or comments regarding the use of this product.

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<table>
<thead>
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<th>MODEL</th>
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</thead>
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<tr>
<td>CODE</td>
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</tr>
<tr>
<td>Manual</td>
<td>BNP-B2214E(ENG)</td>
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