MITSUBISHI ELECTRIC

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CNC

MELDAS C6/C64/C64T

PARAMETER MANUAL

MELDAS

BNP-B2267C(ENG)

Introduction

This manual is a guide of the parameters used with the CNC MELDAS C6/C64/C64T. This manual is written on the assumption that all machine parameters of the MELDAS C6/C64/C64T are provided. However, the CNC may not necessarily be provided with all of the options. When the system is used, therefore, reference should be made to the Specifications Manual issued by the machine maker.

Points to be observed when reading this manual

(1) This manual contains general descriptions as seen from the standpoint of NC (numerical control) and thus refer to the Instruction Manual issued by the machine maker for descriptions of individual machine tools.
The Instruction Manual issued by the machine maker takes precedence over this manual when any mention of "restrictions", "usable states" or such details are mentioned.

(2) As much information as possible on special procedures has been included in this manual, and it may be considered that any procedures not mentioned cannot be undertaken.

(3) Also refer to the following manuals.
- MELDAS C6/C64/C64T Instruction Manual....................................... BNP-B2259
- MELDAS C6/C64/C64T Programming Manual
(Machining center/Transfer machine system)........ BNP-B2260
- MELDAS C6/C64/C64T Programming Manual (Lathe system) BNP-B2264
- MELDAS AC Servo MDS-B-Vx Series Servo Parameter Manual....... BNP-A2993
- MELDAS AC Servo MDS-C1 Series Specification Manual................. BNP-C3000

⚠ CAUTION

⚠ 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 that are not described must be interpreted as "not possible".
⚠ This manual is written on the assumption that all option functions are added. Refer to the Specifications Manual issued by the machine maker before starting use.
⚠ Refer to the manuals issued by the machine manufacturer for each machine tool explanation.
⚠ Some screens and functions may differ or may not be usable depending on the NC system version.

Precautions for Safety

Always read the Specifications Manual issued by the machine maker, this manual, related manuals and attached documents before installation, operation, programming, maintenance or inspection to ensure correct use. Understand this numerical controller, safety items and cautions before using the unit.
This manual ranks the safety precautions into "DANGER", "WARNING" and "CAUTION".

⚠ **DANGER**	When the user may be subject to imminent fatalities or major injuries if handling is mistaken.
⚠ **WARNING**	When the user may be subject to fatalities or major injuries if handling is mistaken.
⚠ **CAUTION**	When the user may be subject to injuries or when physical damage may occur if handling is mistaken.

Note that even items ranked as "⚠**CAUTION**", may lead to major results depending on the situation.
In any case, important information that must always be observed is described.

⚠ 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 that are not described must be interpreted as "not possible".
- ⚠ This manual is written on the assumption that all option functions are added. Refer to the Specifications Manual issued by the machine maker before starting use.
- ⚠ Refer to the manuals issued by the machine manufacturer for each machine tool explanation.
- ⚠ Some screens and functions may differ or may not be usable depending on the NC system version.

CAUTION

2. Items related to servo/spindle parameters

⚠ To change the control mode to the High-gain amp (MDS-B-V14/V24) mode after replacement of the Standard amp (MDS-B-V1/V2), it is need to change the parameters and to adjust the servo parameters to fit to the High-gain amp.

⚠ Mode change between the Standard amp mode and the High-gain amp mode is actually performed when the power (200V) is turned ON. Thus, when changing some parameters unique to each amp, an alarm "7F" occurs and requests to turn the power ON again.
Note that the alarm "7F" may occur when the amp is mounted on the machine for the first time.
When the alarm "7F" occurs, turn the power ON again.
The alarm "7F" may not occur at second turning ON or later unless the above-mentioned parameters are changed.

⚠ With MDS-C1 series, only the serial encoder is applied as the motor end detector. Thus, OHE/OHA type detector cannot be used as the motor end detector.

⚠ Do not make remarkable adjustments or changes of the parameters as the operation may became unstable.

3. Items related to the other parameters

❗ When setting the parameter (#6449/bit6, 7) not to check the overheat, the control unit and the communication terminal may not be controlled because of overheat.
In such case, axis runaway may cause a machine breakage, an accident resulting in injury or death, or device breakage.
To prevent the serious results, ordinarily set the parameters so that the overheat check is valid.

CONTENTS

1. Parameter Screens

The parameter input setting units are as follow.

Input unit "#1003 iunit"	Linear axis "#1017 rot"=0		Rotary axis "#1017 rot"=1
	Machine constant:mm "#1040 M_inch"=0	Machine constant:inch "#1040 M_inch"=1	
B	0.001 mm	0.0001 inch	0.001°
C	0.0001 mm	0.00001 inch	0.0001°

(1) User parameters

The following menus can be selected when the key [TOOL PARAM] is pressed.

Menu	Details	Reference Section
WORK	The WORK OFFSET screen will open.	2.1 Workpiece Coordinate Offset
PROCESS	The PROCESS PARAM screen will open.	2.2 Process Parameters
		2.3 Control Parameters
		2.4 Axis Parameters
		2.5 Barrier Data
I/O PARAM	The I/O PARAM screen will open.	3.1 Base Parameters
		3.2 I/O Device Parameters
SETUP	The screen to set the setup parameters will open.	4. Setup Parameters

(2) Setup Parameters

The following menus can be selected when SETUP is selected. (Refer to the section "4. Setup Parameters" for details.

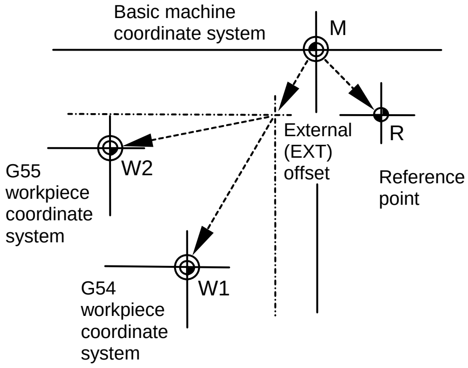
Menu	Details	Reference Section
BASE	The BASE SPEC. PARAM screen will open.	5. Base Specifications Parameters
AXIS SPEC	The AXIS SPEC PARAM screen will open.	6. Axis Specifications Parameters
SERVO	The SERVO PARAM screen will open.	7. Servo Parameters
SPINDLE	The SPINDLE BASE SPEC. PARAM screen will open.	8. Spindle Parameters
MC-ERR	The MC-ERR. CMP. screen will open.	9. Machine Error Compensation
PLC	The PLC DATA screen will open.	10. PLC Constants
MACRO	The MACRO FILE screen will open.	11. Macro List
PSW	The POSITION SWITCH screen will open.	12. Position Switch
IDX-PRM	The INDEXING AXIS PARAMETERS screen will open.	13. Indexing Axis Parameters
IDX-PSW	The INDEXING AXIS POSITION SWITCH screen will open.	14. Indexing Axis Position Switch
IDX-CMD	The INDEXING AXIS COMMANDS screen will open.	15. Indexing Axis Commands

(3) The following menus can be selected when the key ALARM DIAGN is pressed.

Menu	Details	Reference Section
AUX-PRM	The AUX-PARA screen will open.	16. Auxiliary Axis Parameter

2. Machining Parameters

2.1 Workpiece Coordinate Offset

<table>
<tr><th>#</th><th>Parameter</th><th>Explanation</th><th>Setting range (unit)</th></tr>
<tr><td>54</td><td>G54 offset</td><td rowspan="7">Set the workpiece coordinate system and external workpiece coordinate offset values from G54 to G59.
The workpiece coordinate system offset data can be set as an absolute value or incremental value.

</td><td rowspan="7">±99999.999 (mm)</td></tr>
<tr><td>55</td><td>G55 offset</td></tr>
<tr><td>56</td><td>G56 offset</td></tr>
<tr><td>57</td><td>G57 offset</td></tr>
<tr><td>58</td><td>G58 offset</td></tr>
<tr><td>59</td><td>G59 offset</td></tr>
<tr><td>60</td><td>EXT offset</td></tr>
</table>

2.2 Process Parameters

<WRK COUNT> (No. of workpieces machined)

#	Item	Contents	Setting range (unit)
8001	WRK COUNT M	Set the M code that counts the No. of workpiece repeated machining. The No. will not be counted when set to 0.	0 to 99
8002	WRK COUNT	The current machining No. is displayed. Set the initial value.	0 to 999999
8003	WRK LIMIT	Set the maximum No. of workpieces machined. A signal is output to PLC when the No. of machining times is counted to this limit.	0 to 999999

<AUTO TLM> (Automatic tool length measurement)

#	Item	Contents	Setting range (unit)
8004	SPEED	Set the feedrate during automatic tool length measurement.	1 to 1000000 (mm/min)
8005	ZONE r	Set the distance between the measurement position and deceleration start point.	0 to 99999.999 (mm)
8006	ZONE d	Set the tolerable zone of the measurement position. If the sensor signal turns on in front of d before the measurement position, or if the signal does not turn on after d is passed, an alarm will occur.	0 to 99999.999 (mm)

<AUTO CORNER OVR> (Automatic corner override)

#	Item	Contents	Setting range (unit)
8007	OVERRIDE	Set the override value for automatic corner override.	0 to 100 (%)
8008	MAX ANGLE	Set the max. corner opening angle where deceleration should start automatically. If the angle is larger than this value, deceleration will not start.	0 to 180 (degrees)
8009	DSC. ZONE	Set the position where deceleration starts at the corner. Designate at which length point before the corner deceleration should start.	0 to 99999.999 (mm)

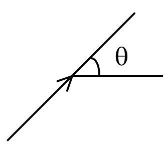
<T-TIP OFFSET> (Wear data input)

#	Item	Contents	Setting range (unit)
8010	ABS. MAX. (For L system only)	Set the max. value when inputting the tool wear compensation amount. A value exceeding this setting value cannot be set.	0 to 99.999 (mm)
8011	INC. MAX. (For L system only)	Set the max. value for when inputting the tool wear offset amount in the addition mode.	0 to 99.999 (mm)

<FIXED C.> (Fixed cycle)

#	Item	Contents	Setting range (unit)
8012	G73 n (For M system only)	Set the return amount for G73 (step cycle).	0 to 99999.999 (mm)
8013	G83 n	Set the return amount for G83 (deep hole drilling cycle).	0 to 99999.999 (mm)
8014	CDZ-VALE (For L system only)	Set the screw cut up amount for G76, 78 (thread cutting cycle).	0 to 127 (0.1 lead)
8015	CDZ-ANGLE (For L system only)	Set the screw cut up angle for G76, 78 (thread cutting cycle).	0 to 89 (degrees)
8016	G71 MINIMUM (For L system only)	Set the minimum cut amount for the final cutting in G71, 72 (rough cutting cycle). If the final cutting amount is smaller than this value, the final cut will not be performed.	0 to 99.999 (mm)
8017	DELTA-D (For L system only)	Set the change amount to the command cut amount D for G71, 72 (rough cutting cycle). Each cut amount will be the value obtained by adding or subtracting this value from command D, and thus, the amount can be changed each cut.	0 to 99.999 (mm)
8018	G84/G74 return (For M system only)	Set up return length m at a G84/G74 pecking tap cycle. **(Note)** Set 0 to specify a usual tap cycle.	0 to 99.999 (mm)

<PRECISION> (High precision control)

#	Item	Contents	Setting range (unit)
8019	R COMP	Set up a compensation factor for reducing a control error in the reduction of a corner roundness and arch radius. Indicates a maximum control error (mm) in parentheses. 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.	0 to 99 (%)
8020	DCC ANGLE	Set up the minimum value of an angle (external angle) that should be assumed to be a corner. When an inter-block angle (external angle) in high-precision mode is larger than the set value, it is determined as a corner and the speed goes down to sharpen the edge.  If the set value is smaller than θ, the speed goes down to optimize the corner. **(Note)** If “0” is set, it will be handled as 5 degrees. The standard setting value is “0”.	0 to 30 (degrees) 0: The angle will be 5 degrees.

2.3 Control Parameters

#	Item	Contents	Setting range (unit)
8101	MACRO SINGLE	Select the control of the blocks where the user macro command continues. 0: Do not stop while macro block continues. 1: Stop every block during signal block operation.	0/1
8102	COLL. ALM OFF	Select the interference (bite) control to the workpiece from the tool diameter during cutter compensation and nose R offset. 0: An alarm is output and operation stops when an interference is judged. 1: Changes the path to avoid interference.	0/1
8103	COLL. CHK OFF	Select the interference (bite) control to the work from the tool diameter during cutter compensation and nose R offset. 0: Performs interference check 1: Does not perform interference check	0/1
8105	EDIT LOCK B	Select the edit lock for program Nos. 8000 to 9999. 0: Program can be edited. 1: Editing of above program is prohibited.	0/1
8106	G46 NO REV-ERR (For L system only)	Select the control for the compensation direction reversal in G46 (nose R offset). 0: An alarm is output and operation stops when the compensation direction is reversed (G41 → G42, G42 → G41). 1: An alarm does not occur when the compensation direction is reversed, and the current compensation direction is maintained.	0/1
8107	R COMPENSATION	0: In arc cutting mode, the machine moves to the inside because of a delay in servo response to a command, making the arc smaller than the command value. 1: In arc cutting mode, the machine compensates the movement to the inside because of a delay in servo response to a command	0/1
8108	R COMP Select	Specify whether to perform arc radius error correction over all axes or axis by axis. 0: Perform correction over all axes. 1: Perform correction over axis by axis. **(Note)** This parameter is effective only when "#8107 R COMPENSATION" is 1.	0/1
8109	HOST LINK	Not used.	0

2.4 Axis Parameters

#	Item	Contents	Setting range (unit)
8201	AX. RELEASE	Select the function to remove the control axis from the control target. 0: Control as normal 1: Remove from control target	0/1
8202	OT-CHECK OFF	Select the stored stroke limit function set in #8204 and #8205. 0: Stored stroke limit valid 1: Stored stroke limit invalid	0/1
8203	OT-CHECK-CANCEL	When the simple absolute position method ("#2049 type" is 9) is selected, the stored stroke limits I, II (or IIB) and IB will be invalid until the first reference point return is executed after the power is turned on. 0: Stored stroke limit II valid (according to #8202) 1: Stored stroke limit II invalid **(Note)** This setting (#8203) affects all the stored stroke limits.	0/1
8204	OT-CHECK-N	Set the coordinates of the (–) direction in the moveable range of the stored stroke limit II or the lower limit coordinates of the prohibited range of stored stroke limit IIB. If the sign and value are the same as #8205 (other than "0"), the stored stroke limit II (or IIB) will be invalid. If the stored stroke limit IIB function is selected, the prohibited range will be between two points even when #8204 and #8205 are set in reverse. When II is selected, the entire range will be prohibited.	–99999.999 to +99999.999 (mm)
8205	OT-CHECK-P	Set the coordinates of the (+) direction in the moveable range of the stored stroke limit II or the upper limit coordinates of the prohibited range of stored stroke limit IIB.	–99999.999 to +99999.999 (mm)
8206	TOOL CHG. P	Set the coordinates of the tool change position for G30. n (tool change position return). Set with coordinates in the basic machine coordinate system.	–99999.999 to +99999.999 (mm)
8207	G76/87 IGNR (For M system only)	Select the shift operation at G76 (fine boring) and G87 (back boring). 0: Shift effective 1: No shift	0/1

#	Item	Contents	Setting range (unit)
8208	G76/87 (–) (For M system only)	Specify the shift direction at G76 and G87. 0: Shift to (+) direction 1: Shift to (–) direction	0/1
8209	G60 SHIFT (For M system only)	Set the last positioning direction and distance for a G60 (uni-directional positioning) command.	–99999.999 to +99999.999 (mm)
8210	OT INSIDE	The stored stoke limit function set in #8204 and #8205 prevents the machine from moving to the inside or outside of the specified range. 0: Inhibits outside area. (select stored stroke limit II.) 1: Inhibits inside area. (select stored stroke limit II B.)	0/1

2.5 Barrier Data

#	Item	Contents	Setting range (unit)
8300	P0 (For L system only)	Set the reference X-coordinates of the chuck and the tail stock barrier. Set the center coordinate (Radius value) of workpiece by the basic machine coordinate system.	–99999.999 to +99999.999 (mm)
8301 8302 8303 8304 8305 8306	P1 P2 P3 P4 P5 P6 (For L system only)	Set the area of the chuck and tail stock barrier. (Radius value) Set the coordinate value from the center of workpiece for X-axis. Set the coordinate value by basic machine coordinate system for Z-axis.	–99999.999 to +99999.999 (mm)

3. I/O Parameters

3.1 Base Parameters

<I/O>	#	<PORT No.>	#	<DEV. No.> <DEV. NAME>
		Specify the board No. to which the serial input/output device is connected to each application.		Set the input/output device No. for each application. The device Nos. are 0 to 4 and correspond to the input/output device parameters. The device name set in the input/output device parameter is also displayed for identification.
DATA IN	9001	Specify the port for inputting the data such as machine program and parameters.	9002	Specify the No. of the device that inputs the data.
DATA OUT	9003	Specify the port for outputting the data such as machine program and parameters.	9004	Specify the No. of the device that outputs the data.
TAPE MODE	9005	Specify the input port for running with the tape mode.	9006	Specify the No. of the device to be run with the tape mode.
MACRO PRINT	9007	Specify the output port for the user macro DPRINT command.	9008	Specify the No. of the device for the DPRINT command.
PLC IN/OUT	9009	Specify the port for inputting/outputting various data with PLC.	9010	Specify the No. of the device for the PLC input/output.
REMOTE PROG IN	9011	Not used.	9012	Not used.

3.2 I/O Device Parameters

Parameters for up to five types of input/output devices can be set in DEV <0> to <4>.

(Note) The parameters are set for each device.

9101 ~	Set the same settings for device 0.
9201 ~	Set the same settings for device 1.
9301 ~	Set the same settings for device 2.
9401 ~	Set the same settings for device 3.
9501 ~	Set the same settings for device 4.

#	Item	Contents	Setting range (unit)
9101 9201 9301 9401 9501	DEVICE NAME 0 DEVICE NAME 1 DEVICE NAME 2 DEVICE NAME 3 DEVICE NAME 4	Set the device name corresponding to the device No. Set a simple name for quick identification.	Use alphabet characters, numerals and symbols to set a name within 3 characters.
9102 9202 9302 9402 9502	BAUD RATE	Set the serial communication speed.	1: 9600 (bps) 2: 4800 3: 2400 4: 1200 5: 600 6: 300 7: 150
9103 9203 9303 9403 9503	STOP BIT	Set the stop bit length used in the start-stop system.	1: 1 (bit) 2: 1.5 3: 2
9104 9204 9304 9404 9504	PARITY CHECK	Specify whether to add the parity check bit to the data during communication.	0: Parity bit not added 1: Parity bit added
9105 9205 9305 9405 9505	EVEN PARITY	Specify the odd or even parity when it is added to the data.	0: Odd parity 1: Even parity
9106 9206 9306 9406 9506	CHR. LENGTH	Set the length of the data bit.	0: 5 (bit) 1: 6 2: 7 3: 8

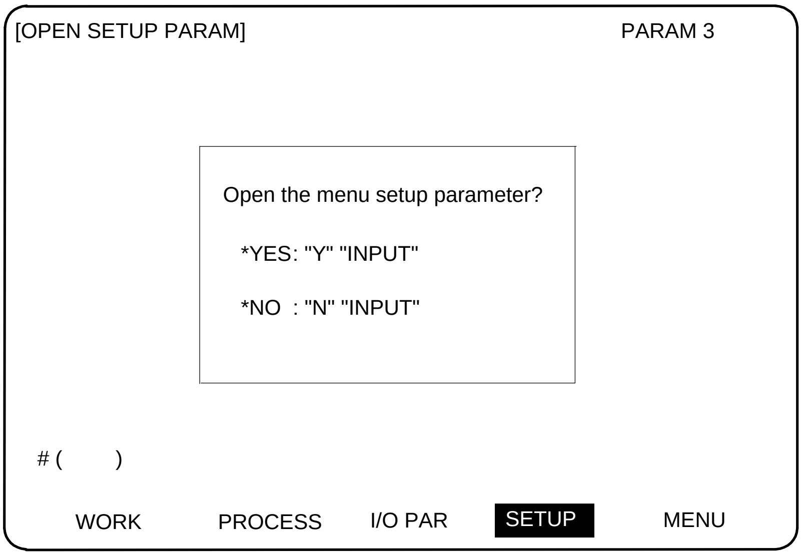
#	Item	Contents	Setting range (unit)
9107 9207 9307 9407 9507	TERMINATOR TYPE	The code to terminate data reading can be selected.	0 and 3: EOR 1 and 2: EOB or EOR
9108 9208 9308 9408 9508	HAND SHAKE	Specify the transmission control method. The method will be no procedure if a value except 1 to 3 is set.	1: RTS/CTS method (This method can be used only for SIO2.) 2: No procedure (No handshaking) 3: DC code method
9109 9209 9309 9409 9509	DC CODE PARITY	Specify the DC code when the DC code method is selected.	0: No parity to DC code (DC3 = 13H) 1: DC code with parity (DC3 = 93H)
9111 9211 9311 9411 9511	DC2/DC4 OUTPUT	Specify the DC code handling when outputting data to the output device.	DC2 / DC4 0: None / None 1: Yes / None 2: None / Yes 3: Yes / Yes
9112 9212 9312 9412 9512	CR OUTPUT	Specify whether to insert the <CR> code just before the EOB (L/F) code during output.	0: Do not add 1: Add
9113 9213 9313 9413 9513	EIA Output	In data output mode, select the ISO or EIA code for data output. In data input mode, the ISO and EIA codes are identified automatically.	0: ISO code output 1: EIA code output
9114 9214 9314 9414 9514	FEED CHR.	Specify the length of the tape feed to be output at the start and end of the data during tape output.	0 to 999 (characters)
9115 9215 9315 9415 9515	PARITY V	Specify whether to check the parity of the No. of characters in block during data input. The No. of characters is factory-set so that the check is valid at all times.	0: Do not perform parity V check 1: Perform parity V check

#	Item	Contents	Setting range (unit)
9116 9216 9316 9416 9516	TIME-OUT (s)	Set the time out time to detect an interruption in communication. The time out is not checked when 0 is set, so the waiting time will be infinite. The screens cannot be changed during the waiting time. Set this time to 10 as the standard.	0 to 30 (s)
9117 9217 9317 9417 9517	DR OFF	Specify whether to check the DR data at the data input/output.	0: DR valid 1: DR invalid
9118 9218 9318 9418 9518	DATA ASC II	0: Output in ISO/EIA code (Depends on whether #9113, #9213, #9313, #9413, or #9513 EIA output parameter is set up) 1: Output in ASC II code	0/1
9119 9219 9319 9419 9519	INPUT FORM	Specify the mode for input (collation). 0: Standard input (Data from the very first EOB is handled as significant information.) 1: EOBs following the first EOB of the input data are skipped until data other than EOB is input.	0/1
9121 9221 9321 9421 9521	EIA CODE [	When outputting with the EIA codes, special ISO codes not included in EIA can be output with alternate codes. For each special code, designate a code (as a hexadecimal) that is not duplicated with existing EIA codes. (Continued on the next page.)	0 to FF (hexadecimal)
9122 9222 9322 9422 9522	]		
9123 9223 9323 9423 9523	#		
9124 9224 9324 9424 9524	*		

#	Item	Contents	Setting range (unit)
9125 9225 9325 9425 9525	=	(Continued from the previous page.)	
9126 9226 9326 9426 9526	:		
9127 9227 9327 9427 9527	$		
9128 9228 9328 9428 9528	!		

4. Setup Parameters

Pressing the menu key SETUP displays the OPEN SETUP PARAM screen.
The system's basic parameters are normally hidden as setup parameters to prevent mistaken operations and to simplify the display.
The setup parameters can be displayed and set by making a declaration to open the setup parameters on this screen.



1) Select the setup parameter.
   Key-in Y in # ( ), and then press INPUT.
   The basic specification parameter screen appears and the normally hidden setup parameter menu will display.
   The required menu can be selected to display and set the setup parameters.

2) Cancel the setup parameter selection.
   Key-in N in # ( ), and then press INPUT.
   The setup parameter menu will disappear.
   (Note) The setup parameters are not displayed when the power is turned on.

Refer to "5. Base Specifications Parameters" and following for details on the setup parameters.
Be sure to turn off the power supply after selecting the setup parameter.

5. Base Specifications Parameters

After setting up the parameter (PR) listed in the table, turn off the NC power. To validate the parameter, turn on the power again.

#	Items		Details	Setting range (unit)
1001 (PR)	SYS_ON	Part system validation setup	Specify the presence of the PLC axes and the 1st to 7th part systems with 1 or 0.	0: Not used 1: Used
1002 (PR)	axisno	Number of axes	Set No. of axes in each part system and the No. of PLC axes. Set so that the total of the NC axes and PLC axes is less than the maximum number of controllable axes.	0 to 14
1003 (PR)	iunit	Input setup unit	Specify the input setting value for each part system and the PLC axis. The parameter units will follow this specification.	B: 1 µm C: 0.1 µm
1013	axname	Axis name	Specify each axis' name address with an alphabetic character. Use the characters X, Y, Z, U, V, W, A, B or C. Do not specify the same address in one part system. The same address can be specified as the other part system. The PLC address does not need to be set. (The axis name is displayed as 1 and 2.)	Axis addresses such as X, Y, Z, U, V, W, A, B, and C
1014	incax	Increment command axis name	When specifying the program movement rate's absolute or incremental method with an address, specify the incremental command axis name address with an alphabetic character. The address that can be used is the same as "#1013 axname". Specify an address that is different from that #1013. Setting is not required if absolute/incremental command with addresses is not performed ("#1076 Abslnc" = 0).	
1015 (PR)	cunit	Command unit	Specify the minimum unit of the program movement amount. cunit Movement amount for movement command 1 10: 0.001 mm (1 µm) 100: 0.01 mm (10 µm) 1000: 0.1 mm (100 µm) 10000: 1.0 mm If there is a decimal point in the movement command, the decimal point position will be handled as 1mm regardless of this setting.	10 : 1 µm 100 : 10 µm 1000 : 100 µm 10000 : 1 mm
1016 (PR)	iout	Inch output	Specify whether the machine system (ball screw pitch, position detection unit) is an inch unit system or metric unit system.	0: Metric unit system 1: Inch unit system

#	Items		Details	Setting range (unit)
1017 (PR)	rot	Rotational axis	Specify whether the axis is a rotary axis or linear axis. For the rotary axis, the position display will be 360 degrees, and the axis will return to 0 degrees. If the position display is to be continuously displayed even with the rotary axis, set the axis as a linear axis	0: Linear axis 1: Rotary axis
1018 (PR)	ccw	Motor CCW	Specify the direction of the motor rotation to the command direction. 0: Rotates clockwise (looking from motor shaft) with the forward rotation command. 1: Rotates counterclockwise (looking from motor shaft) with the forward rotation command.	0: Rotates clockwise 1: Rotates counter-clockwise
1019 (PR)	dia	Diameter specification axis	Specify whether the program movement amount is to be commanded with the diameter dimension or as movement amount. When the movement amount is commanded with the diameter dimensions, 5mm will be moved when the command is a movement distance of 10mm. The movement amount per pulse will also be halved during manual pulse feed. Among parameters concerning length, the tool length, the wear compensation amount and the workpiece coordinate offset are displayed in diameter value when diameter is specified, but other parameters are always displayed in radius value.	0: Command with movement amount 1: Command with diameter dimension
1020 (PR)	sp_ax	Spindle Interpolation	Specify 1 when the NC control axis is used as the spindle.	0: The NC control axis is used as the servo axis. 1: The NC control axis is used as the spindle.

#	Items		Details	Setting range (unit)
1025	I_plane	Initial plane selection	Specify the plane to be selected when the power is turned on or reset. When 0 is specified, 1 is assumed (X-Y plane).	1: X-Y plane (G17 command state) 2: Z-X plane (G18 command state) 3: Y-Z plane (G19 command state)
1026 1027 1028	base_I base_J base_K	Base axis I Base axis J Base axis K	Specify the basic axis address that composes the plane. Specify the axis address set in “#1013 axname”. Set the axis name even when there is no need to configure a plane, such as the case of 2-axis specifications. Normally, when X, Y and Z are specified respectively for base_I,_J,_K, the following relation will be established: G17: X-Y G18: Z-X G19: Y-Z Specify the desired address to set an axis address other than the above.	Control axis addresses such as X, Y, and Z
1029	aux_I	Flat axis I	If there is an axis parallel to "#1026 base_I", specify that axis address.	Control axis addresses such as X, Y, and Z
1030	aux_J	Flat axis J	If there is an axis parallel to "#1027 base_J", specify that axis address.	Control axis addresses such as X, Y, and Z
1031	aux_K	Flat axis K	If there is an axis parallel to "#1028 base_K", specify that axis address.	Control axis addresses such as X, Y, and Z

<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td>1037</td><td>cmdtyp</td><td>Command type</td><td>Specify the program G code series and compensation type.
<table>
<tr><td>cmdtyp</td><td>G code series</td><td>Compensation type</td></tr>
<tr><td>1</td><td>System 1 (for M)</td><td>Type A (one compensation amount for one compensation number)</td></tr>
<tr><td>2</td><td>System 2 (for M)</td><td>Type B (shape and wear amounts for one compensation number)</td></tr>
<tr><td>3</td><td>System 2 (for L)</td><td>Type C (two kinds of compensation amount of shape and wear per compensation No.)</td></tr>
<tr><td>4</td><td>System 3 (for L)</td><td>Same as above</td></tr>
<tr><td>5</td><td>System 4
(for special L)</td><td>Same as above</td></tr>
<tr><td>6</td><td>System 5
(for special L)</td><td>Same as above</td></tr>
<tr><td>7</td><td>System 6
(for special L)</td><td>Same as above</td></tr>
<tr><td>8</td><td>System 7
(for special L)</td><td>Same as above</td></tr>
</table>
There are some items in the specifications that can be used or cannot be used according to the value set in this parameter.
The file structure may also change depending on the compensation data type.
Thus, after changing this parameter, initialize the system with "#1060 SETUP".

(1060) DATA (1) ( ) [INPUT]
↓
"BASE PARA SET? (Y/N)" : N [INPUT]
↓
"FORMAT? (Y/N)" : Y [INPUT]
↓
"SETUP COMPLETE"

(Note) The machining program is cleared with the above operations. Back up necessary machining programs in an external memory before initializing.</td><td>1 to 8</td></tr>
<tr><td>1038</td><td>plcsel</td><td>Ladder selection</td><td>Specify the PLC type.</td><td>0 to 2</td></tr>
</table>

#	Items		Details	Setting range (unit)
1039	spinno	Number of spindles	Specify the existence of a spindle. 0: No spindle 4: Four spindles 1: One spindle 5: Five spindles 2: Two spindles 6: Six spindles 3: Three spindles 7: Seven spindles	0 to 7
1040 (PR)	M_inch	Constant input (inch)	Specify the parameter unit system for the position and length.	0: Metric system 1: Inch system
1041 (PR)	I_inch	Initial state (inch)	Specify the unit system for the program movement amount when the power is turned on or reset and for position display.	0: Metric system 1: Inch system
1042 (PR)	pcinch	PLC axis command (inch)	Specify the unit system for the commands to the PLC axis.	0: Metric system 1: Inch system
1043	lang	Select language displayed	Specify the display language. 0 : Japanese display 1 : English display 21: Polish display **(Note)** If no character package is available for a specified language, the screen is displayed in English.	0/1/21
1044 (PR)	auxno	MR-J2-CT connections	Specify the number of MR-J2-CT axes connected. As for C6/C64 system, up to 5 axes of MR-J2-CT can be connected, thus, the setting range is 0 to 5.	0 to 7

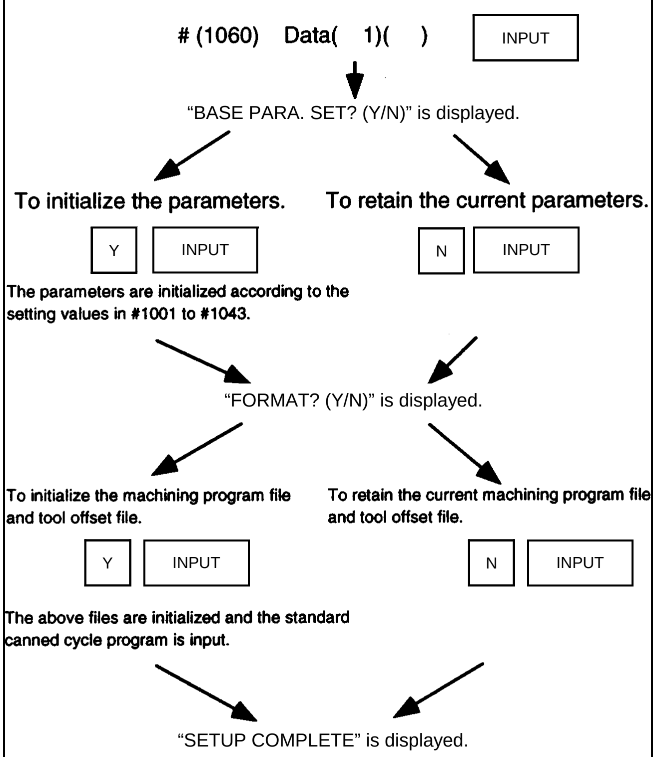
(Note) Selection of inch and metric unit
When set value of "#1041 I_inch" is changed, the unit of length is changed after reset.
Among parameters concerning length, following items are not changed automatically, therefore change the set values to agree with the new unit system when the unit system is changed.

Tool compensation amount (Tool length compensation amount, tool wear compensation amount and tool tip compensation amount)			
Workpiece coordinate offset			
Machining parameter	#8004 SPEED	#8013 G83n	#8052 PULL UP
	#8005 ZONE r	#8016 G71 MINIMUM	#8053 G73U
	#8006 ZONE d	#8017 G71 DELTA-D	#8054 W
	#8009 DSC. ZONE	#8018 G84/G74n	#8056 G74 RETRACT
	#8010 ABS. MAX.	#8027 Toler-1	#8057 G76 LAST-D
	#8011 INC. MAX.	#8028 Toler-2	
	#8012 G73n	#8051 G71 THICK	
Axis parameter	#8204 OT-CHECK-N		
	#8205 OT-CHECK-P		
	#8206 TOOL CHG.P		
	#8209 G60 Shift		
Barrier data	#8300 – #8306		
Basic specification parameter	#1084 RadErr		

#8004 SPEED is 10 inches/min. unit for the inch system.

<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td>1060</td><td>SETUP</td><td>Activate setup processing</td><td>Execute the functions required for initializing the system.

1: Execute one-touch setup



(Note) Most setup parameters will be initialized with one-touch setup, so confirm the data before executing.
This parameter will automatically be set to 0 when the power is turned on.</td><td>1</td></tr>
<tr><td>1061
(PR)</td><td>intabs</td><td>Manual ABS updating</td><td>Defines whether to update the absolute value data during automatic handle interrupt.
This parameter is valid only when "#1145 I_abs" is set to 1.</td><td>0: Does not update (shift coordinates by the amount of the interruption)
1: Updates (same coordinates as when interrupt did not occur will be applied.)</td></tr>
</table>

<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td>1062</td><td>T_cmp</td><td>Tool offset function</td><td>Specify whether the tool length offset and wear compensation is valid during T command execution.
<table><tr><th>Setting value</th><th>Tool length offset</th><th>Wear compensation</th></tr><tr><td>0</td><td>Valid</td><td>Valid</td></tr><tr><td>1</td><td>Valid</td><td>Invalid</td></tr><tr><td>2</td><td>Invalid</td><td>Valid</td></tr><tr><td>3</td><td>Invalid</td><td>Invalid</td></tr></table></td><td>0 to 3</td></tr>
<tr><td>1063</td><td>mandog</td><td>Manual dog-type</td><td>The initial return to the reference point is performed with dog-type return after the power is turned on, and the coordinate system is established.
Specify the manual reference point return method after the coordinate system is established with this parameter.
(This setting is not required when using absolute position detection.)</td><td>0: High speed return
1: Dog-type</td></tr>
<tr><td>1064
(PR)</td><td>svof</td><td>Error correction</td><td>Specify whether to correct the error when the servo is off.</td><td>0: Does not correct the error
1: Corrects the error</td></tr>
<tr><td>1065</td><td>JOG_H</td><td>JOG response type</td><td>Set up an improved JOG response type.
0: Conventional specification
The system is started and stopped by signals via ladder without reference to external input signals.
1: Type 1
The system is started up and stopped by external signals.
2: Type 2
The system is started up and stopped by performing the AND operation for external signals and signals via ladder.
3: Type 3
The system is started up when signals via ladder rise. It is stopped when external signals and signals via ladder fall.
4: Type 4
Reference point return mode:
The system is started up and stopped by signals via ladder without reference to external input signals (conventional specification).
Non-reference point return mode:
The system is started up and stopped by performing AND for external signals and signals via ladder (type 2).</td><td>0 to 4</td></tr>
</table>

#	Items		Details	Setting range (unit)
1066	JOG_HP	Select JOG activation (+) device	Specify the number of the device that inputs +JOG activation signals. The device type is specified by "#1071 JOG_D". The effective range of set values vary depending on the device type. A value outside of the effective range is invalid if specified. **(Note)** The setting range of this parameter has been expanded on the software Ver.D0 and later.	X: 0000 to 03FF (hexadecimal) M: 0000 to 8191 (decimal)
1067	JOG_HN	Select JOG activation (–) device	Specify the number of the device that inputs -JOG activation signals. The device type is specified by "#1071 JOG_D". The effective range of set values vary depending on the device type. A value outside of the effective range is invalid if specified. **(Note)** The setting range of this parameter has been expanded on the software Ver.D0 and later.	X: 0000 to 03FF (hexadecimal) M: 0000 to 8191 (decimal)
1068 (PR)	slavno	Slave axis number	Specify the axis number of a slave axis to be synchronized. The axis number is an NC number excluding the spindle and PLC axis. Two or more slave axes cannot be set up for one master axis. This parameter "slavno" cannot be set up for a slave axis. A multiple part system cannot be set up so that the relation between the master and slave axes extends over a part system.	0: No slave axis 1 to 6: First to sixth axes
1069 (PR)	no_dsp	Axis with no counter display	Set up an axis that displays no counter. This option is valid on the counter display screen (e.g. POSITION screen).	0: Displays the counter 1: Does not display the counter.
1070	axoff	Axis removal	Define an axis that enables axis removal control.	0: Disables axis removal. 1: Enables axis removal
1071 (PR)	JOG_D	±JOG activation signal device name	Specify the number of the device that inputs ±JOG activation signals. 0 : X device 1 or 2: M device Set the JOG_HP (#1066) and JOG_HN (#1067) parameters according to this device specification parameter. **(Note)** The setting range of #1066 and #1067 parameters has been expanded on the software Ver.D0 and later.	0 to 2

#	Items		Details	Setting range (unit)
1073	I_Absm	Initial absolute value	Specify the absolute value/incremental value mode for when the power is turned on or reset.	0: Incremental value command mode 1: Absolute value command mode
1074	I_Sync	Initial synchronous feed	Specify the feedrate specification mode for when the power is turned on or reset. 0: Asynchronous feed (feed per minute) 1: Synchronous feed (feed per rotation)	0: Asynchronous feed 1: Synchronous feed
1075	I_G00	Initial G00	Specify the linear command mode for when the power is turned on or reset. 0: Linear interpolation (G01 command state) 1: Positioning (G00 command state)	0: Linear interpolation 1: Positioning
1076	AbsInc (For L system only)	ABS/INC address	The absolute value/incremental commands can be issued by using the absolute value address and incremental value address for the same axis. 0: Absolute/incremental with G command 1: Absolute/incremental with address code (The "#1013 axname" address will be the absolute value command, and "#1014 incax" address will be the incremental value command)	0: Absolute/ incremental with G command 1: Absolute/ incremental with address code
1077	radius	Incremental command for diameter specification axis	Specify if the diameter specification axis' ("#1019 dia" is set to 1) incremental value command uses the diameter value or radius value	0: Diameter value 1: Radius value
1078	Decpt2	Decimal point type 2	Specify the unit of position commands that do not have a decimal point. 0: The min. input command unit is used (follows "#1015 cunit") 1: 1mm (or 1inch) unit is used	0: The min. input command unit is used 1: 1mm (or 1inch) unit is used
1079	F1digt	Validate F1 digit	Specify whether to execute the F command with a 1-digit code command or with a direct numerical command. 0: Direct numerical command (command feedrate during feed per minute or rotation) 1: 1-digit code command (feedrate specified with "#1185 spd_F1" to "#1189 F5")	0: Direct numerical command 1: 1-digit code command

#	Items		Details	Setting range (unit)
1080	Dril_Z (For M system only)	Specify boring axis	Specify a fixed-cycle boring axis. 0: Uses an axis perpendicular to the selected plane as the boring axis. 1: Uses the Z axis as the boring axis regardless of the selected plane.	0/1
1081	Gmac_P	Give priority to G code parameter	Specify the G code priority relationship during the macro call with the G command. 0: G code used in system is priority 1: Registered G code for call out is priority	0/1
1082	Geomet (For L system only)	Geometric	Specify the validity of the geometric function. As the designated address code is used exclusively for geometric, if "A" or "C" is used for the axis address or 2nd miscellaneous command code, "A" that is the axis address may be handled as the geometric's angle specification. Take special care to the setting of the axis name, etc., when using this function.	0: Invalid 1: Valid
1084	RadErr	Arc error	Specify the tolerable error range when a deviation occurs in the end point and center coordinate in the circular command.	0 to 1.000 (mm)
1085	G00Drn	G00 dry run	Specify whether to apply dry run (feed with manual setting speed instead of command feedrate) to the G00 command. 0: Does not apply to G00 (moves at rapid traverse feedrate) 1: Applies to G00 (moves at manual set feedrate)	0/1
1086	G0lntp	G00 non-interpolation	Specify the G00 movement path type 0: Moves linearly toward the end point (interpolation type) 1: Moves to the end point of each axis at the rapid traverse feedrate for each axis (non-interpolation)	0/1
1087	G96_G0	Constant surface speed control by rapid traverse feed command	Specify how to handle the cycle speed for the G00 command when using the constant surface speed control function. 0: Calculates the cycle speed constantly even during G00 movement. 1: Calculates the cycle speed at the block end point in the G00 command.	0/1

#	Items		Details	Setting range (unit)
1088	G30SL	Disable G30 soft limit	Specify how to handle the soft limit during G30 (2nd reference point return) movement. 0: Soft limit valid during G30 movement 1: Soft limit invalid during G30 movement	0/1
1089	Cut_RT	Short cut for rotary axis	Specify how to handle the short cut control for the rotary axis ("#1017 rot" is set to 1). 0: No short cut (move toward end point) 1: Uses short cut (when using the absolute value command, move in the direction where the movement amount will be 180 degrees or less)	0: No short cut 1: Use short cut
1090	Lin_RT	Linear rotary axis	Specify how to handle a command for the rotary axis that exceeds 360 degrees. 0: For absolute value commands that exceed 360 degrees, the value will be converted into a remainder of 360 degrees and the axis will move. **Example:** If the command is 420 degrees, the applied value will be 60 degrees. 1: For absolute value commands that exceed 360 degrees, the axis will move in the same manner as a linear axis. **Example:** If the command is 420 degrees, the axis will pass the 360 degree position and will move to the 60 degree position.	0/1
1091	Mpoint	Ignore middle point	Specify now to handle the middle point during G28 and G30 reference point return. 0: Moves to the reference point after passing the middle point designated in the program. 1: Ignores the middle point designated in the program and move straight to the reference point.	0/1
1092	Tchg _A	Replace tools for additional axis	Specify the movement of the additional axis during tool change position return. 0: The additional axis does not move with the tool change position return command. 1: After returning the standard axis with the tool change position return command, the additional axis also returns to the tool change position.	0/1
1093	Wmvfin	Waiting method between part systems	Specify the method for waiting between part systems. When the movement command is found in the wait command ! block: 0: Waits before executing movement command 1: Waits after executing movement command	0/1
1094	Tl_SBK (for L system only)	Select life count for single block	Select whether to count the data units to be used for a single block when using the tool life management II function (lathe system). 0: Does not count the data units. 1: Count the data units.	0/1

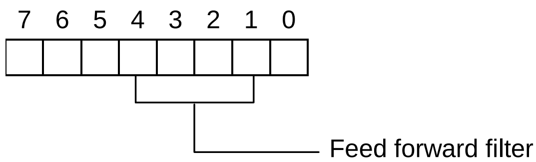
#	Items		Details	Setting range (unit)
1095	T0tfof	TF output	Select how to handle TF for T00 command. 0: TF is output. 1: TF is not output	0/1
1096	T_Ltyp (For L system only)	Tool life management type	Specify the tool life management type.	1: Life management type I 2: Life management type II
1097	T1digt	Tool wear compensation number 1-digit command	Specify the No. of digits in the tool wear compensation No. in the T command. 0: The 2 high-order digits are the tool No., and the 2 low-order digits are the wear compensation No. 1: The 3 high-order digits are the tool No., and the 1 low-order digit is the wear compensation No. This parameter will be fixed to 0 when tool life management II is selected.	0/1
1098	Tlno.	Tool length offset number	Specify the No. of digits in the tool length offset No. in the T command. 0: The 2 or 3 high-order digits are the tool No. The 2 or 1 low-order digits are the tool length offset and wear compensation Nos. 1: The 2 or 3 high-order digits are the tool No. and tool length offset Nos. The 2 or 1 low-order digits are the wear compensation No.	0/1
1099	Treset	Cancel tool wear compensation amount	Specify how to handle tool compensation vector when resetting system. 0: Clears the tool length and wear compensation vectors when resetting. 1: Saves the tool length and wear compensation vectors when resetting. When the values are cleared, the compensation will not be applied, so the axis will move the compensation amount in the next compensation operation. When the values are saved, the compensation will be applied, so the axis will shift the differential amount of the compensation amount in the next compensation operation.	0: Clears 1: Saves

#	Items		Details	Setting range (unit)
1100	Tmove	Tool wear compen-sation	Specify the period to perform tool length offset and wear compensation. 0: Compensate when T command is executed. 1: Superimpose and compensate with the movement command in the block where the T command is located. If there is no movement command in the same block, compensation will be executed after the movement command is superimposed in the next movement command block. 2: Compensate when the T command is executed. 1: Superimpose and compensate a tool length offset with the movement command in the same block. If there is no movement command in the same block, compensation will be executed after the movement command is superimposed in the next movement command block.	0 to 2
1101	Tabsmv	Tool wear compen-sation method	Specify the type of movement command when "#1100 Tmove" is set to 1. 0: Compensate regardless of the movement command type. 1: Compensate only at the movement command in the absolute value command.	0: Compensate regardless of the command type. 1: Compensate only with the absolute value command.
1102	tlm (For L system only)	Manual tool length measuring system	Specify the measurement method for manual tool measurement l. 0: Align tool with basic position 1: Input measurement results	0: Basic position method 1: Measured value input method
1103	T_life	Validate life management	Select the usage of the tool life management function.	0: Do not use. 1: Perform tool life management control.
1104	T_Com2	Tool command method 2	Select the command method for when "#1103 T_Life" is set to 1. 0: Handle the program tool command as the group No. 1: Handle the program tool command as the tool No.	0/1

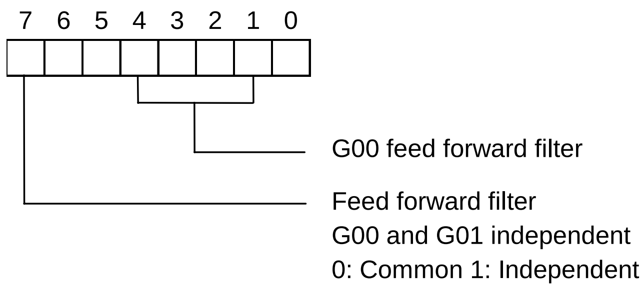
#	Items		Details	Setting range (unit)
1105	T_Sel2	Tool selection method 2	Select the tool selection method for when "#1103 T_Life" is set to 1. 0: Select in order of registered No. from the tools used in the same group. 1: Select the tool with the longest remaining life from tools used in the same group and the unused tools.	0/1
1106	Tcount (For L system only)	Life management count	Specify the function when address N is omitted when inputting data (G10 L3 command) for tool life management function ll.	0: Time specified input 1: No. of times specified input
1107	Tllfsc (For L system only)	Split life management display screen	Set up the number of groups to be displayed on the tool life management II (lathe system) screen. 0: Displayed group count 1 1: Displayed group count 2 2: Displayed group count 4	0 to 2
1108	TlrectM (For L system only)	Life management re-count M code	Set up the M code for tool life management II (lathe system) re-count.	0 to 99
1109 (PR)	subs_ M	Validate alternate M code	Select the user macro interrupt with the substitute M code.	0: Alternate M code invalid 1: Alternate M code valid
1110	M96_M	M96 alternate M code	Specify an M code to replace M96 when "#1109 subs_M" is set to 1.	3 to 97 (excluding 30)
1111	M97_M	M97 alternate M code	Specify an M code to replace M97 when "#1109 subs_M" is set to 1.	
1112 (PR)	S_TRG	Validate status trigger system	Specify the validity conditions for the user macro interrupt signal. 0: Valid when interrupt signal (UIT) turns off to on. 1: Valid when interrupt signal (UIT) is ON.	0: Valid when interrupt signal (UIT) turns off to on. 1: Valid when interrupt signal (UIT) is ON.
1113 (PR)	INT_2	Validate interrupt method type 2	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.	0/1

#	Items		Details	Setting range (unit)
1114	mcrint	Macro argument initialization	Select whether to clear statements other than specified arguments by macro call. Also, select whether to clear local variables by power-on and resetting. 0: Delete non-specified arguments by macro call. 1: Retain non-specified arguments by macro call. 2: Retain non-specified arguments by macro call and clear local variables by power-on and resetting.	0/1/2
1115	thwait	Waiting for thread cutting	Set the queue number during screw thread cutting when the chamfering is not valid.	0 to 99 (Approx. 4 ms.) Standard set value: 4
1116	G30SLM	Invalidate soft limit (manual operation)	Enable this function when disabling the soft limit check function from the second to the fourth reference point return by manual operation.	0: Enable soft limit function. 1: Disable soft limit function.
1117	H_sens	Handle response switch	Switch the handle response mode when feeding the handle. 0: Standard handle response 1: High-speed handle response	0/1
1118	mirr_A (For L system only)	Select how to set up the length of tools on facing turret (double-turret mirror image)	Select one of the following two methods. 0: Set up the current length of tools on facing turret. 1: Set up a value, assuming that the tools on facing turret is in the same direction as that of those on the base turret.	0/1
1119	Tmiron (For L system only)	Select the double-turret mirror image with T command	Select whether to validate the double-turret mirror image with the T command.	0: Invalid 1: Valid
1120 (PR)	TofVal	Change macro variable	Specify whether to change the macro variable (tool offset) numbers for shape compensation and wear compensation. 0: Do not change. (Conventional specifications) 1: Change the shape and wear compensation variable numbers each for X, Z, and R.	0/1

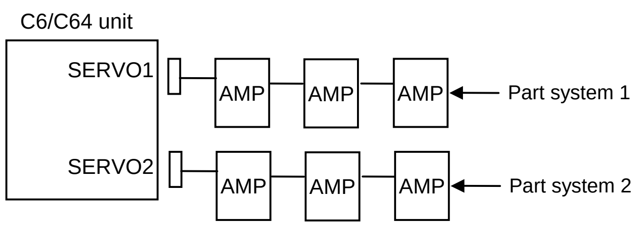
#	Items		Details	Setting range (unit)
1121	edlk_c	Edit lock C	Specify whether to prohibit editing of program Nos. 9000 to 9999.	0: Editing possible 1: Editing prohibited
1122 (PR)	pglk_c	Program display lock	The display and search of program Nos. 9000 to 9999 can be prohibited. Specify whether to prohibit display and search. 0: Display and search is possible 1: Program details are not displayed 2: Program details are not displayed, and operation search is prohibited. The program details will not be displayed, but the program No. and sequence No. will display in the prohibited state.	0 to 2
1123	origin	Origin zero inhibition	Select whether to use the origin zero function.	0: Use 1: Do not use
1124	ofsfix	Fix tool wear compen-sation number	Specify whether to automatically increment the offset No. by 1 with the input or to display the No. as it is in the setting on the tool offset screen. 0: Increment the # No. by 1 when the input key is pressed. (Same as general parameters) 1: # No. does not change even if input key is pressed. When making settings in sequence, 0 is handier. When changing and setting repeatedly while adjusting one offset value, 1 is handier	0/1
1125	real_f	Actual feedrate display	Specify the feedrate display on the monitor screen.	0: Command speed 1: Real move-ment feedrate
1126	PB_G90		Not used.	0
1127	DPRINT	DPRINT alignment	Specify the alignment for printing out with the DPRINT function. 0: No alignment, data is printed with left justification. 1: Align the minimum digit and output.	0/1

#	Items		Details	Setting range (unit)
1128	RstVCI	Clear variables by resetting	Specify how to handle the common variables when resetting. 0: Common variables do not change after resetting. 1: The following common variables are cleared by resetting: During variable 100 sets specifications: #100 to #149 are cleared. During variable 200 or 300 sets specifications: #100 to #199 are cleared.	0/1
1129	PwrVCI	Clear variables by power-on	Specify how to handle the common variables when the power is turned on. 0: The common variables are in the same state as before turning the power off. 1: The following common variables are cleared when the power is turned on. During variable 100 sets specifications: #100 to #149 are cleared. During variable 200 or 300 sets specifications: #100 to #199 are cleared.	0/1
1130	set_t	Display selected tool number	Specify the tool command value display on the POSITION screen. 0: T-modal value of program command is displayed. 1: Tool number sent from PLC is displayed.	0/1
1131 (PR)	Fldcc	Feed forward filter	Parameter to suppress acceleration changes with a filter when starting acceleration or deceleration. Specify the parameter in bits. 	bit1: 7.1 (ms) bit2: 14.2 (ms) bit3: 28.4 (ms) bit4: 56.8 (ms) If bit 1 to bit 4 are all 0 or two or more bits of bit 1 to bit 4 are 1, 3.5 ms is set up.
1132	CRT	CRT brightness control	This parameter adjusts the brightness of the CRT display unit. 3:Highest luminance (Brightest state) –3:Lowest luminance (Darkest state) Adjust this parameter to an appropriate brightness between –3 and 3. The EL display unit does not have brightness adjustment, so setting is not required.	–3 to 3

#	Items		Details	Setting range (unit)
1133	ofsmem	Select how to set up tool wear compensa-tion screen	Select the number stored by previous setup when selecting the tool wear compensation screen. 0: Does not display the number when selecting the screen. 1: Displays the stored number when selecting the screen.	0/1
1134	LCDneg	LCD reverse display	Specify 1 to reverse the display on the 10.4-type monochrome LCD.	0: Normal display 1: Reverse display
1135	unt_nm	Unit name	Set up a unit name. Set up the unit name with 4 or less characters consisting of both alphabets and numbers. If 0 is set up, the unit name is not displayed.	4 or less characters consisting of both alphabets and numbers
1138	Pnosel		Not used.	0
1139	edtype	Edit type selection	Set up an edit type. 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.)	0/1/2
1140	Mn100	M code number	First number of M code that corresponds to setup number from 100 to 199.	0 to 99999999
1141	Mn200	M code number	First number of M code that corresponds to setup number from 200 to 299.	0 to 99999999
1142	Mn300	M code number	First number of M code that corresponds to setup number from 300 to 399.	0 to 99999999
1143	Mn400	M code number	First number of M code that corresponds to setup number from 400 to 499.	0 to 99999999
1144	mdlkof	MDI setup lock	Select whether to enable MDI setup in non-MDI mode.	0: Disable MDI setup 1: Enable MDI setup

#	Items		Details	Setting range (unit)
1145	I_abs	Manual ABS parameter	Specify how to handle the absolute position data during automatic handle interrupt. 0: Absolute position data is renewed if manual ABS switch is on. Data is not renewed if switch is off. 1: Follows the intabs state when "#1061 intabs" is valid.	0/1
1146	Sclamp	Spindle rotation clamp function	Specify how to handle the spindle rotation clamp function with the G92S command. 0: G92S command is handled as a clamp command only in the G96 state (during constant surface speed control). G92S will be handled as normal S command in G97 state (constant surface speed OFF). 1: The S command in the same block as G92 is constantly handled as a clamp command.	0/1
1147	smin_V	Minimum spindle rotation speed clamp type	Specify the type of spindle min. rotation speed clamp value. 0: Rotation speed setting 1: Output voltage coefficient setting Set the "#3023 smini" parameter according to this type setting.	0: Rotation speed setting 1: Output voltage coefficient setting
1148	I_G611	Initial high precision	Specify the default mode after power-on or resetting. 0: G64 (cutting mode) 1: G61.1 (high precision control mode)	0/1
1149	cireft	Arc decelera-tion speed change	Specify whether to enable deceleration at the arc entrance or exit. 0: Disable 1: Enable	0/1
1150	F1dc0	G00 feed forward filter	This parameter is used to filter acceleration changes at the start of rapid acceleration/deceleration. Specify the filters in bit units.  	bit1: 7.1 (ms) bit2: 14.2 (ms) bit3: 28.4 (ms) bit4: 56.8 (ms) If bit 1 to bit 4 are all 0 or two or more bits of bit 1 to bit 4 are 1, 3.5 ms is set up.
1151	rstint	Reset initial	Specify whether to initialize various modals by resetting. 0: Does not initialize. 1: Initializes.	0/1

<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td>1152</td><td>I_G20</td><td>Initial command unit</td><td>Specify whether the default mode after power-on or resetting, inch command or metric command mode.
0: Metric command (G21 command state)
1: Inch command (G20 command state)
Valid when reset input is made.
Related parameter: Bit 6 "Select setting and display unit" of #1226</td><td>0/1</td></tr>
<tr><td>1154
(PR)</td><td>pdoor</td><td>Door interlock II (for each part system)</td><td>Specify whether to control door interlock II independently for each of the two part systems.
When door interlock II is controlled for each part system of the two part systems, part system 1 is connected to SERVO1 of the base I/O unit and part system 2 is connected to SERVO2 of the base I/O unit.



When the auxiliary axis (MR-J2-CT) is used, connect it to the SERVO2 side (after the spindle). This validates door interlock II of part system 2.
0: Do not use door interlock II independently for each part system.
1: Use door interlock II independently for each part system.
When 0 is specified for this parameter, "Signal input device 1 for door interlock II (#1155 DOOR_m)" and "Device number 2 for door interlock II signal input (#1156 DOOR_s) are valid. When 1 is specified, "Signal input device 1 for door interlock II: for each part system (#1511 DOORPm)" and "Signal input device 2 for door interlock II: for each part system (#1512 DOORPs)."</td><td>0/1</td></tr>
</table>

#	Items		Details	Setting range (unit)
1155	DOOR_m	Signal input device 1 for door interlock II	Set up a fixed device number (X??) for door interlock II signal input. A device number from X001 to X3FF can be set up. Device number 000 is invalid. Set up device number 100 when using no fixed device number for door interlock II signal input. **(Note)** The setting range of this parameter has been expanded on the software Ver.D0 and later. Related parameter: "#1154 pdoor" Door interlock II (for each part system)	000 to 3FF (hexadecimal)
1156	DOOR_s	Device number 2 for door interlock II signal input	Set up a fixed device number (X??) for door interlock II signal input. (Set up the same value as that of #1155.) **(Note)** The setting range of this parameter has been expanded on the software Ver.D0 and later. Related parameter: "#1154 pdoor" Door interlock II (for each part system)	000 to 3FF (hexadecimal)
1157	F0atrn	F0 automatic running	Not used.	
1158	F0atno	F0 automatic running program	Not used.	
1166	fixpro	Fixed cycle editing	Select whether to use the edit, program list, and data input/output functions for the fixed cycle or general program. 0: Editing, etc., of general program will be possible. 1: Editing, etc., of fixed cycle will be possible.	0/1
1167	e2rom		Not used.	
1168	test	Simulation test	Specify the test mode for the control unit. The test mode does not use reference point return, and tests with a hypothetical reference point return completed state. This is limited to test operation of the control unit itself, and must not be used when connected to the machine.	0: Normal operation mode 1: Test mode

<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td>1169</td><td>system name</td><td>Part system name</td><td>Set the name of each part system.
This must be set when using the multiple part system.
This name is displayed on the screen only when the part systems must be identified.
Use a max. of four alphabetic characters or numerals.</td><td>A max. of four alphabetic characters or numerals.</td></tr>
<tr><td>1170</td><td>M2name</td><td>Second miscellaneous code</td><td>Set this address code when using the 2nd miscellaneous command. Set an address with A, B and C that is not used with "#1013 axname" or "#1014 incax".</td><td>A, B, C</td></tr>
<tr><td>1171</td><td>taprov</td><td>Tap retract override</td><td>Set the tap retract override value for the synchronous tap.</td><td>1 to 100 (%)</td></tr>
<tr><td>1172</td><td>tapovr</td><td>Tap retract override</td><td>Set the override value when leaving the tap end point in the synchronous tap cycle.
The setting range is 1 to 999, and the unit is %.
When a value less than 100 is set, it will be judged as 100%.</td><td>1 to 999 (%)</td></tr>
<tr><td>1173</td><td>dwlskp</td><td>G04 skip condition</td><td>Specify the skip signal for ending the G04 (dwell) command.
<table>
<tr><th rowspan="2">Setting</th><th colspan="4">Skip signals</th></tr>
<tr><th>SKIP3</th><th>SKIP2</th><th>SKIP1</th><th>SKIP0</th></tr>
<tr><td>0</td><td>×</td><td>×</td><td>×</td><td>×</td></tr>
<tr><td>1</td><td>×</td><td>×</td><td>×</td><td>○</td></tr>
<tr><td>2</td><td>×</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>3</td><td>×</td><td>×</td><td>○</td><td>○</td></tr>
<tr><td>4</td><td>×</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>5</td><td>×</td><td>○</td><td>×</td><td>○</td></tr>
<tr><td>6</td><td>×</td><td>○</td><td>○</td><td>×</td></tr>
<tr><td>7</td><td>×</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>8</td><td>○</td><td>×</td><td>×</td><td>×</td></tr>
<tr><td>9</td><td>○</td><td>×</td><td>×</td><td>○</td></tr>
<tr><td>10</td><td>○</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>11</td><td>○</td><td>×</td><td>○</td><td>○</td></tr>
<tr><td>12</td><td>○</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>13</td><td>○</td><td>○</td><td>×</td><td>○</td></tr>
<tr><td>14</td><td>○</td><td>○</td><td>○</td><td>×</td></tr>
<tr><td>15</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
</table>
Skip when ○ signal is input.</td><td>0 to 15</td></tr>
<tr><td>1174</td><td>skip_F</td><td>G31 skip speed</td><td>Specify the feedrate when there is no F command in the program at G31 (skip) command.</td><td>1 to 999999 (mm/min)</td></tr>
</table>

<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td></td><td></td><td></td><td>Specify the skip signal in the G31.1 to G31.3 (multi-step skip) command, and the feedrate when there is no F command in the program.
<table>
<tr><th rowspan="2">Setting</th><th colspan="4">Skip signals</th></tr>
<tr><th>SKIP3</th><th>SKIP2</th><th>SKIP1</th><th>SKIP0</th></tr>
<tr><td>0</td><td>×</td><td>×</td><td>×</td><td>×</td></tr>
<tr><td>1</td><td>×</td><td>×</td><td>×</td><td>○</td></tr>
<tr><td>2</td><td>×</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>3</td><td>×</td><td>×</td><td>○</td><td>○</td></tr>
<tr><td>4</td><td>×</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>5</td><td>×</td><td>○</td><td>×</td><td>○</td></tr>
<tr><td>6</td><td>×</td><td>○</td><td>○</td><td>×</td></tr>
<tr><td>7</td><td>×</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>8</td><td>○</td><td>×</td><td>×</td><td>×</td></tr>
<tr><td>9</td><td>○</td><td>×</td><td>×</td><td>○</td></tr>
<tr><td>10</td><td>○</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>11</td><td>○</td><td>×</td><td>○</td><td>○</td></tr>
<tr><td>12</td><td>○</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>13</td><td>○</td><td>○</td><td>×</td><td>○</td></tr>
<tr><td>14</td><td>○</td><td>○</td><td>○</td><td>×</td></tr>
<tr><td>15</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
</table>
Skip when ○ signal is input.</td><td>Skip condition:
0 to 15

Skip federate:
1 to 999999
(mm/min)</td></tr>
<tr><td>1175</td><td>skip1</td><td>G31.1 skip condition</td><td>Skip signal specified at G31.1</td><td></td></tr>
<tr><td>1176</td><td>1f</td><td>G31.1 skip speed</td><td>Skip feedrate at G31.1</td><td></td></tr>
<tr><td>1177</td><td>2</td><td>G31.2 skip condition</td><td>Skip signal specified at G31.2</td><td></td></tr>
<tr><td>1178</td><td>2f</td><td>G31.2 skip speed</td><td>Skip feedrate at G31.2</td><td></td></tr>
<tr><td>1179</td><td>3</td><td>G31.3 skip condition</td><td>Skip signal specified at G31.3</td><td></td></tr>
<tr><td>1180</td><td>3f</td><td>G31.3 skip speed</td><td>Skip feedrate at G31.3</td><td></td></tr>
</table>

#	Items		Details	Setting range (unit)
1181	G96_ax	Constant surface speed control	Specify the axis to be targeted for constant surface speed control. 0: Program specification will be invalidated, and the axis will always be fixed to the 1st axis. 1: 1st axis specification 2: 2nd axis specification 3: 3rd axis specification 4: 4th axis specification The program specification will be the priority for all settings other than 0.	0 to 4
1182	thr_F	Thread cutting speed	Set the screw cut up speed when not using chamfering in the thread cutting cycle. 0: Cutting feed clamp feedrate 1 to 60000 mm/min: Set feedrate	0 to 60000 (mm/min)
1183	clmp_M	M code for clamp	Set the M code for C-axis clamp in the hole opening cycle.	0 to 99999999
1184	clmp_D	Dwelling time after output-ting M code for unclamp	Set the dwell time after outputting the M code for C-axis unclamp in the hole opening cycle.	0.000 to 99999.999 (s)
		F1 digit feedrate	Specify the feedrate for the F command in the F1-digit command ("#1079 F1 digit" is set to 1).	1 to 1000000 (mm/min)
1185	spd_F1	F1	Feedrate when F1 is issued (mm/min)	
1186	F2	F2	Feedrate when F2 is issued (mm/min)	
1187	F3	F3	Feedrate when F3 is issued (mm/min)	
1188	F4	F4	Feedrate when F4 is issued (mm/min)	
1189	F5	F5	Feedrate when F5 is issued (mm/min)	
1190 (PR)	s_xcnt (For L system only)	Validate inclined-axis control	0: Disable inclined-axis control 1: Enable inclined-axis control	0/1
1191 (PR)	s_angl (For L system only)	Inclination angle	Specify the inclination angle α of the oblique coordinate X' axis from the orthogonal coordinate system's X axis.	–80.000 to 80.000 (degree)
1192 (PR)	s_zrmv (For L system only)	Compensati on at reference point return	Specify whether to perform compensation for the base axis corresponding to the inclined axis at reference point return. 0: Performs compensation. 1: Does not perform compensation.	0/1

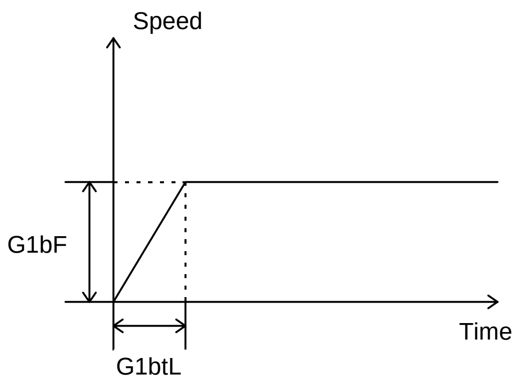
<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td>1193</td><td>inpos</td><td>Validate in-position check</td><td>Specify the deceleration confirmation method for the positioning command.
0: Command deceleration check
(Positioning is completed when the deceleration is completed with the acceleration/deceleration speed issued from the control unit.)
1: In-position check
(Positioning is completed by detecting that the servo amplifier has reached within a set distance from the end point. The set distance is set in "#2224 SV024".)</td><td>0: Command deceleration check
1: In-position check</td></tr>
<tr><td>1194</td><td>H_acdc</td><td>Time constant 0 for handle feed</td><td>Specify the time constant for the manual handle feed.
0: Use time constant for G01
1: Time constant 0 (step)</td><td>0/1</td></tr>
<tr><td>

1195
1196
1197
1198</td><td>

Mmac
Smac
Tmac
M2mac</td><td>

Macro call for:
M command
S command
T command
Second miscellaneous code</td><td>Specify the user macro M, S or T command macro call out.

Macro call out with M command
Macro call out with S command
Macro call out with T command
Macro call out with 2nd miscellaneous command</td><td>0: Invalid
1: Valid</td></tr>
<tr><td>1199
(PR)</td><td>Sselect</td><td>Select initial spindle control</td><td>Select the initial condition of spindle control after power is turned on.
0: 1st spindle control mode (G43.1)
1: 2nd spindle control mode (G44.1)</td><td>0: G43.1
1: G44.1</td></tr>
<tr><td>1200
(PR)</td><td>G0_acc</td><td>Validate acceleration and deceleration with inclination angle constant G0</td><td>Set up acceleration and deceleration types when a rapid traverse command is issued
0: Acceleration and deceleration (conventional) with time constant
1: Acceleration and deceleration with inclination angle constant</td><td>0/1</td></tr>
<tr><td>1201
(PR)</td><td>G1_acc</td><td>Validate acceleration and deceleration with inclination constant G1</td><td>Set up acceleration and deceleration types when a liner interpolation command is issued.
0: Acceleration and deceleration (conventional) with time constant
1: Acceleration and deceleration with inclination angle constant</td><td>0/1</td></tr>
<tr><td>1202</td><td>mirofs
(For L system only)</td><td>Distance between facing turrets</td><td>Set up the distance between tools (noses) (between turrets).</td><td>0 to 99999.999
(mm)</td></tr>
</table>

#	Items		Details	Setting range (unit)
1203	TmirS1 (For L system only)	Select turrets for double-turret mirror image with T command	Set up turrets for double-turret mirror image with the T command that corresponds to tool numbers 1 to 32.	0 to FFFFFFFF
1204	TmirS2 (For L system only)	Select turrets for double-turret mirror image with T command	Set up turrets for double-turret mirror image with the T command that corresponds to tool numbers 33 to 64.	0 to FFFFFFFF
1205	G0bdcc	Acceleration and deceleration before G0 interpolation	0: G00 acceleration and deceleration are selected as those after interpolation regardless of high-accuracy mode. 1: G00 acceleration and deceleration are selected as those before interpolation.	0/1
1206	G1bF	Maximum speed	Set up a cutting feedrate when selecting acceleration and deceleration before interpolation.	1 to 1000000 (mm/min)
1207	G1btL	Time constant	Set up a cutting feed time constant when selecting acceleration and deceleration before interpolation.  	1 to 5000 (ms)
1208	RCK	Arc radius error compen-sation factor	An arc radius error compensation amount can be increased and decreased from –60.0 to 20.0%.	–60.0 to +20.0 (%)
1209	cirdcc	Arc deceleration speed	Specify the deceleration speed at the arc entrance or exit.	1 to 1000000 (mm/min)

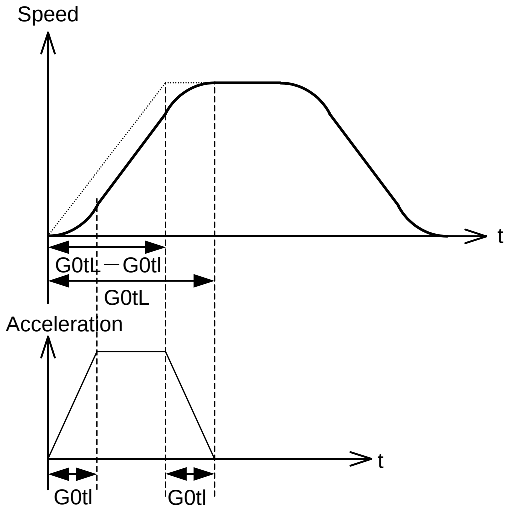
<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td>1210</td><td>RstGmd</td><td>Modal G code reset</td><td>Specify whether to initialize each G code group modal and the H and D codes when the system is reset.
Specify the initialization items in bit correspondence.
0. Initialize. 1: Do not initialize.
M system
<table>
<tr><td>0</td><td>Group 1 Move G modal</td></tr>
<tr><td>1</td><td>Group 2 Flat selection modal</td></tr>
<tr><td>2</td><td>Group 3 Absolute/increment command modal</td></tr>
<tr><td>3</td><td></td></tr>
<tr><td>4</td><td>Group 5 Feed G modal</td></tr>
<tr><td>5</td><td>Group 6 Inch/metric modal</td></tr>
<tr><td>6</td><td>Group 7 Radius compensation modal</td></tr>
<tr><td>7</td><td>Group 8 Length compensation modal</td></tr>
<tr><td>8</td><td></td></tr>
<tr><td>9</td><td>Group 10 Fixed cycle return command modal</td></tr>
<tr><td>A</td><td></td></tr>
<tr><td>B</td><td>Group 12 Workpiece coordinate system modal</td></tr>
<tr><td>C</td><td>Group 13 Cut modal</td></tr>
<tr><td>D</td><td></td></tr>
<tr><td>E</td><td></td></tr>
<tr><td>F</td><td></td></tr>
</table>

<table>
<tr><td>10</td><td>Group 17 Constant surface speed control command modal</td></tr>
<tr><td>11</td><td></td></tr>
<tr><td>12</td><td>Group 19 G command mirror modal</td></tr>
<tr><td>13</td><td>Group 20 Spindle 2 control modal</td></tr>
<tr><td>14</td><td></td></tr>
<tr><td>15</td><td></td></tr>
<tr><td>16</td><td></td></tr>
<tr><td>17</td><td></td></tr>
<tr><td>18</td><td>H, D codes</td></tr>
<tr><td>19</td><td></td></tr>
<tr><td>1A</td><td></td></tr>
<tr><td>1B</td><td></td></tr>
<tr><td>1C</td><td></td></tr>
<tr><td>1D</td><td></td></tr>
<tr><td>1E</td><td></td></tr>
<tr><td>1F</td><td></td></tr>
</table>

The H code indicates the tool length offset number, and the D code indicates the tool radius compensation number.
When bit 18 is set to on, the H and D codes and group 8 G modal area retained.
When bit 7 is set to on, the H code and group 8 G modal are retained.</td><td>Specify a hexadecimal number.</td></tr>
</table>

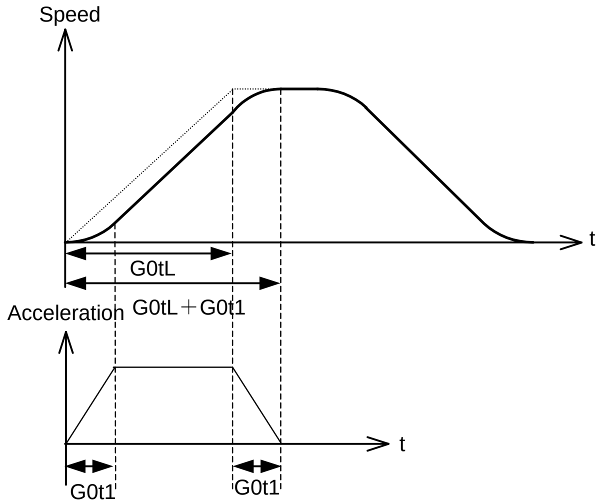
<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td>1210</td><td>RstGmd</td><td>Modal G code reset</td><td>L system
<table>
<tr><td>0</td><td>Group 1 Move G modal</td></tr>
<tr><td>1</td><td>Group 2 Flat selection modal</td></tr>
<tr><td>2</td><td>Group 3 Absolute/increment command modal</td></tr>
<tr><td>3</td><td>Group 4 Barrier check modal</td></tr>
<tr><td>4</td><td>Group 5 Feed G modal</td></tr>
<tr><td>5</td><td>Group 6 Inch/metric modal</td></tr>
<tr><td>6</td><td>Group 7 Nose radius compensation modal</td></tr>
<tr><td>7</td><td></td></tr>
<tr><td>8</td><td></td></tr>
<tr><td>9</td><td>Group 10 Fixed cycle return command modal</td></tr>
<tr><td>A</td><td></td></tr>
<tr><td>B</td><td>Group 12 Workpiece coordinate system modal</td></tr>
<tr><td>C</td><td>Group 13 Cut modal</td></tr>
<tr><td>D</td><td></td></tr>
<tr><td>E</td><td></td></tr>
<tr><td>F</td><td></td></tr>
</table>
<table>
<tr><td>10</td><td>Group 17 Constant surface speed control command modal</td></tr>
<tr><td>11</td><td>Group 18 Balance cut</td></tr>
<tr><td>12</td><td></td></tr>
<tr><td>13</td><td>Group 20 Spindle 2 control modal</td></tr>
<tr><td>14</td><td>Group 15 Double-turret mirror image</td></tr>
<tr><td>15</td><td></td></tr>
<tr><td>16</td><td></td></tr>
<tr><td>17</td><td></td></tr>
<tr><td>18</td><td></td></tr>
<tr><td>19</td><td></td></tr>
<tr><td>1A</td><td></td></tr>
<tr><td>1B</td><td></td></tr>
<tr><td>1C</td><td></td></tr>
<tr><td>1D</td><td></td></tr>
<tr><td>1E</td><td></td></tr>
<tr><td>1F</td><td></td></tr>
</table>
</td><td>Specify a hexadecimal number.</td></tr>
<tr><td>1211</td><td>FHtyp</td><td>Feed hold stop type</td><td>Specify the type of the external signal used for feed hold.
0: Disable the external signal.
1: Enable the external signal (contact A)
2: Enable the external signal (contact B)</td><td>0 to 2</td></tr>
<tr><td>1212</td><td>FHno</td><td>Feed hold external signal device</td><td>Specify the number (X??) of the device used to input the feed hold signal.
(Note) The setting range of this parameter has been expanded on the software Ver.D0 and later.</td><td>000 to 3FF (hexadecimal)</td></tr>
<tr><td>1216</td><td>extdcc</td><td>External deceleration level</td><td>Use an upper limit value at the feedrate indicated when validating external deceleration signals.</td><td>1 to 1000000 (mm/min)</td></tr>
<tr><td>1217</td><td>aux01</td><td></td><td>Not used.</td><td></td></tr>
</table>

#	Items		Details	Setting range (unit)
1218	aux02 (bit3)	Parameter input/output format	Specify a parameter input/output format. 0: Type I 1: Type II	0/1
	aux02 (bit4)	Tool number selection	Specify the R register that contains the tool number used for automatic calculation when measuring the coordinate offset of an external work piece. 0: Conforms to "#1130 set_t". 1: Uses the tool number indicated by user PLC	0/1
	aux02 (bit5)	Parameter I/O II spindle specification address	Specify the spindle specification address of parameter I/O type II. 0: C 1: T This parameter also applies to the spindle specification address for input and collation. **(Note)** This parameter is valid only for parameter I/O type II ("#1218 aux02/bit 3" is 1).	0/1
	aux02 (bit6)	Set No. valid when program input	Specify which program No. is selected when inputting operation using "#1 MAIN PROGRAM" in Data I/O screen. 0: The No. in the input data is valid. 1: The No. set in the data setting area is valid.	0/1
	aux02 (bit7)	Input by program overwrite	When inputting the machining program in the "Data input" screen, select one of the following options when the input program has already been registered: 0: Outputs error message "E65 PROG. No. DUPLI" 1: Input by overwrite	0/1
1219	aux03 (bit1)	Stop high-speed PC monitoring function	Set 1 to disable the function that stops the system when the high-speed processing time is extended. Disable the monitoring function only as a temporary measure.	0/1
	aux03 (bit2)	Improve skip coordinate accuracy	0: Skip accuracy (conventional specification) 1: Changes skip accuracy (correct a position in skip coordinates when entering skip signals).	0/1
	aux03 (bit3)		Reserved for the system.	0

#	Items		Details	Setting range (unit)
	aux03 (bit7)	Time constant setting changeover for software acceleration/ deceleration	0: Accelerating time is G0tL(G1tL). If the time is set to the software acceleration/deceleration 2nd step time constant (#2005 G0t1) under such condition as the acceleration/deceleration before G00 interpolation and the software acceleration/deceleration are used one together, the inclination at software acceleration/deceleration will be steeper. Thus, the acceleration for G28/G30 will be larger than that for G00.  1. Total accelerating time is "G0L". 2. The time for curve part is "G0t1". 3. The time for linear part is obtained by "G0tL-(2×G0t1)". (Continued on the next page)	0/1

<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td></td><td></td><td></td><td>(Continued from the previous page)

1: Accelerating time is obtained by G0tL+G0t1 (G1tL+G1t1).
When the acceleration/deceleration before G00 interpolation and the software acceleration/deceleration are used one together, if the same time is set to S-curve filter time (#1131 F1dcc) and the software acceleration/deceleration 2nd step time constant (#2005 G0t1), the G00 acceleration can be obtained equals as G28/G30.



1. Total accelerating time is obtained by "G0tL+G0t1".
2. The time for curve part is "G0t1".
3. The time for linear part is obtained by "G0tL-G0t1".
(Note) This parameter is valid on the software Ver.C3 and later.</td><td></td></tr>
<tr><td>1220</td><td>aux04
(bit 0)
(For L system only)</td><td>Tool life check timing selection</td><td>Specify the life check standard applicable when the use count is incremented in tool life management II.
0: Determines that the tool life is over when the incremented use count exceeds the life count. (Use count > life count)
1: Determines that the tool life is over when the incremented use count has reached the life count. (Use count ≥ life count)</td><td>0/1

(Default: 0)</td></tr>
</table>

#	Items		Details	Setting range (unit)
1220	aux04 (bit1)	Validity of space code in comment	Validate or invalidate the space code described in the comment statements in the machining program in edit operation with the custom display. 0: Invalidate the space code in the comment statements of the machining program. 1: Validate the space code in the comment statements of the machining program.	0/1 (Default: 0)
1221	aux05		Not used.	
1222	aux06 (bit0)		Not used.	0
	aux06 (bit1)		Not used.	0
	aux06 (bit3)	Enable/disable setup parameter lock	Specify whether to enable the setup parameter lock function. 0: Disable 1: Enable	0/1
	aux06 (bit7)		Not used.	0
1223	aux07 (bit0)		Not used.	0
	aux07 (bit1)		Not used.	0
	aux07 (bit2)		Not used.	0
	aux07 (bit3)		Not used.	0
	aux07 (bit4)		Not used.	0
	aux07 (bit5)		Not used.	0
	aux07 (bit6)	Cancel synchronous tap (,S) retract	0: Retains a spindle rotation speed (, S) when performing synchronous tap retract. 1: Cancels a spindle rotation speed (, S) by retract with G80.	0/1
	aux07 (bit7)	Synchronous tap method	Specify a synchronous tap method. 0: Synchronous tap (multi-step acceleration and deceleration and rapid return) 1: Conventional type synchronous tap	0/1
1224	aux08		Unusable. Set 0 for this option.	
1225	aux09 (bit7)	Enable/disable spindle rotation clamp	Specify whether to enable spindle rotation clamp by the spindle rotation clamp command (G92S, Q) instead of the spindle rotation command (R3210) specified by the user ladder. 0: Enable 1: Disable	0/1

#	Items		Details	Setting range (unit)
1226	aux10 (bit0)	Tool compen-sation data for external workpiece coordinate offset measurement	Select the tool offset data to be used for external workpiece coordinate offset measurement. 0: Tool length data and nose wear data 1: Tool length data	0/1
	aux10 (bit1)	Optional block skip type	Specify whether to enable optional block skipping in the middle of a block. 0: Enable block skipping only at the beginning of a block. 1: Enable block skipping at the beginning of the block and in the middle of a block.	0/1
	aux10 (bit2)	Single block stop timing	Specify the time at which the single block signal is activated. 0: When the signal goes on while automatic operation is starting, the block stops after it is finished. 1: When the signal is on at the end of the block, the block stops.	0/1
	aux10 (bit3)		Not used.	0
	aux10 (bit4)	S command during constant surface speed	Specify whether to output a strobe signal when the S command is issued in constant surface speed mode. 0: Output no strobe signal in constant surface speed mode. 1: Output strobe signals in constant surface speed mode.	0/1
	aux10 (bit5)	Dog/OT signal arbitrary assignment valid	Specify whether to enable the arbitrary allocation parameter for the origin dog and H/W OT. 0: Disable arbitrary allocation. (Fixed devices are valid.) Note that when the backup module for powerfailure is mounted, all dog signals allocation will be disabled, however, OT signals will be allocated to the fixed devices. 1: Enable arbitrary allocation. (Devices specified by #2073 to #2075 parameters)	0/1

#	Items		Details	Setting range (unit)
1226	aux10 (bit6)	Setup and display unit	Specify the unit to be used as the setup/display unit or handle feed unit, the command unit or internal unit. 0: Internal unit 1: Unit specified by command **(Note 1)** This parameter is valid only in initial millimeter mode (0 is set in "#1041 I_inch"). The internal unit is always used in initial inch mode (1 is set in "#1041 I_inch"). **(Note 2)** This parameter is validated immediately after it is set. **(Note 3)** If addition setting is performed for tool and workpiece offset data with the command unit being inch and internal unit being mm, an error may be generated. Related parameter: #1152 I_G20 (Initial command unit)	0/1
	aux10 (bit7)	Shorten JOG stop time	Specify whether to shorten the JOG stop time. 0: Do not shorten the JOG stop time. (Same as before) 1: Shorten the JOG stop time.	0/1
1227	aux11 (bit0)	Select PLC signal or spindle feedrate attained	Set up this option when disabling the cutting start interlock by spindle feedrate attained. 0: Cutting start interlock by PLC signal 1: Cutting start interlock by spindle feedrate attained	0/1
	aux11 (bit1)	Select H or D code	Set up this option to validate the data that is set up on the tool life management screen when issuing the H99 or D99 command. 0: The H and D codes validate the data that is set up on the management setup screen. 1: Validates the data that is set up on the manage-ment setup screen when issuing the H99 or D99 command.	0/1

#	Items		Details	Setting range (unit)
1227	aux11 (bit2)	Measures against tool setter chattering	Select a condition where a relieving operation completes after measurement with tools. 0: Sensor signals have stopped for 500 ms or longer. 1: 100 μs or longer has passed after sensor signals stopped.	0/1
	aux11 (bit3)	Absolute coordinate switching (nose R)	Select whether to display a nose position or coordinate value with the absolute coordinate counter. 0: Displays the nose position. 1: Displays the position specified by program command.	0/1
	aux11 (bit4)	Program address check	Specify whether to simply check the program address when the machining program is executed. 0: Does not check the program address. 1: Checks the program address.	0/1
	aux11 (bit5)	Spindle rotation speed clamp	Specify whether to clamp the rotation speed in constant surface speed mode when the spindle rotation clamp command is issued. 0: Clamps the rotation regardless of the constant surface speed mode. 1: Clamps the rotation only in constant surface speed mode.	0/1
	aux11 (bit6)		Not used.	0
	aux11 (bit7)	Switch the range of tool life data to be input	Set up the range of tool life data to be input or compared. 0: Inputs or compares all of the data output. 1: Inputs or compares part of the data output 1) Tool life management I data to be input or compared tool number (D), lifetime (E), life count (F), and auxiliary data (B). 2) Tool life management II data to be input or compared Group number (G), method (M), life (E/F), tool number (D), and compensation number (H)	0/1

#	Items		Details	Setting range (unit)
1228	aux12 (bit0)	Switch coordinate value screen	Set up this option to switch the coordinate value screen. 0: 80-character screen 1: 40-character screen	0/1
	aux12 (bit1)	Switch offset and parameter screen	Set up this option to switch the offset and parameter screen to the parameter screen. 0: Displays the offset and parameter screen. 1: Displays the parameter screen.	0/1
	aux12 (bit2)	Switch data protection in data transmission mode	Set up the range of data protection in data transmission mode. 0: Protects both send and receive data. 1: Protects receive data only.	0/1
	aux12 (bit3)	Nose R specification	Select whether to specify the nose R compensation by shape or wear number. 0: Specifies the nose R compensation by shape number. 1: Specifies the nose R compensation by wear number.	0/1
	aux12 (bit4)	Select operation error or stop code	Specify both block cutting start interlock and cutting start interlock as the operation error or stop code. 0: Operation error 1: Stop code	0/1
	aux12 (bit5)	Select constant surface speed coordinates	Select constant surface speed coordinates. 0: Workpiece coordinate value 1: Absolute coordinate value	0/1
	aux12 (bit6)	Switch relative values displayed	0: Includes coordinate preset amounts in relative values (absolute values). 1: Does not coordinate preset amounts in relative values (absolute values).	0/1
	aux12 (bit7)	Protection with manual value command	Set up this option to protect a manual value command. 0: Does not protect the manual value command (same as before). 1: Protects the manual value command.	0/1
1229	set01 (bit0)	Subprogram interrupt	0: Specifies the user macro interrupt of macro type. 1: Specifies the user macro interrupt of sub-program type.	0/1
	set01 (bit1)	Accurate thread cutting E	0: Address E specifies the number of threads per inch for inch screw cutting. 1: Address E specifies precise reading for inch screw cutting.	0/1

#	Items		Details	Setting range (unit)
1229	set01 (bit2)	Radius compen-sation type B (For M system only)	0: When the start-up and cancel commands are operated during radius compensation, their blocks are not handled by intersection operation processing; they are handled as offset vectors in the direction vertical to that of the commands. 1: When the start-up and cancel commands are operated during radius compensation, the inter-section operation processing of the command block and the next block is executed.	0/1
		Nose R compen-sation type B (For L system only)	0: When the start-up and cancel commands are operated during nose R, their blocks are not handled by intersection operation processing; they are handled as offset vectors in the direction vertical to that of the commands. 1: When the start-up and cancel commands are operated during nose R, the intersection operation processing of the command block and the next block is executed.	0/1
	set01 (bit3)	Initial constant surface speed	0: The initial state after power-on is a constant surface speed control cancel mode. 1: The initial state after power-on is a constant surface speed control mode.	0/1
	set01 (bit4)	Synchronous tap	0: Handles the tap cycles as the tap cycles with a floating tap chuck. 1: Handles the tap cycles as the tap cycles without a floating tap chuck.	0/1
	set01 (bit5)	Start point alarm	Select an operation when the operation start point cannot be found while moving the next block of G117. 0: Enables an auxiliary function after the block has been moved. 1: Outputs a program error (P33) when the operation start point is not found.	0/1
	set01 (bit6)	Grid display selection	Select a grid type to be displayed on the servo monitor screen during dog type reference point return. 0: Selects the distance between dog ON and reference point (including a grid mask amount). 1: Selects a value given by reducing a grid mask amount from the distance between dog ON and reference point.	0/1
1230	set02		Not used.	
1231	set03		Not used.	
1232	set04		Not used.	
1233	set05		Not used.	

#	Items		Details	Setting range (unit)
1234	set06		Not used.	
1235	set07		Not used.	
1236	set08 (bit0)	Manual rotation axis feedrate unit	Select the unit of manual rotation axis feedrate. 0: Fixed to [°/min] 1: Same speed as before	0/1
1237 (PR)	set09 (bit0)	External workpiece offset	Set up this function to use the external workpiece coordinates by shifting them to the Z axis. 0: Does not reverse the sign of external workpiece offsets (Z shift) (same as before). 1: Reverses the sign of external workpiece offsets (Z shift). **(Note)** When the sign of external workpiece offsets (Z shift) has been reversed, do not measure those external workpiece offsets. However, the external workpiece offsets can be measured by tool pre-setter.	0/1
1238 (PR)	set10		Not used.	
1239 (PR)	set11 (bit0)	Coil switching method	0: Via PLC. (YD3F) 1: NC internal processing. (YD3F is invalid.) **(Note)** As for C6/C64/C64T, always set “1” when using MDS-B-SP and later. However, if the system structure needs the mechanical gears for spindles, set “0”.	0/1
1240 (PR)	set12 (bit0)	Handle input pulse	Select the handle input pulse. 0: MELDAS standard handle pulse 1: Handle 400 pulse	0/1
	set12 (bit1)	Megatorque motor handle feed magnifi-cation	Select the magnification of megatorque motor handle 1 pulse. 0: Double the handle 1 pulse magnification specified by the handle feed magnification signal (Y780, Y781, Y782). 1: Use the handle 1 pulse magnification specified by the handle feed magnification signal (Y780, Y781, Y782) as is.	0/1

#	Items		Details	Setting range (unit)
1265 (PR)	ext01 (bit0)	Command format	Select the command format. 0: Conventional format	0
1266 (PR)	ext02		Not used.	
1267 (PR)	ext03 (bit0)	G code type	Select the G code type. This parameter is valid when 1 is set in "#1265 ext01 bit 0 (command format)".	0/1
1268 (PR)	ext04		Not used.	
1269 (PR)	ext05		Not used.	
1270 (PR)	ext06		Not used.	
1271 (PR)	ext07 (bit0)	Mirror image operation	Select the type of mirror image operation. Not applied to this CNC. 0: Type 1 • The program mirror image, external mirror image, and parameter mirror image are exclusive to each other. • An increment command moves the image to the position indicated by the move amount with the sign inverted. 1: Type 2 • Mirror image operation is enabled when the program mirror image (G51.1) command is issued or when the external signal or parameter is ON. • An increment command moves the image to the position determined by applying the mirror image to the absolute program coordinates.	0/1 (Default: 0)
	ext07 (bit1)	Address specifying fixed-cycle repetition count (For M system only)	Specify the address that specifies the fixed-cycle repetition count. Not applied to this CNC. 0: Address L only 1: Addresses K and L If addresses K and L are specified simultaneously, the data at address K is used for operation.	0/1 (Default: 0)
	ext07 (bit2)	F-command unit	Specify the unit to be used if a thread cutting read command contains on decimal point. Not applied to this CNC. 0: Type 1 (conventional specifications) F1 → 1 mm/rev, 1 inch/rev 1: Type 2 F1 → 0.01 mm/rev, 0.0001 inch/rev	0/1 (Default: 0)

#	Items		Details	Setting range (unit)
1271 (PR)	ext07 (bit3)	G-code group for unidirectional positioning (for M system only)	Specify the G-code group for unidirectional positioning. Not applied to this CNC. 0: Unmodal G code (group 00) 1: Modal G code (group 01) Related parameter: "#8209 G60 SHIFT"(Set the last positioning direction and distance for each axis applicable when the unidirectional positioning command is issued.)	0/1
	ext07 (bit4)	Operation by independent G40 command	Specify the mode of canceling tool radius compensation vector by the independent G40 command. Not applied to this CNC. 0: Type 1 (conventional specifications) The independent G40 command cancels the tool radius compensation vector. 1: Type 2 The tool radius compensation vector is not canceled by the independent G40 command but is canceled by the next move command for the tool radius compensation plane.	0/1 (Default: 0)
	ext07 (bit5)	Cut start position (For L system only)	Specify the position from where cutting begins in a composite-type fixed cycle for lathe. 0: Conventional specifications The cut start position is determined by the final shaping program. 1: Extended specifications The cut start position is determined from the cycle start point.	0/1 (Default: 0)
	ext07 (bit6)	Nose R compensation (For L system only)	Specify whether to apply nose R compensation to shapes in a rough cutting cycle. 0: Conventional specifications If nose R compensation is enabled for the final shaping program, the shape obtained after applying nose R compensation to the final shaping program is used as the rough cutting shape. 1: Extended specifications The shape made by the final shaping program, without nose R compensation, is used as the rough cutting shape.	0/1 (Default: 0)

#	Items		Details	Setting range (unit)
1271 (PR)	ext07 (bit7)	Cut amount (For L system only)	Specify the operation to be performed when the program-specified cut amount exceeds the cut amount of the final shaping program. 0: Conventional specifications A program error occurs if the program-specified cut amount exceeds the cut amount of the final shaping program. 1: Extended specifications Rough cutting is performed by one cut if the program-specified cut amount exceeds the cut amount of the final shaping program.	0/1 (Default: 0)
1272 (PR)	ext08 (bit1)	M function synchronous tap cycle	Specify whether to enable the M function synchronous tap cycle. 0: Disable 1: Enable	0/1
1273 (PR)	ext09		Not used.	
1274 (PR)	ext10		Not used.	
1275 (PR)	ext11		Not used.	
1276 (PR)	ext12		Not used.	
1277 (PR)	ext13 (bit0)	Tool life management II count type 2	Specify how and when the mount or use count is incremented in tool life management II. 0: Type 1 The count is incremented when the spindle is used for cutting. 1: Type 2 The count is incremented for the tool used or mounted for one program. The increment is enabled by resetting.	0/1 (Default: 0)
1278 (PR)	ext14		Not used.	
1279 (PR)	ext15		Not used.	
1280 (PR)	ext16		Not used.	
1281 (PR)	ext17		Not used.	
1282 (PR)	ext18		Not used.	
1283 (PR)	ext19		Not used.	
1284 (PR)	ext20		Not used.	
1285 (PR)	ext21		Not used.	

#	Items		Details	Setting range (unit)
1286 (PR)	ext22		Not used.	
1287 (PR)	ext23 (bit0)	Workpiece coordinate display	Select the mode of displaying the workpiece coordinate counter. 0: Does not update the display immediately after workpiece coordinate data is changed. 1: Updates the display immediately after workpiece coordinate data is changed.	0/1
	ext23 (bit4)	Relative coordinate display	(M system) 0: Displays the actual position including tool length compensation. 1: Displays the machining position in terms of a program command excluding tool length compensation. (L system) 0: Displays the actual position including tool shape compensation. 1: Displays the machining position in terms of a program command excluding tool shape compensation.	0/1
	ext23 (bit5)	Relative coordinate display	(M system) 0: Displays the actual position including tool radius compensation. 1: Displays the machining position in terms of a program command excluding tool radius compensation. (L system) 0: Displays the actual position including nose R compensation. 1: Displays the machining position in terms of a program command excluding nose R compensation.	0/1
	ext23 (bit6)	Absolute coordinate display	(M system) 0: Displays the actual position including tool length compensation. 1: Displays the machining position in terms of a program command excluding tool length compensation. (L system) 0: Displays the actual position including tool shape compensation. 1: Displays the machining position in terms of a program command excluding tool shape compensation.	0/1

#	Items		Details	Setting range (unit)
	ext23 (bit7)	Absolute coordinate display	(M system) 0: Displays the actual position including tool radius compensation. 1: Displays the machining position in terms of a program command excluding tool radius compensation. (L system) 0: Displays the actual position including nose R compensation. 1: Displays the machining position in terms of a program command excluding nose R compensation.	0/1
1288 (PR)	ext24		Not used.	
1289 (PR)	ext25		Not used.	
1290 (PR)	ext26		Not used.	
1291 (PR)	ext27		Not used.	
1292 (PR)	ext28		Not used.	
1293 (PR)	ext29		Not used.	
1294 (PR)	ext30		Not used.	
1295 (PR)	ext31		Not used.	
1296 (PR)	ext32		Not used.	
1297 (PR)	ext33		Not used.	
1298 (PR)	ext34		Not used.	
1299 (PR)	ext35		Not used.	
1300 (PR)	ext36 (bit7)	Spindle synchronization command method	Select the command method for spindle synchronous control. 0: Spindle synchronous control II (Controlled by PLC I/F) 1: Spindle synchronous control I (Controlled by G code)	0/1

#	Items		Details	Setting range (unit)
1301	nrfchk	Origin neighboring check method	Select the high-speed check method of the origin neighboring signal. 0: Does not check positions near the origin at high speeds. (Conventional specifications) 1: Checks positions near the origin at high speeds using command machine positions. 2: Checks positions near the origin at high speeds using detector feedback positions.	0 to 2
1501	polyax (For L system only)	Rotational tool axis number	Specify the number of the rotational tool axis (servo axis) used for polygonal machining (G51.1). Specify 0 when polygonal machining is not performed. A value exceeding the base specification parameter "#1002 axisno" cannot be specified. This parameter is valid when the G code system is 6 or 7 (7 or 8 is set in base specification parameter "#1037 cmdtyp").	0 to controlled axis number
1505	ckref2	Second reference point return check	Specify the trigger for a check at the specified position in manual second reference point return mode. 0: Completion of spindle orientation 1: Generation of second reference point return interlock signal	0/1
1510	DOOR_H	Shorten door interlock II axis stop time	Specify whether to shorten the time during which the axis is stopped when the door is opened. 0: Uses the conventional axis stop time. 1: Shortens the axis stop time. **(Note)** When the door interlock II signal is input via a ladder, the conventional axis stop time is used.	0/1
1511	DOORPm	Signal input device 1 for door interlock II: for each part system	Specify the fixed device number (X??) for door interlock II signal input for each part system. A device number from X001 to X3FF can be specified. Device number 000 is invalid. Specify device number 100 when using no fixed device number for door interlock II signal input. **(Note)** The setting range of this parameter has been expanded on the software Ver.D0 and later. Related parameter: #1154 pdoor (Door interlock II for each part system)	000 to 3FF (hexadecimal)
1512	DOORPs	Signal input device 2 for door interlock II: for each part system	Specify the fixed device number (X??) for door interlock II signal input for each part system. (Specify the same value as that of #1155.) **(Note)** The setting range of this parameter has been expanded on the software Ver.D0 and later. Related parameter: #1154 pdoor (Door interlock II for each part system)	000 to 3FF (hexadecimal)

#	Items	Details	Setting range (unit)
1801	Hacc_c	Arc radius clam acceleration	-99999999 to +99999999
1802	Macc_c	Acceleration check at middle speed	-99999999 to +99999999
1803	Lacc_c	Acceleration check at low speed	-99999999 to +99999999
1811	Hcof_A	X-axis high acceleration coefficient β	-99999999 to +99999999
1812	Hcof_B	X-axis high acceleration coefficient α	-99999999 to +99999999
1813	Mcof_A	X-axis middle acceleration coefficient β	-99999999 to +99999999
1814	Mcof_B	X-axis middle acceleration coefficient α	-99999999 to +99999999
1815	Lcof_A	X-axis low acceleration coefficient β	-99999999 to +99999999
1816	Lcof_B	X-axis low acceleration coefficient α	-99999999 to +99999999
1817	mag_C	X-axis change magnification θ [%] Set 0 when no compensation or change is executed.	-99999999 to +99999999
1821	Hcof_A	Y-axis high acceleration coefficient β	-99999999 to +99999999
1812	Hcof_B	Y-axis high acceleration coefficient α	-99999999 to +99999999
1813	Mcof_A	Y-axis middle acceleration coefficient β	-99999999 to +99999999
1814	Mcof_B	Y-axis middle acceleration coefficient α	-99999999 to +99999999
1815	Lcof_A	Y-axis low acceleration coefficient β	-99999999 to +99999999
1816	Lcof_B	Y-axis low acceleration coefficient α	-99999999 to +99999999
1817	mag_C	Y-axis change magnification θ [%] Set 0 when no compensation or change is executed.	-99999999 to +99999999

#	Items	Details	Setting range (unit)
1901 (PR)	station addr	Set up a station address number (the NC is the n-th slave station).	1 to 7
1902 (PR)	Din size	Set up the size of the data to be transferred from the PC to the NC (from the master station to the slave station) in bytes (8 points).	0 to 32 (bytes (8 bits))
1903 (PR)	Dout size	Set up the size of the data to be transferred from the NC to the PC (from the slave station to the master station) in bytes (8 points).	0 to 32 (bytes (8 bits))
1904 (PR)	data length	Set up the data length of a character.	0 to 2 : 7 bits 3 : 8 bits
1905 (PR)	baud rate	Set up a data transfer rate. The transfer rate differs according to operation clock rates.	Clock: 6/10 MHz 0: 38400 / 57600 1: 19200 / 28800 2: 9600 / 14400 3: 4800 / 7200 4: 2400 / 3600 5: 1200 / 1800 6: 600 / 900 (bps)
1906 (PR)	stop bit	Set up the stop bit length.	0 and 1: 1 bit 2 and 3: 2 bits
1907 (PR)	parity check	Select whether to make a parity check.	0: Invalid 1: Valid
1908 (PR)	even parity	Select the odd or even parity bit. If no parity check is specified, this parameter is ignored.	0: Odd parity 1: Even parity
1909 (PR)	Tout (ini)	(ini) specifies a time-out from when the connection check sequence finishes to when the first usual sequence (input) finishes.	0 to 999 (0.1 s)
1910 (PR)	(run)	(run) specifies a time-out from when the NC (slave station) outputs usual sequence data to when the next usual sequence data is input. If the time-out is exceeded, an emergency stop occurs and the system waits for the preparation sequence to start. If the set value is 0, no time-out occurs or no communication stop can be detected.	
1911 (PR)	clock select	Select an operation cycle.	0: 6 MHz 1: 10 MHz
1926 (PR)	IP address	Set NC's IP address.	Set these according to connection environment's network regulations.
1927 (PR)	Subnet mask	Set sub-net mask.	
1928 (PR)	Gateway address	Designate gateway IP address.	

#	Items	Details	Setting range (unit)
1929 (PR)	Port number	Set the HMI connection port No. (Set the default value 64758 unless particularly required.)	0 to 65535
1930 (PR)	Speed 10M/auto	Set the communication rate. 0: Fixed to “10Mbyte” 1: Recognized whether “10Mbyte” or “100Mbyte” automatically and set.	0/1
1931 (PR)	IP address(2)	Set NC's IP address. Set for the card mounted on the 2nd channel when 2-channel connection is used on the Ethernet communication. (Note1)	Set these according to connection environ-ment's network regulations.
1932 (PR)	Subnet mask(2)	Set sub-net mask. Set for the card mounted on the 2nd channel when 2-channel connection is used on the Ethernet communication. (Note1)	
1933 (PR)	Port number(2)	Set the HMI connection port No. (Set the default value 64758 unless particularly required.) Set for the card mounted on the 2nd channel when 2-channel connection is used on the Ethernet communication. (Note1)	0 to 65535
1934 (PR)	Speed(2) 10M/auto	Set the communication rate. 0: Fixed to “10Mbyte” 1: Recognized “10Mbyte” or “100Mbyte” automatically and set. Set for the card mounted on the 2nd channel when 2-channel connection is used on the Ethernet communication. (Note1)	0/1

(Note1) When two Ethernet cards are mounted, make sure not to use IP address on the same network IDs.
The cards are regarded as “same network IDs” when the area masked (validated) by “Subnet mask” parameter is the same as another.

#	Items	Details	Setting range (unit)
21025	SmpDelay	Set up a sampling time after an alarm occurs.	0 to 3000 (ms)
21028	ed_mess	Set up an edit type. 0: Displays messages with state. 1: Displays operation message equivalent to M50.	0/1
21029	NCname	Use this to display the NC unit name on the CE terminal screen.	8 or less alphanumeric characters
21030	AlmHold (h)	Set the time to delete sampling data automatically after an alarm occurs. If 0 is set, the alarm will not be deleted automatically.	0 to 9999 (h)
21031	UnitMax	Set the number of connected control units when setting and displaying several NC control units with one terminal using the multiple NC common display function. Up to 15 NC control units can be connected. The default value is "0", so if the setting is not changed, it will be interpreted that 1 control unit is connected. (The setting values "0" and "1" are handled in the same manner.)	0 to 15 (Default value: 0)
21032	UnitNum	Set the control unit's station No. when setting and displaying several NC control units with one terminal using the multiple NC common display function. "0" is the first station No. and "14" is the last station No. Make sure that the stations are not set in duplicate.	0 to 14 (Default value: 0)
21033	KeyCtrlLmt	Acquisition of the key operation rights are limited. 0: The key operation rights can be acquired from another display unit on all screens. 1: The key operation rights cannot be acquired while the Program screen is opened. 2: The key operation rights cannot be acquired from another display unit on any screen.	0 to 2
21034	ReMonDisp	The remote monitor tool displays are limited. 0: The remote monitor tool displays are not limited. 1: Display information is not sent to the remote monitor tool. **(Note)** Avoid setting from the remote monitor tool. The display will not appear as soon as this parameter is set.	0 to 1
21049	SPname	Designate the spindle No. selected for the G43.1 modal in each part system. 0: 1st spindle 4: 4th spindle 1: 1st spindle 5: 5th spindle 2: 2nd spindle 6: 6th spindle 3: 3rd spindle 7: 7th spindle	0 to 7

#	Items		Details	Setting range (unit)
21101	add01 (bit0)	PLC axis rapid traverse mode acceleration/ deceleration type	Select the PLC axis rapid traverse mode acceleration/ deceleration type. (This is compatible from software version C0 and higher.) 0: Select constant time constant acceleration/ deceleration 1: Select constant inclination acceleration/ deceleration **(Note)** This parameter cannot be used when the peripheral axes (MC1K I/F) is used.	0/1
	add01 (bit1)	PLC axis cutting feed mode acceleration/ deceleration type /Peripheral axis (MC1K I/F) acceleration/ deceleration type	Select the PLC axis cutting feed mode acceleration/ deceleration type. (This is compatible from software version C0 and higher.) 0: Select constant time constant acceleration/ deceleration 1: Select constant inclination acceleration/ deceleration **(Note)** Select the peripheral axis (MC1K I/F) acceleration/deceleration type when the peripheral axes are used. (This is compatible from software version C0 and higher.)	0/1
	add01 (bit2)	Circular command block overlap valid	Validates the block overlap at the circular command. (This is compatible from software version C1 and higher.) 0: Invalid 1: Valid	0/1
	add01 (bit3)	G31 automatic acceleration/ deceleration	Validates dry run, override and automatic acceleration/ deceleration for the G31 (skip) command. (This is compatible from software version C1 and higher.) 0: Invalid 1: Valid	0/1
	add01 (bit4)		Reserved for system.	0
	add01 (bit5)		Reserved for system.	0

#	Items		Details	Setting range (unit)
21102	add02 (bit0)	Servo parameter 100-point compliance	0: The number of servo parameters is set to 64 points. 1: The number of servo parameters is set to 100 points when using the 100-point servo parameter compliant amplifier. (This is compatible from software version C1 and higher.)	0/1
	add02 (bit1)	External search time-out valid	0: Time-out check of the external search command (DDBS) is not performed. 1: Time-out is performed approx. 3 seconds after the external search command (DDBS) is issued. (This is compatible from software version C2 and higher.)	0/1
	add02 (bit2)	RIO communi-cation interruption alarm invalid	0: The alarm “RIO communication interrupted” will occur if the remote I/O unit is not mounted. 1: Any alarm will not occur evenif the remote I/O unit is not mounted. Set “1” if the remote I/O unit is not used though CC-Link, MELSECNET/10, etc. is used. (This is compatible from software version C3 and higher.)	0/1
21103	add03 (bit0)		Reserved for system.	0
	add03 (bit1)	Amp S/W automatic download valid (only C64T)	Specify whether to perform or not the automatic download of the amp software when the power is turned ON. 0: Disables download 1: Enables download (This is compatible from software version C4 and higher.)	0/1 (Standard:0)
21104	add04 (bit0)	Sampling mode selection	Select the sampling mode. (This is compatible from software version D0 and higher.) 0: Cycle monitor mode 1: NC alarm diagnosis mode When NC power is turned ON, cycle monitor mode is selected.	0/1

#	Items		Details	Setting range (unit)
21105	add05		Not used.	0
21106	add06			
21107	add07			
21108	add08			
21109	add09			
21110	add10			
21111	add11			
21112	add12			
21113	add13			
21114	add14			
21115	add15			
21116	add16			
21117	add17			
21118	add18			
21119	add19			
21120	add20			
21121	add21			
21122	add22			
21123	add23			
21124	add24			

6. Axis Specifications Parameters

6.1 Axis Specifications Parameters

After setting up the parameter (PR) listed in the table, turn off the NC power. To validate the parameter, turn on the power again.

<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td>2001</td><td>rapid</td><td>Rapid traverse feedrate</td><td>Set up the rapid traverse feedrate for each axis. The maximum value to be set differs with mechanical systems.</td><td>1 to 1000000
(mm/min)</td></tr>
<tr><td>2002</td><td>clamp</td><td>Cutting feedrate for clamp function</td><td>Define the maximum cutting feedrate for each axis. Even if the feedrate in G01 exceeds this value, the clamp will be applied at this feedrate.</td><td>1 to 1000000
(mm/min)</td></tr>
<tr><td>2003
(PR)</td><td>smgst</td><td>Acceleration and deceler-ation modes</td><td>Specify acceleration and deceleration control modes.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>OT3</td><td>OT2</td><td>OT1</td><td>C3</td><td></td><td>C1</td><td>LC</td><td>R3</td><td></td><td>R1</td><td>LR</td></tr>
</table>
(Note) Set 0 in null bits.

Rapid traverse feed acceleration and deceleration types
LR: Linear acceleration/deceleration
R1: Primary delay
R3: Exponential acceleration and linear deceleration
(Note) Designate “F” with bits 0 to 3 for rapid traverse with acceleration/deceleration by software. Note that the acceleration/deceleration by software will not applied on such case as follows;
(1) When the parameters are set as “#1205 G0bdcc” = “1” (acc/dec before G00 is valid) and “#1086 G0Intp” = “0” (G00 non-interpolation invalid), the acceleration/deceleration before interpolation will be applied to the following operation.
(a) Travel by G00 command
(b) Travel from G28/G30 command start point to the intermediate point
(c) Travel from G29 command reference to the intermediate point
(Continued on the next page)</td><td>Specify the modes in hexadecimal notation.</td></tr>
</table>

#	Items	Details	Setting range (unit)
		(Continued from the previous page)	

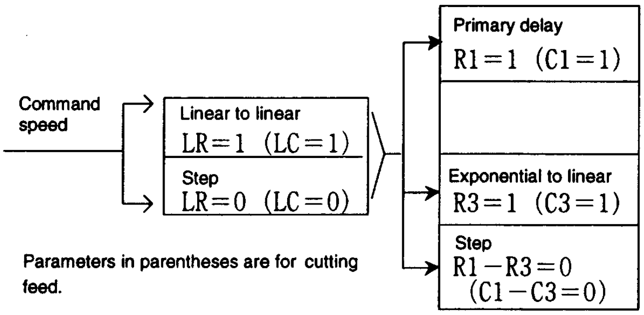
Cutting feed acceleration and deceleration types

LC: Linear acceleration/deceleration
C1: Primary delay
C3: Exponential acceleration and linear deceleration

(Note) Designate "F" with bits 4 to 7 for cutting feed with acceleration/deceleration by software. Note that the acceleration/deceleration by software will not applied on such case as follows;

(1) AS for G01/G02/G03 command during G61.1 modal, s-curve acceleration/ deceleration before interpolation is applied to.
(2) Linear acceleration/deceleration is applied to the cutting feed during synchronous tapping.

<Combination of acceleration and deceleration patterns>



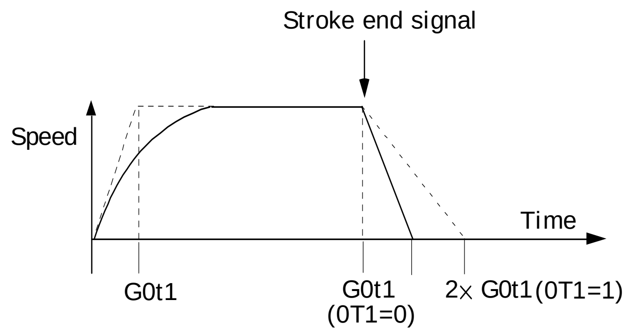
R1 > R3 when both R1 and R3 contain 1.

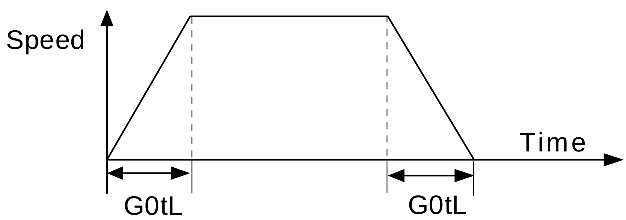
<Stroke end stop types>

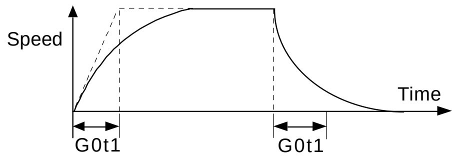
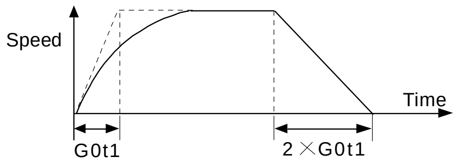
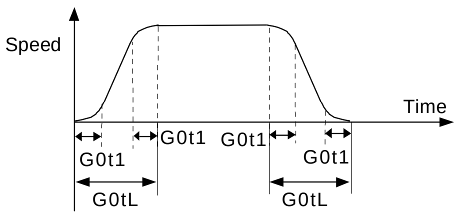
Type	OT2	OT3
Linear deceleration	0	0
Position loop step stop	1	0
Speed loop step stop	0	1
Position loop step stop	1	1

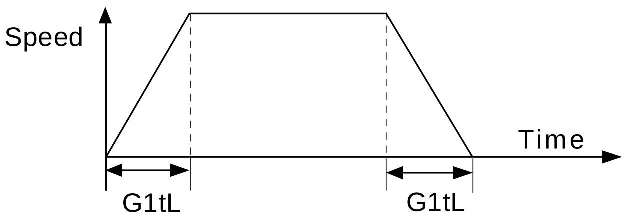
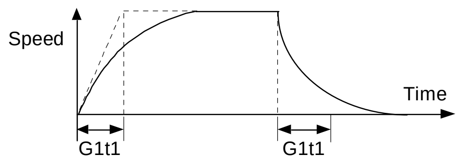
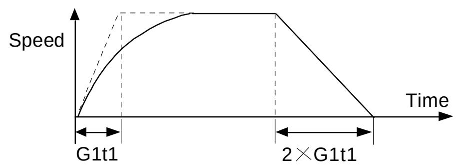
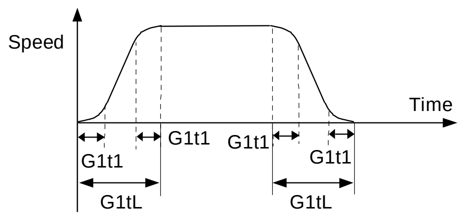
OT1	0	Deceleration by G0t1
	1	Deceleration by 2 × G0t1

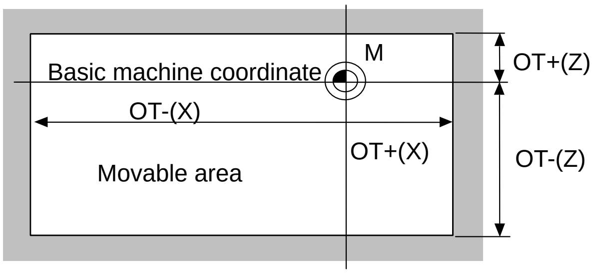
(Continued on the next page)

<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td></td><td></td><td></td><td>(Continued from the previous page)


OT1 is valid under the following conditions (valid for dog type reference point return):
Stop type: Linear deceleration
Acceleration mode: Exponential
Deceleration mode: Linear</td><td></td></tr>
<tr><td>2004</td><td>G0tL</td><td>G0 time constant (linear)</td><td>Set up a linear control time constant for rapid traverse acceleration and deceleration.
The time constant is validated when LR (rapid traverse feed with linear acceleration or deceleration) or F (acceleration or deceleration by software) is selected in acceleration or deceleration mode "#2003 smgst."

</td><td>1 to 4000 (ms)</td></tr>
</table>

#	Items		Details	Setting range (unit)
2005	G0t1	G0 time constant (primary delay) Second-step time constant for acceleration and deceleration by software	Set up a primary-delay time constant for rapid traverse acceleration and deceleration. The time constant is validated when R1 (rapid traverse feed with primary delay) or R3 (exponential acceleration and linear deceleration) is selected in acceleration or deceleration mode "#2003 smgst." When acceleration or deceleration by software is selected, the second-step time constant is used. **<Rapid traverse feed with primary delay>**  **<Rapid traverse feed with exponential acceleration and linear deceleration>**  **<Acceleration/deceleration by software>** 	1 to 5000 (ms)
2006	G0t2		Not used.	0

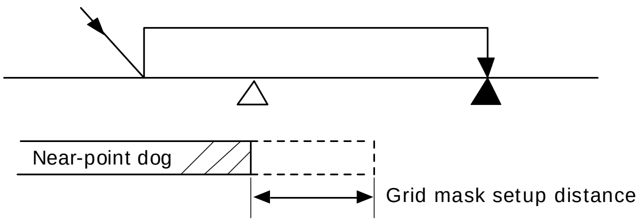
#	Items		Details	Setting range (unit)
2007	G1tL	G1 time constant (linear)	Set up a linear control time constant for cutting acceleration and deceleration. The time constant is validated when LC (cutting feed with linear acceleration and deceleration) or F (acceleration and deceleration by software) is selected in acceleration or deceleration mode "#2003 smgst." 	1 to 4000 (ms)
2008	G1t1	G1 time constant (primary delay) Second-step time constant for acceleration and deceleration by software	Set up the primary delay time constant for cutting acceleration and deceleration. The time constant is validated when C1 (cutting feed with the primary delay) or C3 (cutting feed with exponential acceleration and linear deceleration) is selected in acceleration or deceleration mode "#2003 smgst." When acceleration or deceleration by software is selected, the second stage time constant is used. **<Cutting feed with primary delay>**  **<Cutting feed with exponential acceleration and linear deceleration>**  **<Acceleration/deceleration by software>** 	1 to 5000 (ms)
2009	G1t2		Not used.	

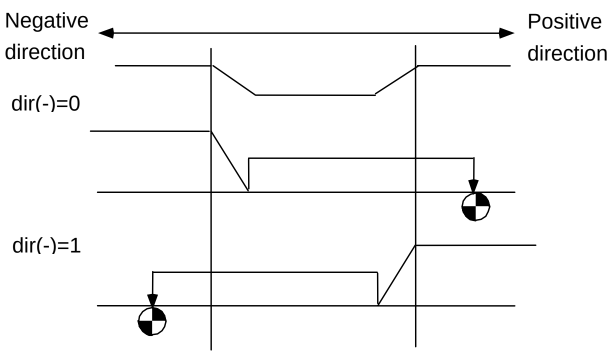
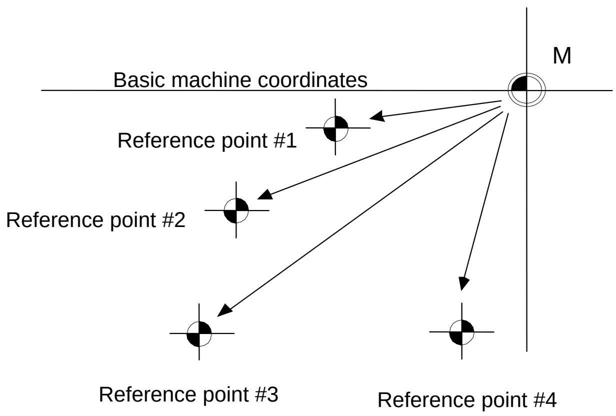
#	Items		Details	Setting range (unit)
2010	fwd_g	Feed forward gain	Set up a feed forward gain for pre-interpolation acceleration and deceleration. The larger the set value, the smaller the theoretical control error will be. However, if a mechanical vibration occurs, the set value must be reduced.	0 to 100 (%)
2011	G0back	G0 backlash	Set up the backlash compensation amount when the direction is reversed with the movement command in rapid traverse feed mode or in manual mode.	–9999 to 9999 (command unit / 2)
2012	G1back	G1 backlash	Set up the backlash compensation amount when the direction is reversed with the movement command in cutting mode.	–9999 to 9999 (command unit / 2)
2013 2014	0T – 0T +	Soft limit I – Soft limit I +	Set up a soft limit area with reference to the zero point of the basic mechanical coordinates. For the movable area of stored stroke limit 1, set the coordinate in the negative direction in #2013 and the coordinate in the positive direction in #2014. To narrow the available range in actual use, use the parameters #8204 OT- and #8205 OT+. **(Note)** When the same value (other than 0) is set in #2013 and #2014, this function is disabled. 	±99999.999 (mm)
2015	t1m1–	Negative direction sensor of tool setter or TLM standard length	Set up a 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).	±99999.999 (mm)
2016	t1m1+	Positive direction sensor of tool setter	Set up the sensor position in the positive direction when using the tool setter.	±99999.999 (mm)

#	Items		Details	Setting range (unit)
2017	tap_g	Axis servo gain	Set the position loop gain in the synchronous tap cycle. The setting range is 0.25 to 200.00rad/s, in 0.25 increment units. The standard setting is 10.	0.25 to 200.00 (rad/s)
2018	no_srv	Operation with no servo control	Set when performing test operation without connecting the drive amplifier and motor. 0: Specify normal operation. 1: Operation is possible even if units are not connected as the drive system alarm will be ignored. This is for test operation during start up and is not used normally. If 1 is set during normal operation, errors will not be detected even if they occur.	0/1
2019	revnum	Retract steps	Set up the steps required for retracting to the reference point for each axis. 0: Does not execute retracting to the reference point. 1 to 4: Sets up the steps required for retracting to the reference point.	0 to 4
2020	o_chkp	Spindle orientation completion check during second reference point return	Set up the distance from the second reference point to the position for checking that the spindle orientation has completed during second reference point return. If the set value is 0, the above check is omitted.	0 to 99999.999 (mm)
2021	out_f	Maximum speed outside soft limit range	Set up the maximum speed outside the soft limit range.	0 to 1000000
2022	G30SLX	Validate soft limit (automatic and manual)	Set up this function to disable a soft limit check during the second to the fourth reference points return in both automatic and manual operation modes. 0: Enables soft limit check. 1: Disables soft limit check.	0/1
2023	ozfmin	Set up ATC speed lower limit	Set up the minimum speed outside the soft limit range during the second to the fourth reference points return in both automatic and manual operation modes.	0 to 1000000
2024	synerr	Allowable error	Set up the following for the master axis: the maximum synchronization error that is allowed to check for synchronization errors. When 0 is set up, the error check is not carried out.	0 to 99999.999 (mm)

6.2 Zero Point Return Parameters

After setting up the parameter (PR) listed in the table, turn off the NC power. To validate the parameter, turn on the power again.

#	Items		Details	Setting range (unit)
2025	G28rap	G28 rapid traverse feedrate	Set up a rapid traverse feedrate for dog type reference point return command.	1 to 1000000 (mm/min)
2026	G28crp	G28 approach speed	Set up the speed of approach to the reference point in the reference point return command. This speed is attained after the system stops with deceleration by dog detection. **(Note)** The G28 approach speed unit is 10°/min only when using the spindle/C-axis with the Z-phase type encoder for the reference point return type ("#1226 aux10" bit3 = 1). Note that this unit is applied to both micrometric and sub-micrometric specifications.	1 to 60000 (mm/min)
2027	G28sft	Reference point shift distance	Set up the distance from the electrical zero-point detection position to the actual machine reference point during reference point return.	0 to 65535 (µm)
2028	grmask	Grid mask amount	Set up a distance where the grid point is ignored when near-point dog OFF signals are close to that grid point during reference point return.  The grid mask is valid by one grid.	0 to 65535 (µm) Even for the specifications in sub-micrometric system, set up the value in units of µm.
2029	grspc	Grid interval	Set up a detector grid interval. Generally, set up the value equal to the ball screw pitch. However, if the detector grid interval is not equal to the screw pitch when measured with a linear scale, set up the detector grid interval. To reduce the grid interval, use its divisors. To use 0.001 mm as minimum setup units, set up the negative value. Example) Setup value 1 → 1.000 mm (°) –1 → 0.001 mm (°) Even when the specifications in sub-micrometrics are used, 0.001 mm is specified for the minimum setup units.	–32767 to 999 (mm)

#	Items		Details	Setting range (unit)
2030 (PR)	dir (–)	Reference point direction (–)	Set which side of the near-point dog the reference point is at during reference point return. <For dog type reference point return>  	0: Positive direction 1: Negative direction
2031	noref	Axis without reference point	Specify the axis that does not have a reference point. Before automatic operation starts, reference point return is not required.	0: Normal controlled axis 1: Axis without reference point
2032	nochk	Whether reference point return is completed not checked	The absolute and incremental commands can be executed even if dog type (or Z phase pulse system) reference point return is not completed. Specify whether to check that the reference point return is completed.	0: Checks reference point return completion. 1: Does not check reference point return completion.
2037 2038 2039 2040	G53ofs #2_rfp #3_rfp #4_rfp	Reference point #1 to #4	Set up the position of the first, second, third, and fourth reference points from the zero point of the basic mechanical coordinates.  	±999999.999 (mm)

6.3 Absolute Position Parameters

#	Items		Details	Setting range (unit)
2049 (PR)	type	Absolute position detection method	Specify the absolute position zero point alignment method. 0: Not absolute position detection 1: Stopper method (push onto mechanical stopper) 2: Marked point alignment method (align with marked point) 3: Dog-type (align with dog and proximity switch) 9: Simple absolute position detection (Not absolute position detection, but the position when the power is turned off is registered.) Automatic initial setting is valid only when the stopper method is selected.	0 to 9
2050	absdir	Base point of Z direction	Set the direction of the grid point just before the marked point (of the detector) when using marked point alignment method.	0: Positive direction 1: Negative direction
2051	check	Check	Set the tolerable range for the movement amount (deviation amount) when the power is turned off. 0: Not checked 1 to 99999.999mm: If the difference of the position when the power is turned off and turned on again is larger than this value, an alarm will be output.	0 to 99999.999 (mm)
2052	absg28	Width compared by G28	Specify the position comparison when executing G28 or G30. The comparison results set the tolerable range. 0: No comparison 1 to 65535 (0.5 µm units): If the results of the comparison of the value read in from the detector and the position in the control unit exceed this set value, an alarm will be output, and the machine will stop. The standard value is 100.	0 to 65535 (0.5 µm)
2053	absm02	Width compared by M02	Specify the position comparison when executing M02 or M30. The comparison results set the tolerable range. 0: Not compared 1 to 65535 (0.5 µm units): If the results of the comparison of the value read in from the detector and the position in the control unit exceed this set value, an alarm will be output, and the machine will stop. The standard value is 100.	0 to 65535 (µm)

#	Items		Details	Setting range (unit)
2054	clpush	Current limit (%)	Set up the current limit value for the initial setting when detecting an absolute position with a dog-less system. The setup value is the ratio of the current limit value to the rated value.	0 to 100 (%)
2055	pushf	Push speed	Set the feedrate for the automatic initial setting during stopper method.	1 to 999 (mm/min)
2056	aproch	Approach	Set the approach distance for the automatic initial setting in the stopper method. Approach distance: After pushing onto the machine stopper once, the tool returns this distance, and then pushes again. When set to 0, the reference point coordinates set in "#2037 G53ofs" will be used as the approach start position.	0 to 999.999 (mm)
2057	nrefp	Near zero point +	Set the width where the near-reference-point signal is output. (Positive direction width) When set to 0, the width is equivalent to the grid width setting.	0 to 32.767 (mm)
2058	nrefn	Near zero point –	Set the width where the near-reference-point signal is output. (Negative direction width) When set to 0, the width is equivalent to the grid width setting.	0 to 32.767 (mm)
2059	zerbas	Select zero point parameter and reference point	Specify the position to be the zero point coordinate during absolute position initial setting. 0: Machine stopper position in machine stopper method. Marked point in marked point alignment method. 1: On the grid point just before machine stopper in machine stopper. On the grid point just before the marked point in marked point alignment method.	0/1

6.4 Axis Specifications Parameters 2

#	Items		Details	Setting range (unit)
2061	OT_1B–	Soft limit IB–	Set up the coordinates of the lower limit of the inhibited area of stored stroke limit IB. Specify a value in the basic machine coordinates system. If the same value (other than 0) with the same sign as that of "#2062 OT_IB–" is specified, the stored stroke limit IB function is disabled.	±99999.999 (mm)
2062	OT_1B+	Soft limit IB+	Set up the coordinates of the upper limit of the inhibited area of stored stroke limit IB. Specify a value in the basic machine coordinates system.	±99999.999 (mm)
2063	OT_1B type	Soft limit IB type	Select OT_IB or OT_IC in which OT_IB+/– is used in stored stroke limit I. 0: Soft limit IB valid 1: Soft limit IB and IC invalid 2: Soft limit IC valid	0/1/2
2068	G0fwdg	G00 feed forward gain	Specify the feed forward gain applicable to acceleration/deceleration before G00 interpolation. The greater the set value, the shorter the positioning time during in-position checking. If machine vibration occurs, decrease the set value.	0 to 200 (%)
2069	Rcoeff	Axis arc radius error correction efficient	The amount of arc radius error correction can be increased or decreased between -100% to +100% for each axis.	-100.0 to +100.0 (%)
2070 (PR)	div_RT	Rotational axis division count	Specify the number of divisions of one turn of the rotational axis for purpose of control. **(Example)** When 36 is set, one turn is supposed to be 36.000. **(Note)** When 0 is set, the normal rotational axis (360.000 degrees for one turn) is assumed. * If this parameter is changed when the absolute position detection specification is used, absolute position data is lost. Initialization must be performed again.	0 to 999

#	Items		Details	Setting range (unit)
2073	zrn_dog	Origin dog Random assignment device	When it is desired to assign the origin dog signal to a position other than the fixed device, specify the input device in this parameter. **(Note1)** This parameter is valid when 1 is set in #1226 aux10 bit 5. **(Note2)** When this parameter is valid, do not set the same device number. If the same device number exists, an emergency stop occurs. Note that the device number is not checked for an axis to which a signal that ignores the fixed signal is input. **(Note3)** The setting range of this parameter has been expanded on the software Ver.D0 and later.	000 to 3FF (HEX)
2074	H/W_OT+	H/W OT+ Random assignment device	When it is desired to assign the OT (+) g signal to a position other than the fixed device, specify the input device in this parameter. **(Note1)** This parameter is valid when 1 is set in #1226 aux10 bit 5. **(Note2)** When this parameter is valid, do not set the same device number. If the same device number exists, an emergency stop occurs. Note that the device number is not checked for an axis to which a signal that ignores the fixed signal is input. **(Note3)** The setting range of this parameter has been expanded on the software Ver.D0 and later.	000 to 3FF (HEX)
2075	H/W_OT-	H/W OT- Random assignment device	When it is desired to assign the OT (-) g signal to a position other than the fixed device, specify the input device in this parameter. **(Note1)** This parameter is valid when 1 is set in #1226 aux10 bit 5. **(Note2)** When this parameter is valid, do not set the same device number. If the same device number exists, an emergency stop occurs. Note that the device number is not checked for an axis to which a signal that ignores the fixed signal is input. **(Note3)** The setting range of this parameter has been expanded on the software Ver.D0 and later.	000 to 3FF (HEX)
2076	index_x	Index table indexing axis	Specify the index table indexing axis. 0: Normal axis 1: Index table indexing axis **(Note)** This parameter is valid only for the NC axis. The parameter is invalid if specified for the PLC axis.	0/1

#	Items		Details	Setting range (unit)
22011	bscmp–	Offset compensa-tion position	Specify the coordinates on the machine basic coordinates where the compensation is carried out by the offset amount.	±99999.999
22012	bscmp+	Max. compensa-tion position	Specify the coordinates on the machine basic coordinates where the compensation is carried out by the max. offset amount.	±99999.999

(Note) The positional relation of either #22011 and #22012 can be on the minus side.

7. Servo Parameters

The parameters can be changed from any screen.
The valid servo parameters will differ according to the motor type. The setting values and meanings may also differ. Follow the correspondence table given below, and set the correct parameters.
Refer to each Instruction Manual or the following manuals for details on each motor.

MELDAS AC Servo/ Spindle MDS-A Series MDS-B Series Specification Manual BNP-B3759
MELDAS AC Servo MDS-B-SVJ2 Series Specification and Instruction Manual BNP-B3937
MELDAS AC Servo/ Spindle MDS-C1 Series Specification Manual BNP-C3000

Parameter		Corresponding model		
		MDS-B-SVJ2	MDS-C1-Vx (High-gain) (MDS-B-Vx4)	MDS-C1-Vx (Standard) (MDS-B-Vx)
SV001	Motor side gear ratio	○	○	○
SV002	Machine side gear ratio	○	○	○
SV003	Position loop gain 1	○	○	○
SV004	Position loop gain 2	○	○	○
SV005	Speed loop gain 1	○	○	○
SV006	Speed loop gain 2	–	○	○
SV007	Speed loop delay compensation	–	○	○
SV008	Speed loop lead compensation	○	○	○
SV009	Current loop q axis lead compensation	○	○	○
SV010	Current loop d axis lead compensation	○	○	○
SV011	Current loop q axis gain	○	○	○
SV012	Current loop d axis gain	○	○	○
SV013	Current limit value	○	○	○
SV014	Current limit value in special control	○	○	○
SV015	Acceleration rate feed forward gain	○	○	○
SV016	Lost motion compensation 1	○	○	○
SV017	Servo specification selection	○	○	○
SV018	Ball screw pitch	○	○	○
SV019	Position detector resolution	○	○	○
SV020	Speed detector resolution	○	○	○
SV021	Overload detection time constant	○	○	○
SV022	Overload detection level	○	○	○
SV023	Excessive error detection width during servo ON	○	○	○
SV024	In-position detection width	○	○	○
SV025	Motor/Detector type	○	○	○
SV026	Excessive error detection width during servo OFF	○	○	○
SV027	Servo function selection 1	○	○	○
SV028	Linear motor magnetic pole shift length	–	–	–
SV029	Speed at the change of speed loop gain	–	○	○
SV030	Voltage dead time compensation	–/○	○/○	○/○
SV031	Overshooting compensation 1	○	○	○
SV032	Torque offset	○	○	○

Parameter		Corresponding model		
		MDS-B-SVJ2	MDS-C1-Vx (High-gain) (MDS-B-Vx4)	MDS-C1-Vx (Standard) (MDS-B-Vx)
SV033	Servo function selection 2	○	○	○
SV034	Servo function selection 3	○	○	○
SV035	Servo function selection 4	○	○	○
SV036	Regenerative resistor type	○	○	○
SV037	Load inertia scale	○	○	○
SV038	Notch filter frequency 1	–	○	○
SV039	Lost motion compensation timing	–	○	○
SV040	Non-sensitive band in feed forward control	–/○	○/○	○/○
SV041	Lost motion compensation 2	○	○	○
SV042	Overshooting compensation 2	○	○	○
SV043	Disturbance observer filter frequency	○	○	○
SV044	Disturbance observer gain	○	○	○
SV045	Frictional torque	–/○	○/○	○/○
SV046	Notch filter frequency 2	–	○	–
SV047	Inductive voltage compensation gain	○	○	○
SV048	Vertical axis drop prevention time	○	○	○
SV049	Position loop gain 1 in spindle synchronous control	○	○	○
SV050	Position loop gain 2 in spindle synchronous control	○	○	○
SV051	Dual feedback control time constant	–	○	○
SV052	Dual feedback control non-sensitive band	–	○	○
SV053	Excessive error detection width in special control	○	○	○
SV054	Overrun detection width in closed loop control	–/–	○/○	○/○
SV055	Max. gate off delay time after emergency stop	–	○	○
SV056	Deceleration time constant at emergency stop	○	○	○
SV057	SHG control gain	○	○	○
SV058	SHG control gain in spindle synchronous control	○	○	○
SV059	Collision detection torque estimating gain	○	○	○
SV060	Collision detection level	○	○	○
SV061	D/A output channel 1 data No.	○	○	○
SV062	D/A output channel 2 data No.	○	○	○
SV063	D/A output channel 1 output scale	○	○	○
SV064	D/A output channel 2 output scale	○	○	○
SV065	Tool end compensation spring constant	–	○	–

7.1 MDS-B-SVJ2

(1) Details for servo parameters

For parameters marked with a (PR) in the table, turn the NC power OFF after setting. After the power is turned ON again, the parameter is validated.

CAUTION

In the explanation on bits, set all bits not used, including blank bits, to “0”.

No.	Items		Details	Setting range
2201 (PR)	SV001 PC1	Motor side gear ratio	Set the motor side and machine side gear ratio. For the rotary axis, set the total deceleration (acceleration) ratio. Even if the gear ratio is within the setting range, the electronic gears may overflow and cause an alarm.	1 to 32767
2202 (PR)	SV002 PC2	Machine side gear ratio		1 to 32767
2203	SV003 PGN1	Position loop gain 1	Set the position loop gain. The standard setting is “33”. The higher the setting value is, the more precisely the command can be followed and the shorter the positioning time gets, however, note that a bigger shock is applied to the machine during acceleration/deceleration. When using the SHG control, also set SV004 (PGN2) and SV057 (SHGC).	1 to 200 (rad/s)
2204	SV004 PGN2	Position loop gain 2	When using the SHG control, also set SV003 (PGN1) and SV057 (SHGC). When not using the SHG control, set to “0”.	0 to 999 (rad/s)
2205	SV005 VGN1	Speed loop gain	Set the speed loop gain. Set this according to the load inertia size. The higher the setting value is, the more accurate the control will be, however, vibration tends to occur. If vibration occurs, adjust by lowering by 20 to 30%. The value should be determined to be 70 to 80% of the value at the time when the vibration stops.	1 to 999
2206			Not used. Set to “0”.	0
2207			Not used. Set to “0”.	0
2208	SV008 VIA	Speed loop lead compensation	Set the gain of the speed loop integration control. The standard setting is “1364”. During the SHG control, the standard setting is “1900”. Adjust the value by increasing/decreasing it by about 100 at a time. Raise this value to improve contour tracking precision in high-speed cutting. Lower this value when the position droop vibrates (10 to 20Hz).	1 to 9999
2209	SV009 IQA	Current loop q axis lead compensation	Set the gain of current loop. As this setting is determined by the motor’s electrical characteristics, the setting is fixed for each type of motor. Set the standard values for all the parameters depending on each motor type.	1 to 20480
2210	SV010 IDA	Current loop d axis lead compensation		1 to 20480
2211	SV011 IQG	Current loop q axis gain		1 to 2560
2212	SV012 IDG	Current loop d axis gain		1 to 2560

No.	Items		Details	Setting range
2213	SV013 ILMT	Current limit value	Set the normal current (torque) limit value. (Limit values for both + and - direction.) When the value is "500" (a standard setting), the maximum torque is determined by the specification of the motor.	0 to 500 (Stall [rated] current %)
2214	SV014 ILMTsp	Current limit value in special control	Set the current (torque) limit value in a special control (initial absolute position setting, stopper control, etc). (Limit values for both of the + and - directions.) Set to "500" when not using.	0 to 500 (Stall [rated] current %)
2215	SV015 FFC	Acceleration rate feed forward gain	When a relative error in the synchronous control is large, apply this parameter to the axis that is delaying. The standard setting value is "0". For the SHG control, set to "100". To adjust a relative error in acceleration/ deceleration, increase the value by 50 to 100 at a time.	0 to 999 (%)
2216	SV016 LMC1	Lost motion compensation 1	Set this when the protrusion (that occurs due to the non-sensitive band by friction, torsion, backlash, etc) at quadrant change is too large. This compensates the torque at quadrant change. This is valid only when the lost motion compensation (SV027 (SSF1/lmc)) is selected.	
			Type 1: When SV027 (SSF1)/ bit9, 8 (lmc)=01 Set the compensation amount based on the motor torque before the quadrant change. The standard setting is "100". Setting to "0" means the compensation amount is zero. Normally, use Type 2.	-1 to 200 (%)
			Type 2: When SV027 (SSF1)/ bit9, 8 (lmc)=10 Set the compensation amount based on the stall (rated) current of the motor. The standard setting is double of the friction torque. Setting to "0" means the compensation amount is zero.	-1 to 100 (Stall [rated] current %)
			When you wish different compensation amount depending on the direction When SV041 (LMC2) is "0", compensate with the value of SV016 (LMC1) in both of the + and -directions. If you wish to change the compensation amount depending on the command direction, set this and SV041 (LMC2). (SV016: + direction, SV041: - direction. However, the directions may be opposite depending on other settings.) When "-1" is set, the compensation won't be performed in the direction of the command.	

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>2217
(PR)</td><td>SV017
SPEC</td><td>Servo specification selection</td><td colspan="2">

F	E	D	C	B	A	9	8

7	6	5	4	3	2	1	0
abs		vdir		mc			dmk

bit		Meaning when "0" is set	Meaning when "1" is set
0	dmk	Deceleration control stop (SVJ2 standard)	Dynamic brake stop
1			
2			
3	mc	Contactor control output invalid	Contactor control output valid
4			
5	vdir	HA053N to HA33N motor Detector installation position standard (A, C)	HA053N to HA33N motor Detector installation position 90 degrees (B, D)
6			
7	abs	Incremental control	Absolute position control
8			
9			
A			
B			
C			
D			
E			
F			

(Note) Set to "0" for bits with no particular description.</td></tr>
<tr><td>2218
(PR)</td><td>SV018
PIT</td><td>Ball screw pitch</td><td>Set the ball screw pitch. Set to "360" for the rotary axis.</td><td>1 to 32767
(mm/rev)</td></tr>
<tr><td>2219
(PR)</td><td>SV019
RNG1</td><td>Position detector resolution</td><td rowspan="2">For both parameters, set the number of pulses per one revolution of the motor detector.

Motor model name	Setting value SV019	Setting value SV020
HC*-E42/A42/A47, HC*R-E42/A42/A47 HA*N-E42/A42	100	100
HC*-E33/A33, HC*R-E33/A33 HA*N-E33/A33	25	25
HC-SF, HC-RF	16	16
HA-FF, HC-MF	8	8
</td><td rowspan="2">8 to 100
(kp/rev)</td></tr>
<tr><td>2220
(PR)</td><td>SV020
RNG2</td><td>Speed detector resolution</td></tr>
</table>

No.	Items		Details	Setting range
2221	SV021 OLT	Overload detection time constant	Set the detection time constant of Overload 1 (Alarm 50). Set to “60” as a standard. (For machine tool builder adjustment.)	1 to 300 (s)
2222	SV022 OLL	Overload detection level	Set the current detection level of Overload 1 (Alarm 50) in respect to the stall (rated) current. Set to “150” as a standard. (For machine tool builder adjustment.)	50 to 180 (Stall [rated] current %)
2223	SV023 OD1	Excessive error detection width during servo ON	Set the excessive error detection width when servo ON. <Standard setting value> $OD1=OD2=\dfrac{\text{Rapid traverse rate (mm/min)}}{60*PGN1}/2\ (mm)$ When “0” is set, the excessive error detection will not be performed.	0 to 32767 (mm)
2224	SV024 INP	In-position detection width	Set the in-position detection width. Set the accuracy required for the machine. The lower the setting is, the higher the positioning accuracy gets, however, the cycle time (setting time) becomes longer. The standard setting is “50”.	0 to 32767 (µm)

No.	Items		Details	Setting range
2225 (PR)	SV025 MTYP	Motor/ Detector type	See below	

F	E	D	C	B	A	9	8
pen				ent			

7	6	5	4	3	2	1	0
mtyp							

bit		Explanation
0	mtyp	Set the motor type.
1		
2		
3		
4		
5		
6		
7		

Set-ting	0x	1x	2x	3x	4x	5x	6x	7x	8x
x0	HA40N							HA-FF43	HA43N
x1	HA80N							HA-FF63	HA83N
x2	HA100N								HA103N
x3	HA200N								
x4									
x5									
x6									
x7									
x8									
x9									
xA									HA93N
xB									
xC								HA-FF053	HA053N
xD								HA-FF13	HA13N
xE								HA-FF23	HA23N
xF								HA-FF33	HA33N

Set-ting	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	HC-MF43		HC52 or HC-SF52	HC53 or HC-SF53			
x1	HC-MF73		HC102 or HC-SF102	HC103 or HC-SF103		HC103R or HC-RF103	
x2			HC152 or HC-SF152	HC153 or HC-SF153		HC153R or HC-RF153	
x3			HC202 or HC-SF202	HC203 or HC-SF203		HC203R or HC-RF203	
x4			HC352 or HC-SF352	HC-SF353			
x5							
x6							
x7							
x8							
x9							
xA							
xB							
xC	HC-MF053						
xD	HC-MF13						
xE	HC-MF23						
xF							

(To be continued to the next page)

No.	Items		Details	Setting range
			(Continued from the previous page)	

bit		Explanation
8 9 A B	ent	Set the speed detector type. Set to “2”.
C D E F	pen	Set the position detector type. Set to “2”.

No.	Items		Details	Setting range
2226	SV026 OD2	Excessive error detection width during servo OFF	Set the excessive error detection width when servo ON. For the standard setting, refer to the explanation of SV023 (OD1). When “0” is set, the excessive error detection will not be performed.	0 to 32767 (mm)
2227	SV027 SSF1	Servo function selection 1	(see bit tables below)	

F	E	D	C	B	A	9	8
aflt	zrn2			ovs		lmc	

7	6	5	4	3	2	1	0
		vfct					zup

bit		Meaning when “0” is set	Meaning when “1” is set
0	zup	Vertical axis lift-up control stop	Vertical axis lift-up control start
1			
2			
3			
4 5	vfct	Set the jitter compensation No. of compensation pulses with a binary. 00: Jitter compensation invalid 01: Jitter compensation 1 pulse 10: Jitter compensation 2 pulses 11: Jitter compensation 3 pulses	
6			
7			
8 9	lmc	Set the compensation amount with SV016 (LMC1) and SV041 (LMC2). 00: Lost motion compensation stop 01: Lost motion compensation type 1 10: Lost motion compensation type 2 11: Setting prohibited	
A B	ovs	Set the compensation amount with SV031 (OVS1) and SV042 (OVS2). 00: Overshooting compensation stop 01: Overshooting compensation type 1 10: Overshooting compensation type 2 11: Setting prohibited	
C			
D			
E	zrn2	Set to “1”.	
F	aflt	Adoptive filter stops	Adoptive filter starts

(Note) Set to “0” for bits with no particular description.

No.	Items		Details	Setting range
2228	SV028		Not used. Set to “0”.	0
2229	SV029		Not used. Set to “0”.	0
2230	SV030 IVC	Voltage dead time compensa-tion	When 100% is set, the voltage equivalent to the logical non-energized time will be compensated. Adjust in increments of 10% from the default value 100%. If increased too much, vibration or vibration noise may be generated. When not using, set to “0”.	0 to 200 (%)
2231	SV031 OVS1	Overshoot-ing compensa-tion 1	Set this if overshooting occurs during positioning. This compensates the motor torque during positioning. This is valid only when the overshooting compensation SV027 (SSF1/ovs) is selected.	-1 to 100 (Stall [rated] current %)
			Type 1: When SV027 (SSF1)/ bit11, 10 (ovs)=01 Set the compensation amount based on the motor’s stall (rated) current. Increase by 1% and determine the amount that overshooting doesn’t occur. In Type 1, compensation during the feed forward control during circular cutting won’t be performed.	
			Type 2: When SV027 (SSF1)/ bit11, 10 (ovs)=10 Use this if you perform the overshooting compensation during the feed forward control during circular cutting. The setting method is the same in Type 1.	
			When you wish different compensation amount depending on the direction When SV042 (OVS2) is “0”, compensate with the value of SV031 (OVS1) in both of the + and -directions. If you wish to change the compensation amount depending on the command direction, set this and SV042 (OVS2). (SV031: + direction, SV042: - direction. However, the directions may be opposite depending on other settings.) When “-1” is set, the compensation won’t be performed in the direction of the command.	
2232	SV032 TOF	Torque offset	Set the unbalance torque of vertical axis and inclined axis.	-100 to 100 (Stall [rated] current %)

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>2233</td><td>SV033
SSF2</td><td>Servo function selection 2</td><td>

F	E	D	C	B	A	9	8
				afs			

7	6	5	4	3	2	1	0
		fhz2		nfd			

<table>
<tr><th colspan="2">bit</th><th>Meaning when “0” is set</th><th>Meaning when “1” is set</th></tr>
<tr><td>0
1
2
3</td><td>nfd</td><td colspan="2">Set the filter depth for Notch filter (SV038: FHz1).
The control is stabilized by making the filter shallower.

Value	0	2	4	6	8	A	C	E
Depth (dB)	Infntly deep	-18.1	-12.0	-8.5	-6.0	-4.1	-2.5	-1.2

Deep← → Shallow</td></tr>
<tr><td>4
5</td><td>fhz2</td><td colspan="2">Set the operation frequency of Notch filter 2.
00: No operation 01:2250Hz 10:1125Hz 11:750Hz</td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8
9
A
B</td><td>afs</td><td colspan="2">Set the vibration sensitivity of the adaptive filter. If the filter depth is not deep enough (generally 70% or more) and the vibration cannot be sufficiently eliminated, raise the value.</td></tr>
<tr><td>C</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td></td><td></td><td></td></tr>
<tr><td>E</td><td></td><td></td><td></td></tr>
<tr><td>F</td><td></td><td></td><td></td></tr>
</table>

(Note) Set to “0” for bits with no particular description.</td><td></td></tr>
</table>

No.	Items		Details	Setting range
2234	SV034 SSF3	Servo function selection 3	(see below)	

F	E	D	C	B	A	9	8

7	6	5	4	3	2	1	0
daf2	daf1	dac2	dac1	mon			

bit		Meaning when "0" is set	Meaning when "1" is set
0–3	mon	NC servo monitor MAX current display data changeover	
4	dac1	D/A output ch.1 overflow setting	D/A output ch.1 clamp setting
5	dac2	D/A output ch.2 overflow setting	D/A output ch.2 clamp setting
6	daf1	D/A output ch.1 no filter	D/A output ch.1 filter setting
7	daf2	D/A output ch.2 no filter	D/A output ch.2 filter setting
8			
9			
A			
B			
C			
D			
E			
F			

Setting	MAX current 1	MAX current 2
0	Max. current command value when power is turned ON (%)	Max. current command value for one second (%)
1	Max. current command value for one second (%)	Max. current FB value for one second (%)
2	Max. current FB value when power is turned ON (%)	Max. current FB value for one second (%)
3	Load inertia rate (%)	-
4	Adaptive filter operation frequency (Hz)	Adaptive filter operation gain (%)
5	PN bus voltage (V)	Regenerative operation frequency monitor (The number of times/sec)
6	Estimated max. torque for one second (%)	Max. current FB value for one second (%)
7	Estimated max. torque for one second (%)	Max. disturbance torque for two seconds (%)
8 to F	Setting prohibited	

(Note) Set to "0" for bits with no particular description.

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>2235</td><td>SV035
SSF4</td><td>Servo function selection 4</td><td>
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td>cl2n</td><td colspan="3">clG1</td><td></td><td></td><td></td><td></td></tr>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
<table>
<tr><th colspan="2">bit</th><th>Meaning when “0” is set</th><th>Meaning when “1” is set</th></tr>
<tr><td>0</td><td></td><td></td><td></td></tr>
<tr><td>1</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td></td><td></td><td></td></tr>
<tr><td>3</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td></td><td></td><td></td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td></td><td></td><td></td></tr>
<tr><td>9</td><td></td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C
D
E</td><td>clG1</td><td colspan="2">Collision detection method 1
Set the collision detection level during cutting feed (G1).
The G1 collision detection level=SV060*clG1.
When clG1=0, the collision detection method 1 during cutting feed won’t function.</td></tr>
<tr><td>F</td><td>cl2n</td><td>Collision detection method 2 valid</td><td>Collision detection method 2 invalid</td></tr>
</table>
(Note) Set to “0” for bits with no particular description.</td><td></td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>2236
(PR)</td><td>SV036
PTYP</td><td>Regenera-
tive resistor
type</td><td>
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td colspan="4">amp</td><td colspan="4">rtyp</td></tr>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td colspan="4">emgx</td><td></td><td></td><td></td><td></td></tr>
</table>
<table>
<tr><th colspan="2">bit</th><th>Explanation</th></tr>
<tr><td>0
1
2
3</td><td></td><td>Always set to “0(0000)”.</td></tr>
<tr><td>4
5
6
7</td><td>emgx</td><td>Set the external emergency stop function. (Setting is prohibited for values with no description.)
<table>
<tr><th>Set-
ting</th><th>Explanation</th></tr>
<tr><td>0</td><td>External emergency stop invalid</td></tr>
<tr><td>4</td><td>External emergency stop valid</td></tr>
</table></td></tr>
<tr><td>8
9
A
B</td><td>rtyp</td><td>Set the regenerative resistor type.
<table>
<tr><th>Set-
ting</th><th>Explanation</th></tr>
<tr><td>0</td><td>Drive unit standard built-in resistor (SVJ2-01 doesn’t have a built-in resistor)</td></tr>
<tr><td>1</td><td>Setting prohibited</td></tr>
<tr><td>2</td><td>MR-RB032</td></tr>
<tr><td>3</td><td>MR-RB12 or GZG200W390HMK</td></tr>
<tr><td>4</td><td>MR-RB32 or GZG200W1200HMK: 3 units connected in parallel</td></tr>
<tr><td>5</td><td>MR-RB30 or GZG200W390HMK: 3 units connected in parallel</td></tr>
<tr><td>6</td><td>MR-RB50 or GZG300W390HMK: 3 units connected in parallel</td></tr>
<tr><td>7 to F</td><td>Setting prohibited</td></tr>
</table></td></tr>
<tr><td>C
D
E
F</td><td>amp</td><td>Always set to “0(0000)”.</td></tr>
</table>
</td><td></td></tr>
</table>

No.	Items		Details	Setting range
2237	SV037 JL	Load inertia scale	Set "the motor inertia + motor axis conversion load inertia" in respect to the motor inertia. $SV037 (JL) = \frac{Jl+Jm}{Jm} *100$ Jm: Motor inertia Jl: Motor axis conversion load inertia	0 to 5000 (%)
2238	SV038 FHz1	Notch filter frequency 1	Set the vibration frequency to suppress if machine vibration occurs. (Valid at 72 or more) When not using, set to "0".	0 to 3000 (Hz)
2239	SV039 LMCD	Lost motion compensation timing	Set this when the lost motion compensation timing doest not match. Adjust by increasing the value by 10 at a time.	0 to 2000 (ms)
2240	SV040 LMCT	Non-sensitive band in feed forward control	Set the non-sensitive bad of the lost motion compensation and overshooting compensation during the feed forward control. When "0" is set, the actual value that will be set is 2µm. Adjust by increasing by 1µm.	0 to 100 (µm)
2241	SV041 LMC2	Lost motion compensation 2	Set this with SV016 (LMC1) only when you wish to set the lost motion compensation amount to be different depending on the command directions. Set to "0" as a standard.	-1 to 200 (Stall [rated] current %)
2242	SV042 OVS2	Overshooting compensation 2	Set this with SV031 (OVS1) only when you wish to set the overshooting compensation amount to be different depending on the command directions. Set to "0" as a standard.	-1 to 100 (Stall [rated] current %)
2243	SV043 OBS1	Disturbance observer filter frequency	Set the disturbance observer filter band. The standard setting is "300". Lower the setting by 50 at a time if vibration occurs. To use the disturbance observer, also set SV037 (JL) and SV044 (OBS2). When not using, set to "0".	0 to 1000 (rad/s)
2244	SV044 OBS2	Disturbance observer gain	Set the disturbance observer gain. The standard setting is "100" to "300". To use the disturbance observer, also set SV037 (JL) and SV043 (OBS1). When not using, set to "0".	0 to 1000 (%)
2245	SV045 TRUB	Frictional torque	Set the frictional torque when using the collision detection function.	0 to 100 (Stall [rated] current %)
2246	SV046		Not used. Set to "0".	0
2247	SV047 EC	Inductive voltage compensation gain	Set the inductive voltage compensation gain. Set to "100" as a standard. If the current FB peak exceeds the current command peak, lower the gain.	0 to 200 (%)
2248	SV048 EMGrt	Vertical axis drop prevention time	Input a length of time to prevent the vertical axis from dropping by delaying Ready OFF until the brake works when the emergency stop occurs. Increase the setting by 100ms at a time and set the value where the axis does not drop.	0 to 2000 (ms)

No.	Items		Details	Setting range
2249	SV049 PGN1sp	Position loop gain 1 in spindle synchronous control	Set the position loop gain during the spindle synchronous control (synchronous tapping, synchronous control with spindle/C axis). Set the same value as the value of the spindle parameter, position loop gain in synchronous control. When performing the SHG control, set this with SV050 (PGN2sp) and SV058 (SHGCsp).	1 to 200 (rad/s)
2250	PGN2sp	Position loop gain 2 in spindle synchronous control	Set this with SV049 (PGN1sp) and SV058 (SHGCsp) if you wish to perform the SHG control in the spindle synchronous control (synchronous tapping, synchronous control with spindle/C axis). When not performing the SHG control, set to “0”.	0 to 999 (rad/s)
2251	SV051		Not used. Set to “0”.	0
2252	SV052		Not used. Set to “0”.	0
2253	SV053 OD3	Excessive error detection width in special control	Set the excessive error detection width when servo ON in a special control (initial absolute position setting, stopper control, etc.). If “0” is set, excessive error detection won’t be performed when servo ON during a special control.	0 to 32767 (mm)
2254	SV054		Not used. Set to “0”.	0
2255	SV055		Not used. Set to “0”.	0
2256	SV056 EMGt	Deceleration time constant at emergency stop	Set the time constant used for the deceleration control at emergency stop. Set a length of time that takes from rapid traverse rate (rapid) to stopping. Normally, set the same value as the rapid traverse acceleration/deceleration time constant.	0 to 5000 (ms)
2257	SV057 SHGC	SHG control gain	When performing the SHG control, set this with S003 (PGN1) and SV004 (PGN2). When not performing the SHG control, set to “0”.	0 to 999 (rad/s)
2258	SV058 SHGCsp	SHG control gain in spindle synchronous control	Set this with SV049 (PGN1sp) and SV050 (PGN2sp) if you wish to perform the SHG control in the spindle synchronous control (synchronous tapping, synchronous control with spindle/C axis). When not performing the SHG control, set to “0”.	0 to 999 (rad/s)
2259	SV059 TCNV	Collision detection torque estimating gain	To use the collision detection function, set the torque estimating gain. In the case of MDS-B-SVJ2, the value is the same as the load inertia ratio that includes the motor inertia. (=SV037:JL) If acceleration/deceleration is performed after setting SV034.mon=3 and SV060=0, the load inertia ratio will be displayed on the NC monitor screen.	0 to 5000 (%)
2260	SV060 TLMT	Collision detection level	When using the collision detection function, set the collision detection level during the G0 feeding. If “0” is set, none of the collision detection function will work.	0 to 200 (Stall [rated] current %)

No.	Items		Details	Setting range
2261	SV061 DA1NO	D/A output channel 1 data No.	Input the data number you wish to output to D/A output channel.	0 to 102
2262	SV062 DA2NO	D/A output channel 2 data No.		
2263	SV063 DA1MPY	D/A output channel 1 output scale	When "0" is set, output is done with the standard output unit. Set other than "0" when you wish to change the unit. Set the scale with a 1/256 unit. When "256" is set, the output unit will be the same as the standard output unit.	-32768 to 32767 (Unit: 1/256)
2264	SV064 DA2MPY	D/A output channel 2 output scale		
2265	SV065		Not used. Set to "0".	0

(2) Initial setting value

(a) HC**/HC**R series

Motor		HC 52	HC 102*	HC 102	HC 152*	HC 152	HC 202*	HC 202	HC 352*
Drive unit capacity		06	07	10	10	20	10	20	20
SV001	PC1	-	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	33	33	33
SV004	PGN2	0	0	0	0	0	0	0	0
SV005	VGN1	50	80	50	80	50	115	80	130
SV006		0	0	0	0	0	0	0	0
SV007		0	0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	8192	4096	8192	4096	8192	2048	4096	2048
SV010	IDA	8192	4096	8192	4096	8192	2048	4096	2048
SV011	IQG	512	256	384	256	384	256	384	256
SV012	IDG	512	256	384	256	384	256	384	256
SV013	ILMT	500	500	500	500	500	500	500	500
SV014	ILMTsp	500	500	500	500	500	500	500	500
SV015	FFC	0	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000	0000	0000	0000
SV018	PIT	-	-	-	-	-	-	-	-
SV019	RNG1	-	-	-	-	-	-	-	-
SV020	RNG2	-	-	-	-	-	-	-	-
SV021	OLT	60	60	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150	150	150
SV023	OD1	-	-	-	-	-	-	-	-
SV024	INP	50	50	50	50	50	50	50	50
SV025	MTYP	22B0	22B1	22B1	22B2	22B2	22B3	22B3	22B4
SV026	OD2	-	-	-	-	-	-	-	-
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0	0
SV029		0	0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0	0

Motor		HC 52	HC 102*	HC 102	HC 152*	HC 152	HC 202*	HC 202	HC 352*
Drive unit capacity		06	07	10	10	20	10	20	20
SV033	SSF2	0	0	0	0	0	0	0	0
SV034	SSF3	0	0	0	0	0	0	0	0
SV035	SSF4	0	0	0	0	0	0	0	0
SV036	PTYP	-	-	-	-	-	-	-	-
SV037	JL	0	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	0	0	0	0	0
SV041	LMC2	0	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0	0
SV046		0	0	0	0	0	0	0	0
SV047	EC	100	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0	0
SV051		0	0	0	0	0	0	0	0
SV052		0	0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0	0
SV054		0	0	0	0	0	0	0	0
SV055		0	0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0	0
SV065		0	0	0	0	0	0	0	0

Motor		HC 53	HC 103	HC 153	HC 203*	HC 103R	HC 153R	HC 203R
Drive unit capacity		06	10	20	20	10	10	20
SV001	PC1	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	33	33
SV004	PGN2	0	0	0	0	0	0	0
SV005	VGN1	80	80	80	100	10	10	10
SV006		0	0	0	0	0	0	0
SV007		0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	4096	4096	4096	2048	8192	8192	8192
SV010	IDA	4096	4096	4096	2048	8192	8192	8192
SV011	IQG	256	256	256	200	384	384	256
SV012	IDG	256	256	256	200	384	384	256
SV013	ILMT	500	500	500	500	500	500	500
SV014	ILMTsp	500	500	500	500	500	500	500
SV015	FFC	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000	0000	0000
SV018	PIT	-	-	-	-	-	-	-
SV019	RNG1	-	-	-	-	-	-	-
SV020	RNG2	-	-	-	-	-	-	-
SV021	OLT	60	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150	150
SV023	OD1	-	-	-	-	-	-	-
SV024	INP	50	50	50	50	50	50	50
SV025	MTYP	22C0	22C1	22C2	22C3	22E1	22E2	22E3
SV026	OD2	-	-	-	-	-	-	-
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0
SV029		0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0

Motor		HC 53	HC 103	HC 153	HC 203*	HC 103R	HC 153R	HC 203R
Drive unit capacity		06	10	20	20	10	10	20
SV033	SSF2	0	0	0	0	0	0	0
SV034	SSF3	0	0	0	0	0	0	0
SV035	SSF4	0	0	0	0	0	0	0
SV036	PTYP	-	-	-	-	-	-	-
SV037	JL	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	0	0	0	0
SV041	LMC2	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0
SV046		0	0	0	0	0	0	0
SV047	EC	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0
SV051		0	0	0	0	0	0	0
SV052		0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0
SV054		0	0	0	0	0	0	0
SV055		0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0
SV065		0	0	0	0	0	0	0

(b) HA**N series

Motor		HA 40N	HA 80N	HA 100N	HA 200N*	HA 053N	HA 13N	HA 23N	HA 33N	HA 43N	HA 83N	HA 103N*
Drive unit capacity		06	10	20	20	01	01	03	03	06	10	20
SV001	PC1	-	-	-	-	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	33	33	33	33	33	33
SV004	PGN2	0	0	0	0	0	0	0	0	0	0	0
SV005	VGN1	90	150	150	220	35	35	35	35	120	150	180
SV006		0	0	0	0	0	0	0	0	0	0	0
SV007		0	0	0	0	0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048
SV010	IDA	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048
SV011	IQG	512	512	512	200	256	256	256	256	512	512	512
SV012	IDG	512	512	512	200	256	256	256	256	512	512	512
SV013	ILMT	500	500	500	500	500	500	500	500	500	500	500
SV014	ILMTsp	500	500	500	500	500	500	500	500	500	500	500
SV015	FFC	0	0	0	0	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV018	PIT	-	-	-	-	-	-	-	-	-	-	-
SV019	RNG1	-	-	-	-	-	-	-	-	-	-	-
SV020	RNG2	-	-	-	-	-	-	-	-	-	-	-
SV021	OLT	60	60	60	60	60	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150	150	150	150	150	150
SV023	OD1	-	-	-	-	-	-	-	-	-	-	-
SV024	INP	50	50	50	50	50	50	50	50	50	50	50
SV025	MTYP	2200	2201	2202	2203	228C	228D	228E	228F	2280	2281	2282
SV026	OD2	-	-	-	-	-	-	-	-	-	-	-
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0	0	0	0	0
SV029		0	0	0	0	0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0	0	0	0	0

Motor		HA 40N	HA 80N	HA 100N	HA 200N*	HA 053N	HA 13N	HA 23N	HA 33N	HA 43N	HA 83N	HA 103N*
Drive unit capacity		06	10	20	20	01	01	03	03	06	10	20
SV033	SSF2	0	0	0	0	0	0	0	0	0	0	0
SV034	SSF3	0	0	0	0	0	0	0	0	0	0	0
SV035	SSF4	0	0	0	0	0	0	0	0	0	0	0
SV036	PTYP	-	-	-	-	-	-	-	-	-	-	-
SV037	JL	0	0	0	0	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	0	0	0	0	0	0	0	0
SV041	LMC2	0	0	0	0	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0	0	0	0	0
SV046		0	0	0	0	0	0	0	0	0	0	0
SV047	EC	100	100	100	100	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0	0	0	0	0
SV051		0	0	0	0	0	0	0	0	0	0	0
SV052		0	0	0	0	0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0	0	0	0	0
SV054		0	0	0	0	0	0	0	0	0	0	0
SV055		0	0	0	0	0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0	0	0	0	0
SV065		0	0	0	0	0	0	0	0	0	0	0

(c) HC-SF series

Motor		HC-SF 52	HC-SF 102	HC-SF 152	HC-SF 202	HC-SF 352	HC-SF 53	HC-SF 103	HC-SF 153	HC-SF 203	HC-SF 353
Drive unit capacity		06	07	10	10	20	06	07	10	10	20
SV001	PC1	-	-	-	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	33	33	33	33	33
SV004	PGN2	0	0	0	0	0	0	0	0	0	0
SV005	VGN1	80	80	80	120	130	90	90	130	180	180
SV006		0	0	0	0	0	0	0	0	0	0
SV007		0	0	0	0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	8192	4096	4096	2048	2048	4096	4096	2048	2048	2048
SV010	IDA	8192	4096	4096	2048	2048	4096	4096	2048	2048	2048
SV011	IQG	500	300	300	300	250	250	250	200	200	200
SV012	IDG	500	300	300	300	250	250	250	200	200	200
SV013	ILMT	500	500	500	500	500	500	500	500	500	500
SV014	ILMTsp	500	500	500	500	500	500	500	500	500	500
SV015	FFC	0	0	0	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV018	PIT	-	-	-	-	-	-	-	-	-	-
SV019	RNG1	16	16	16	16	16	16	16	16	16	16
SV020	RNG2	16	16	16	16	16	16	16	16	16	16
SV021	OLT	60	60	60	60	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150	150	150	150	150
SV023	OD1	-	-	-	-	-	-	-	-	-	-
SV024	INP	50	50	50	50	50	50	50	50	50	50
SV025	MTYP	22B0	22B1	22B2	22B3	22B4	22C0	22C1	22C2	22C3	22C4
SV026	OD2	-	-	-	-	-	-	-	-	-	-
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0	0	0	0
SV029		0	0	0	0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0	0	0	0

Motor		HC-SF 52	HC-SF 102	HC-SF 152	HC-SF 202	HC-SF 352	HC-SF 53	HC-SF 103	HC-SF 153	HC-SF 203	HC-SF 353
Drive unit capacity		06	07	10	10	20	06	07	10	10	20
SV033	SSF2	0	0	0	0	0	0	0	0	0	0
SV034	SSF3	0	0	0	0	0	0	0	0	0	0
SV035	SSF4	0	0	0	0	0	0	0	0	0	0
SV036	PTYP	-	-	-	-	-	-	-	-	-	-
SV037	JL	0	0	0	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	0	0	0	0	0	0	0
SV041	LMC2	0	0	0	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0	0	0	0
SV046		0	0	0	0	0	0	0	0	0	0
SV047	EC	100	100	100	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0	0	0	0
SV051		0	0	0	0	0	0	0	0	0	0
SV052		0	0	0	0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0	0	0	0
SV054		0	0	0	0	0	0	0	0	0	0
SV055		0	0	0	0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0	0	0	0
SV065		0	0	0	0	0	0	0	0	0	0

(d) HC-RF/HA-FF series

Motor		HC-RF 103	HC-RF 153	HC-RF 203	HA-FF 053	HA-FF 13	HA-FF 23	HA-FF 33	HA-FF 43	HA-FF 63
Drive unit capacity		10	10	20	01	01	03	03	04	06
SV001	PC1	-	-	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	33	33	33	33
SV004	PGN2	0	0	0	0	0	0	0	0	0
SV005	VGN1	10	10	10	10	13	13	18	20	20
SV006		0	0	0	0	0	0	0	0	0
SV007		0	0	0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	8192	8192	8192	8192	4096	4096	4096	4096	4096
SV010	IDA	8192	8192	8192	8192	4096	4096	4096	4096	4096
SV011	IQG	384	384	256	500	300	700	500	700	700
SV012	IDG	384	384	256	500	300	700	500	700	700
SV013	ILMT	500	500	500	500	500	500	500	500	500
SV014	ILMTsp	500	500	500	500	500	500	500	500	500
SV015	FFC	0	0	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV018	PIT	-	-	-	-	-	-	-	-	-
SV019	RNG1	16	16	16	8	8	8	8	8	8
SV020	RNG2	16	16	16	8	8	8	8	8	8
SV021	OLT	60	60	60	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150	150	150	150
SV023	OD1	-	-	-	-	-	-	-	-	-
SV024	INP	50	50	50	50	50	50	50	50	50
SV025	MTYP	22E1	22E2	22E3	227C	227D	227E	227F	2270	2271
SV026	OD2	-	-	-	-	-	-	-	-	-
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0	0	0
SV029		0	0	0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0	0	0

Motor		HC-RF 103	HC-RF 153	HC-RF 203	HA-FF 053	HA-FF 13	HA-FF 23	HA-FF 33	HA-FF 43	HA-FF 63
Drive unit capacity		10	10	20	01	01	03	03	04	06
SV033	SSF2	0	0	0	0	0	0	0	0	0
SV034	SSF3	0	0	0	0	0	0	0	0	0
SV035	SSF4	0	0	0	0	0	0	0	0	0
SV036	PTYP	-	-	-	-	-	-	-	-	-
SV037	JL	0	0	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	0	0	0	0	0	0
SV041	LMC2	0	0	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0	0	0
SV046		0	0	0	0	0	0	0	0	0
SV047	EC	100	100	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0	0	0
SV051		0	0	0	0	0	0	0	0	0
SV052		0	0	0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0	0	0
SV054		0	0	0	0	0	0	0	0	0
SV055		0	0	0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0	0	0
SV065		0	0	0	0	0	0	0	0	0

(e) HC-MF series

Motor		HC-MF 053	HC-MF 13	HC-MF 23	HC-MF 43	HC-MF 73
Drive unit capacity		01	01	03	04	07
SV001	PC1	-	-	-	-	-
SV002	PC2	-	-	-	-	-
SV003	PGN1	33	33	33	33	33
SV004	PGN2	0	0	0	0	0
SV005	VGN1	6	6	6	6	8
SV006		0	0	0	0	0
SV007		0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364
SV009	IQA	4096	4096	4096	4096	4096
SV010	IDA	4096	4096	4096	4096	4096
SV011	IQG	200	300	400	300	300
SV012	IDG	200	300	400	300	300
SV013	ILMT	500	500	500	500	500
SV014	ILMTsp	500	500	500	500	500
SV015	FFC	0	0	0	0	0
SV016	LMC1	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000
SV018	PIT	-	-	-	-	-
SV019	RNG1	8	8	8	8	8
SV020	RNG2	8	8	8	8	8
SV021	OLT	60	60	60	60	60
SV022	OLL	150	150	150	150	150
SV023	OD1	-	-	-	-	-
SV024	INP	50	50	50	50	50
SV025	MTYP	229C	229D	229E	2290	2291
SV026	OD2	-	-	-	-	-
SV027	SSF1	4000	4000	4000	4000	4000
SV028		0	0	0	0	0
SV029		0	0	0	0	0
SV030	IVC	0	0	0	0	0
SV031	OVS1	0	0	0	0	0
SV032	TOF	0	0	0	0	0

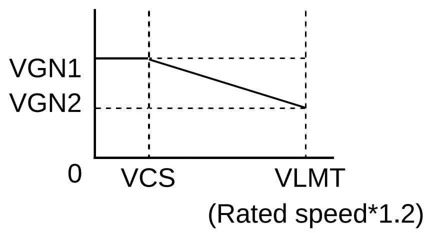
Motor		HC-MF 053	HC-MF 13	HC-MF 23	HC-MF 43	HC-MF 73
Drive unit capacity		01	01	03	04	07
SV033	SSF2	0	0	0	0	0
SV034	SSF3	0	0	0	0	0
SV035	SSF4	0	0	0	0	0
SV036	PTYP	-	-	-	-	-
SV037	JL	0	0	0	0	0
SV038	FHz1	0	0	0	0	0
SV039	LMCD	0	0	0	0	0
SV040	LMCT	0	0	0	0	0
SV041	LMC2	0	0	0	0	0
SV042	OVS2	0	0	0	0	0
SV043	OBS1	0	0	0	0	0
SV044	OBS2	0	0	0	0	0
SV045	TRUB	0	0	0	0	0
SV046		0	0	0	0	0
SV047	EC	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0
SV051		0	0	0	0	0
SV052		0	0	0	0	0
SV053	OD3	0	0	0	0	0
SV054		0	0	0	0	0
SV055		0	0	0	0	0
SV056	EMGt	0	0	0	0	0
SV057	SHGC	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0
SV059	TCNV	0	0	0	0	0
SV060	TLMT	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0
SV065		0	0	0	0	0

7.2 MDS-C1-Vx High-gain (MDS-B-Vx4 Compatible)

(1) Details for servo parameters

For parameters marked with a (PR) in the table, turn the NC power OFF after setting. After the power is turned ON again, the parameter is validated.

> ⚠ **CAUTION**
>
> ⚠ In the explanation on bits, set all bits not used, including blank bits, to “0”.

No.	Items		Details	Setting range
2201 (PR)	SV001 PC1	Motor side gear ratio	Set the motor side and machine side gear ratio. For the rotary axis, set the total deceleration (acceleration) ratio. Even if the gear ratio is within the setting range, the electronic gears may overflow and cause an alarm.	1 to 32767
2202 (PR)	SV002 PC2	Machine side gear ratio		1 to 32767
2203	SV003 PGN1	Position loop gain 1	Set the position loop gain. The standard setting is “33”. The higher the setting value is, the more precisely the command can be followed and the shorter the positioning time gets, however, note that a bigger shock is applied to the machine during acceleration/deceleration. When using the SHG control, also set SV004 (PGN2) and SV057 (SHGC). (If “201” or bigger is set, the SHG control cannot be used.)	1 to 200 (In case of MDS-B-Vx4, 1 to 400) (rad/s)
2204	SV004 PGN2	Position loop gain 2	When using the SHG control, also set SV003 (PGN1) and SV057 (SHGC). When not using the SHG control, set to “0”.	0 to 999 (rad/s)
2205	SV005 VGN1	Speed loop gain 1	Set the speed loop gain. Set this according to the load inertia size. The higher the setting value is, the more accurate the control will be, however, vibration tends to occur. If vibration occurs, adjust by lowering by 20 to 30%. The value should be determined to be 70 to 80% of the value at the time when the vibration stops.	1 to 999
2206	SV006 VGN2	Speed loop gain 2	If the noise is bothersome at high speed during rapid traverse, etc, lower the speed loop gain. As in the right figure, set the speed loop gain of the speed 1.2 times as fast as the motor’s rated speed, and use this with SV029 (VCS). When not using, set to “0”. 	-1000 to 1000

No.	Items		Details	Setting range
2207	SV007 VIL	Speed loop delay compensation	Set this when the limit cycle occurs in the full-closed loop, or overshooting occurs in positioning. Select the control method with SV027 (SSF1)/bit1, 0 (vcnt). Normally, use “Changeover type 2”. When you set this parameter, make sure to set the torque offset (SV032 (TOF)). When not using, set to “0”.	0 to 32767
			No changeover When SV027 (SSF1)/ bit1, 0 (vcnt)=00 The delay compensation control is always valid.	
			Changeover type 1 When SV027 (SSF1)/ bit1, 0 (vcnt)=01 The delay compensation control works when the command from the NC is “0”. Overshooting that occurs during pulse feeding can be suppressed.	
			Changeover type 2 When SV027 (SSF1)/ bit1, 0 (vcnt)=10 The delay compensation control works when the command from the NC is “0” and the position droop is “0”. Overshooting or the limit cycle that occurs during pulse feeding or positioning can be suppressed.	
2208	SV008 VIA	Speed loop lead compensation	Set the gain of the speed loop integration control. The standard setting is “1364”. During the SHG control, the standard setting is “1900”. Adjust the value by increasing/decreasing it by about 100 at a time. Raise this value to improve contour tracking precision in high-speed cutting. Lower this value when the position droop vibrates (10 to 20Hz).	1 to 9999
2209	SV009 IQA	Current loop q axis lead compensation	Set the gain of current loop. As this setting is determined by the motor’s electrical characteristics, the setting is fixed for each type of motor. Set the standard values for all the parameters depending on each motor type.	1 to 20480
2210	SV010 IDA	Current loop d axis lead compensation		
2211	SV011 IQG	Current loop q axis gain		1 to 4096 (In case of MDS-B-Vx4, 1 to 8192)
2212	SV012 IDG	Current loop d axis gain		
2213	SV013 ILMT	Current limit value	Set the normal current (torque) limit value. (Limit values for both + and - direction.) When the value is “500” (a standard setting), the maximum torque is determined by the specification of the motor.	0 to 999 (Stall [rated] current %)
2214	SV014 ILMTsp	Current limit value in special control	Set the current (torque) limit value in a special control (initial absolute position setting, stopper control, etc). (Limit values for both of the + and - directions.) Set to “500” when not using.	0 to 999 (Stall [rated] current %)

No.	Items		Details	Setting range
2215	SV015 FFC	Acceleration rate feed forward gain	When a relative error in the synchronous control is large, apply this parameter to the axis that is delaying. The standard setting value is “0”. For the SHG control, set to “100”. To adjust a relative error in acceleration/deceleration, increase the value by 50 to 100 at a time.	0 to 999(%)
2216	SV016 LMC1	Lost motion compensa-tion 1	Set this when the protrusion (that occurs due to the non-sensitive band by friction, torsion, backlash, etc) at quadrant change is too large. This compensates the torque at quadrant change. This is valid only when the lost motion compensation (SV027 (SSF1/lmc)) is selected.	
			Type 1: When SV027 (SSF1)/ bit9, 8 (lmc)=01 Set the compensation amount based on the motor torque before the quadrant change. The standard setting is “100”. Setting to “0” means the compensation amount is zero. Normally, use Type 2.	-1 to 200 (%)
			Type 2: When SV027 (SSF1)/ bit9, 8 (lmc)=10 Set the compensation amount based on the stall (rated) current of the motor. The standard setting is double of the friction torque. Setting to “0” means the compensation amount is zero.	-1 to 100 (Stall [rated] current %)
			When you wish different compensation amount depending on the direction When SV041 (LMC2) is “0”, compensate with the value of SV016 (LMC1) in both of the + and -directions. If you wish to change the compensation amount depending on the command direction, set this and SV041 (LMC2). (SV016: + direction, SV041: - direction. However, the directions may be opposite depending on other settings.) When “-1” is set, the compensation won’t be performed in the direction of the command.	

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>2217
(PR)</td><td>SV017
SPEC</td><td>Servo specification selection</td><td>

F	E	D	C	B	A	9	8
spm				drvall	drvup	mpt3	mp
7	6	5	4	3	2	1	0
abs		vdir	fdir	vfb	seqh	dfbx	fdir2

bit		Meaning when “0” is set	Meaning when “1” is set
0	fdir2	Speed feedback forward polarity	Speed feedback reverse polarity
1	dfbx	Dual feedback control stop	Dual feedback control start
2	seqh	READY/Servo ON time normal	READY/Servo ON time high speed
3	vfb	Speed feedback filter stop	Speed feedback filter stop (2250Hz)
4	fdir	Position feedback forward polarity	Position feedback reverse polarity
5	vdir	Standard setting	HA motor (4 pole motor) Detector installation position 90 degrees (B, D)
6			
7	abs	Incremental control	Absolute position control
8	mp	MP scale 360P (2mm pitch)	MP scale 720P (1mm pitch)
9	mpt3	MP scale ABS detection type 1, 2	MP scale ABS detection type 3
A	drvup	Standard setting	Possible to connect a drive unit whose capacity is 1 rank higher/lower than the standard one.
B	drvall	Setting for normal use	Possible to connect a drive unit with any capacity.
C D E F	spm	0 : Setting for normal use 1 : When using the S type drive unit (Only in the case of MDS-C1-Vx) 2 to F : Setting prohibited	

(Note 1) Set to “0” for bits with no particular description.
(Note 2) bit3 (vfb) is only for MDS-C1-Vx.

</td><td></td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>2218
(PR)</td><td>SV018
PIT</td><td>Ball screw pitch</td><td>Set the ball screw pitch. Set to “360” for the rotary axis.</td><td>1 to 32767
(mm/rev)</td></tr>
<tr><td rowspan="2">2219
(PR)</td><td rowspan="2">SV019
RNG1</td><td rowspan="2">Position detector resolution</td><td>In the case of the semi-closed loop control
Set the same value as SV020 (RNG2). (Refer to the explanation of SV020.)</td><td>1 to 9999
(kp/rev)</td></tr>
<tr><td>In the case of the semi-closed loop control
Set the same value as SV020 (RNG2). (Refer to the explanation of SV020.)</td><td>1 to 9999
(kp/pit)</td></tr>
</table>

Detector model name	Resolution	SV019 setting
OHE25K-ET, OHA25K-ET	100,000(p/rev)	100
OSE104-ET, OSA104-ET	100,000(p/rev)	100
OSE105-ET, OSA105-ET	1,000,000(p/rev)	1000
RCN723 (Heidenhain)	8,000,000(p/rev)	8000
Relative position detection scale	Refer to specification manual for each detector	PIT/Resolution (µm)
AT41 (Mitsutoyo)	1 (µm/p)	The same as SV018 (PIT)
FME type, FLE type (Futaba)	Refer to specification manual for each detector	PIT/Resolution (µm)
MP type (Mitsubishi Heavy Industries)	Refer to specification manual for each detector	PIT/Resolution (µm)
AT342 (Mitsutoyo)	0.5 (µm/p)	Twice as big as SV018 (PIT)
AT343 (Mitsutoyo)	0.05 (µm/p)	20 times as big as SV018 (PIT)
LC191M (Heidenhain)	Refer to specification manual for each detector	PIT/Resolution (µm)
LC491M (Heidenhain)	Refer to specification manual for each detector	PIT/Resolution (µm)

<table>
<tr><td>2220
(PR)</td><td>SV020
RNG2</td><td>Speed detector resolution</td><td>Set the number of pulses per one revolution of the motor end detector.</td><td>1 to 9999
(kp/rev)</td></tr>
</table>

Detector model name	SV020 setting
OSE104, OSA104	100
OSE105, OSA105	1000

No.	Items		Details	Setting range
2221	SV021 OLT	Overload detection time constant	Set the detection time constant of Overload 1 (Alarm 50). Set to “60” as a standard. (For machine tool builder adjustment.)	1 to 999 (s)
2222	SV022 OLL	Overload detection level	Set the current detection level of Overload 1 (Alarm 50) in respect to the stall (rated) current. Set to “150” as a standard. (For machine tool builder adjustment.)	110 to 500 (Stall [rated] current %)
2223	SV023 OD1	Excessive error detection width during servo ON	Set the excessive error detection width when servo ON. <Standard setting value> $OD1=OD2=\dfrac{\text{Rapid traverse rate (mm/min)}}{60*PGN1}/2\ (mm)$ When “0” is set, the excessive error detection will not be performed.	0 to 32767 (mm)
2224	SV024 INP	In-position detection width	Set the in-position detection width. Set the accuracy required for the machine. The lower the setting is, the higher the positioning accuracy gets, however, the cycle time (setting time) becomes longer. The standard setting is “50”.	0 to 32767 (µm)

No.	Items		Details	Setting range
2225 (PR)	SV025 MTYP	Motor /Detector type	(see below)	

F	E	D	C	B	A	9	8
pen				ent			

7	6	5	4	3	2	1	0
mtyp							

bit		Explanation
0, 1, 2, 3, 4, 5, 6, 7	mtyp	Set the motor type. Set this along with SV017 (SPEC)/spm. 1) When SV017/spm=0 (Normal drive unit)

Set-ting	0x	1x	2x	3x	4x	5x	6x	7x
x0	HA40N		HA50L	HA53L				
x1	HA80N		HA100L	HA103L				
x2	HA100N		HA200L	HA203L				
x3	HA200N		HA300L	HA303L				
x4	HA300N		HA500L	HA503L				
x5	HA700N							
x6	HA900N							
x7			HA-LH11K2					
x8			HA-LH15K2					
x9								
xA			HA150L	HA153L				
xB								
xC								
xD			HA-LF15K2					
xE								
xF								

Set-ting	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	HA43N			HC52	HC53			
x1	HA83N			HC102	HC103		HC103R	
x2	HA103N			HC152	HC153		HC153R	
x3	HA203N			HC202	HC203		HC203R	
x4	HA303N			HC352	HC353		HC353R	
x5	HA703N			HC452	HC453		HC503R	
x6				HC702	HC703			
x7				HC902				
x8								
x9								
xA	HA93N							
xB								
xC	HA053N							
xD	HA13N							
xE	HA23N							
xF	HA33N							

(Continued to the next page)

No.	Items	Details	Setting range

(Continued from the previous page)

bit	Explanation

2) When SV017/spm=1 (S type drive unit)

Set-ting	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0								
x1								
x2								
x3								
x4			HC353					
x5		HC452	HC453					
x6		HC702						
x7								
x8								
x9								
xA								
xB								
xC								
xD								
xE								
xF								

bit		Explanation
8, 9, A, B	ent	Set the detector type. Set the position detector type for “pen”, and the speed detector type for “ent”. In the case of the semi-closed loop control, set the same value for “pen” and “ent”.
C, D, E, F	pen	

pen setting	ent setting	Detector model name
0	0	OSE104
1	1	OSA104
2	2	OSE105, OSA105
3	3	
4	Setting impossible	OHE25K-ET, OSE104-ET
5	Setting impossible	OHA25K-ET, OSA104-ET
6	Setting impossible	OSE105-ET, OSA105-ET, RCN723 (Heidenhain)
7	Setting impossible	
8	Setting impossible	Relative position detection scale, MP type (Mitsubishi Heavy Industries)
9	Setting impossible	AT41 (Mitsutoyo), FME type, FLE type (Futaba)
A	Setting impossible	AT342,AT343 (Mitsutoyo), LC191M/491M (Heidenhain), MDS-B-HR
B	Setting impossible	
C	C (Current synchroni-zation)	The setting of the slave axis in the speed/current synchronization control. When the master axis is the semi-closed control.
D	E (Current synchroni-zation)	The setting of the slave axis in the speed/current synchronization control. When the master axis is the full-closed control. (Current synchronization control is only for MDS-C2-Vx.)
E	Setting impossible	
F	Setting impossible	

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>2226</td><td>SV026
OD2</td><td>Excessive error detection width during servo OFF</td><td>Set the excessive error detection width when servo ON.
For the standard setting, refer to the explanation of SV023 (OD1).
When "0" is set, the excessive error detection will not be performed.</td><td>0 to 32767
(mm)</td></tr>
<tr><td>2227</td><td>SV027
SSF1</td><td>Servo function selection 1</td><td>
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td>aflt</td><td>zrn2</td><td colspan="2">afse</td><td colspan="2">ovs</td><td colspan="2">lmc</td></tr>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>omr</td><td>zrn3</td><td colspan="2">vfct</td><td></td><td>upc</td><td colspan="2">vcnt</td></tr>
</table>
<table>
<tr><th colspan="2">bit</th><th>Meaning when "0" is set</th><th>Meaning when "1" is set</th></tr>
<tr><td>0
1</td><td>vcnt</td><td colspan="2">Set the execution changeover type of the speed loop delay compensation.
00: Delay compensation changeover invalid
01: Delay compensation changeover type 1
10: Delay compensation type 2
11: Setting prohibited</td></tr>
<tr><td>2</td><td>upc</td><td>Start torque compensation invalid</td><td>Start torque compensation valid</td></tr>
<tr><td>3</td><td></td><td></td><td></td></tr>
<tr><td>4
5</td><td>vfct</td><td colspan="2">Set the number of compensation pulses of the jitter compensation.
00: Jitter compensation invalid
01: Jitter compensation 1 pulse
10: Jitter compensation 2 pulses
11: Jitter compensation 3 pulses</td></tr>
<tr><td>6</td><td>zrn3</td><td colspan="2">ABS scale: Set to "1" in using AT342, AT343, LC191M/491M.</td></tr>
<tr><td>7</td><td>omr</td><td>Machine end compensation invalid</td><td>Machine end compensation valid</td></tr>
<tr><td>8
9</td><td>lmc</td><td colspan="2">Set the compensation amount with SV016 (LMC1) and SV041 (LMC2).
00: Lost motion compensation stop
01: Lost motion compensation type 1
10: Overshooting compensation type 2
11: Setting prohibited</td></tr>
<tr><td>A
B</td><td>ovs</td><td colspan="2">Set the compensation amount with SV031 (OVS1) and SV042 (OVS2).
00: Overshooting compensation stop
01: Overshooting compensation type 1
10: Overshooting compensation type 2
11: Overshooting compensation type 3</td></tr>
<tr><td>C
D</td><td>afse</td><td colspan="2">00: Adoptive filter sensitivity standard
11: Adoptive filter sensitivity increase (Set 2bits at a time)</td></tr>
<tr><td>E</td><td>zrn2</td><td colspan="2">Set to "1".</td></tr>
<tr><td>F</td><td>aflt</td><td>Adoptive filter stop</td><td>Adoptive filter start</td></tr>
</table>
(Note) Set to "0" for bits with no particular description.</td><td></td></tr>
<tr><td>2228</td><td>SV028</td><td></td><td>Not used. Set to "0".</td><td>0</td></tr>
<tr><td>2229</td><td>SV029</td><td>Speed at the change of speed loop gain</td><td>If the noise is bothersome at high speed during rapid traverse, etc, lower the speed loop gain.
Set the speed at which the speed loop gain changes, and use this with SV006 (VGN2). (Refer to SV006.)
When not using, set to "0".</td><td>0 to 9999
(r/min)</td></tr>
</table>

No.	Items		Details	Setting range
2230	The higher order 8bits and lower order 8bits are used for different functions. "The setting value of SV030" = (Icx*256) + IVC			0 to 32767
	SV030 IVC (Low order)	Voltage dead time compensa-tion	When 100% is set, the voltage equivalent to the logical non-energized time will be compensated. When "0" is set, a 100% compensation will be performed. Adjust in increments of 10% from the default value 100%. If increased too much, vibration or vibration noise may be generated.	0 to 255 (%)
	SV030 Icx (High order)	Current bias 1	Set to "0" as a standard. Use this in combination with SV040 and the high order 8bits of SV045.	0 to 127
2231	SV031 OVS1	Overshooting compensation 1	Set this if overshooting occurs during positioning. This compensates the motor torque during positioning. This is valid only when the overshooting compensation SV027 (SSF1/ovs) is selected.	-1 to 100 (Stall [rated] current %)
			Type 1: When SV027 (SSF1)/ bitB, A (ovs)=01 Set the compensation amount based on the motor's stall current. This compensates overshooting that occurs during pulse feeding. Normally, use Type 2.	
			Type 2: When SV027 (SSF1)/ bitB, A (ovs)=10 Set the compensation amount based on the motor's stall current. Increase by 1% and determine the amount that overshooting doesn't occur. In Type 2, compensation during the feed forward control during circular cutting won't be performed.	
			Type 3: When SV027 (SSF1)/ bitB, A (ovs)=11 Use this to perform the overshooting compensation during circular cutting or the feed forward control. The setting method is the same in Type 2.	
			When you wish different compensation amount depending on the direction When SV042 (OVS2) is "0", compensate with the value of SV031 (OVS1) in both of the + and -directions. If you wish to change the compensation amount depending on the command direction, set this and SV042 (OVS2). (SV031: + direction, SV042: - direction. However, the directions may be opposite depending on other settings.) When "-1" is set, the compensation won't be performed in the direction of the command.	
2232	SV032 TOF	Torque offset	Set the unbalance torque of vertical axis and inclined axis.	-100 to 100 (Stall [rated] current %)

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>2233</td><td>SV033
SSF2</td><td>Servo function selection 2</td><td colspan="2">
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td colspan="4">dos</td><td></td><td></td><td>hvx</td><td>svx</td></tr>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td colspan="3">nfd2</td><td>nf3</td><td colspan="3">nfd1</td><td>zck</td></tr>
</table>
<table>
<tr><th colspan="2">bit</th><th>Meaning when "0" is set</th><th>Meaning when "1" is set</th></tr>
<tr><td>0</td><td>zck</td><td>Z phase check valid (Alarm 42)</td><td>Z phase check invalid</td></tr>
<tr><td>1
2
3</td><td>nfd1</td><td colspan="2">Set the filter depth for Notch filter 1 (SV038).
<table>
<tr><td>Value</td><td>000</td><td>001</td><td>010</td><td>011</td><td>100</td><td>101</td><td>110</td><td>111</td></tr>
<tr><td>Depth (dB)</td><td>Infntly deep</td><td>-18.1</td><td>-12.0</td><td>-8.5</td><td>-6.0</td><td>-4.1</td><td>-2.5</td><td>-1.2</td></tr>
</table>
Deep← → Shallow</td></tr>
<tr><td>4</td><td>nf3</td><td>Notch filter 3 stop</td><td>Notch filter 3 start (1125Hz)</td></tr>
<tr><td>5
6
7</td><td>nfd2</td><td colspan="2">Set the operation frequency of Notch filter 2 (SV046).
<table>
<tr><td>Value</td><td>000</td><td>001</td><td>010</td><td>011</td><td>100</td><td>101</td><td>110</td><td>111</td></tr>
<tr><td>Depth (dB)</td><td>Infntly deep</td><td>-18.1</td><td>-12.0</td><td>-8.5</td><td>-6.0</td><td>-4.1</td><td>-2.5</td><td>-1.2</td></tr>
</table>
Deep← → Shallow</td></tr>
<tr><td>8
9</td><td>svx
hvx</td><td colspan="2">Set the performance mode of the servo control.
(Only for MDS-C1-Vx)
00: By current loop gain
01: MDS-B-Vx compatible mode selected
10: High gain mode selected
11: High gain mode selected</td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C
D
E
F</td><td>dos</td><td colspan="2">Digital signal output selection
0 : MP scale absolute position detection, offset demand signal output
1 : Specified speed signal output
2 to F : Setting prohibited</td></tr>
</table>
(Note) Set to "0" for bits with no particular description.</td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>2234</td><td>SV034
SSF3</td><td>Servo function selection 3</td><td colspan="2">

<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td colspan="4">ovsn</td><td></td><td></td><td></td><td></td></tr>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td>os2</td><td>zeg</td><td></td><td></td><td>mohn</td><td>has2</td><td>has1</td></tr>
</table>

<table>
<tr><th colspan="2">bit</th><th>Meaning when “0” is set</th><th>Meaning when “1” is set</th></tr>
<tr><td>0</td><td>has1</td><td>Setting for normal use
(Except for HC)</td><td>HAS control 1 valid
(HC: High acceleration rate support)</td></tr>
<tr><td>1</td><td>has2</td><td>Setting for normal use
(Except for HC)</td><td>HAS control 2 valid
(HC: Overshooting support)</td></tr>
<tr><td>2</td><td>mohn</td><td>MDS-B-HR motor thermal valid</td><td>MDS-B-HR motor thermal ignored</td></tr>
<tr><td>3</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td>zeg</td><td>Z phase normal edge detection
(Setting for normal use)</td><td>Z phase reverse edge detection
(Valid only when SV027/bit6=1)</td></tr>
<tr><td>6</td><td>os2</td><td>Setting for normal use</td><td>Overspeed detection level changeover</td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td></td><td></td><td></td></tr>
<tr><td>9</td><td></td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C
D
E
F</td><td>ovsn</td><td colspan="2">Set the non-sensitive band of the overshooting compensation type 3 in increments of 2µm at a time.
In the feed forward control, the non-sensitive band of the model position droop is set, and overshooting of the model is ignored.
Set the same value as the standard SV040.</td></tr>
</table>

(Note) Set to “0” for bits with no particular description.</td></tr>
</table>

No.	Items		Details	Setting range
2235	SV035 SSF4	Servo function selection 4	(see bit layout and bit table below)	

F	E	D	C	B	A	9	8
clt	clG1			cl2n	clet	cltq	

7	6	5	4	3	2	1	0
ckab	iup	tdt					

bit		Meaning when "0" is set	Meaning when "1" is set
0 1 2 3 4 5	tdt	Td creation time setting Set to "0". (For machine tool builder adjustment)	
6	iup	Set to "1" when using any of motors from HC152 to HC702 and from HC153 to HC453.	
7	ckab	Setting for normal use	No signal 2 (Alarm 21) special detection
8 9	cltq	Set the retracting torque for collision detection in respect to the maximum torque of the motor. 00: 100% 01: 90% 10: 80% (Standard) 11: 70%	
A	clet	Setting for normal use	The disturbance torque peak of the latest two seconds is displayed in MPOS of the servo monitor screen.
B	cl2n	Collision detection method 2 valid	Collision detection method 2 invalid
C D E	clG1	Collision detection method 1 Set the collision detection level during cutting feed (G1). The G1 collision detection level=SV060*clG1. When clG1=0, the collision detection method 1 during cutting feed won't function.	
F	clt	Setting for normal use	The guide value of the SV059 setting value is displayed in MPOS of the servo monitor screen.

(Note) bit7 (ckab) is only for MDS-C1-Vx.

No.	Items		Details	Setting range
2236 (PR)	SV036 PTYP	Power supply type	(see bit layout below)	

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

bit		Explanation
0 1 2 3 4 5 6 7	ptyp	When the CN4 connector of the drive unit and the power supply are connected, setting below is necessary. To validate the external emergency stop function, add 40h.

Set-ting	0x	1x	2x	3x	4x	5x	6x	7x	8x
x0	Not used			CV-300					
x1		CV-110							CR-10
x2			CV-220						CR-15
x3									CR-22
x4	CV-37								CR-37
x5		CV-150			CV-450	CV-550			
x6	CV-55		CV-260						CR-55
x7				CV-370					
x8	CV-75								CR-75
x9		CV-185							CR-90

bit		Explanation
8 9 A B	rtyp	Set the regenerative resistor type when MDS-A-CR is used.

Set-ting	Regenerative resistor model name	Resistance value	Capacity
0	MDS-C1-CV (Setting when using power supply regeneration)		
1	GZG200W260HMJ	26Ω	80W
2	GZG300W130HMJ×2	26Ω	150W
3	MR-RB30	13Ω	300W
4	MR-RB50	13Ω	500W
5	GZG200W200HMJ×3	6.7Ω	350W
6	GZG300W200HMJ×3	6.7Ω	500W
7	R-UNIT-1	30Ω	700W
8	R-UNIT-2	15Ω	700W
9	R-UNIT-3	15Ω	2100W
A to F	No setting		

bit		Explanation
C D E F	amp	Always set to “0”.

No.	Items		Details	Setting range
2237	SV037 JL	Load inertia scale	Set “the motor inertia + motor axis conversion load inertia” in respect to the motor inertia. $$SV037\ (JL) = \frac{Jl+Jm}{Jm} *100$$ Jm: Motor inertia Jl: Motor axis conversion load inertia	0 to 5000 (%)
2238	SV038 FHz1	Notch filter frequency 1	Set the vibration frequency to suppress if machine vibration occurs. (Valid at 36 or more) When not using, set to “0”.	0 to 9000 (Hz)

No.	Items		Details	Setting range
2239	SV039 LMCD	Lost motion compensation timing	Set this when the lost motion compensation timing doest not match. Adjust by increasing the value by 10 at a time.	0 to 2000 (ms)
2240	The higher order 8bits and lower order 8bits are used for different functions. "Setting value of SV040" = (Icy*256) + LMCT			0 to 32767
	SV040 LMCT (Low order)	Lost motion compensation non-sensitive band	Set the non-sensitive band of the lost motion compensation in the feed forward control. When "0" is set, the actual value that is set is 2µm. Adjust by increasing by 1µm at a time.	0 to 100 (µm)
	SV040 Icy (High order)	Current bias 2	Normally, set to "40" if you use HC202 to HC902, HC203 to HC703. Use this in combination with SV030 and the high order 8bits of SV045.	0 to 127
2241	SV041 LMC2	Lost motion compensation 2	Set this with SV016 (LMC1) only when you wish to set the lost motion compensation amount to be different depending on the command directions. Set to "0" as a standard.	-1 to 200 (Stall [rated] current %)
2242	SV042 OVS2	Overshooting compensation 2	Set this with SV031 (OVS1) only when you wish to set the overshooting compensation amount to be different depending on the command directions. Set to "0" as a standard.	-1 to 100 (Stall [rated] current %)
2243	SV043 OBS1	Disturbance observer filter frequency	Set the disturbance observer filter band. Set to "100" as a standard. To use the disturbance observer, also set SV037 (JL) and SV044 (OBS2). When not using, set to "0".	0 to 1000 (rad/s)
2244	SV044 OBS2	Disturbance observer gain	Set the disturbance observer gain. The standard setting is "100" to "300". To use the disturbance observer, also set SV037 (JL) and SV043 (OBS1). When not using, set to "0".	0 to 500 (%)
2245	The higher order 8bits and lower order 8bits are used for different functions. "Setting value of SV045" = (Icy*256) + LMCT			0 to 32767
	SV045 TRUB (Low order)	Frictional torque	When you use the collision detection function, set the frictional torque.	0 to 100 (Stall [rated] current %)
	SV045 Ib1 (High order)	Current bias 3	Set to "0" as a standard. Use this in combination with SV030 and the high order 8bits of SV040.	0 to 127
2246	SV046 FHz2	Notch filter frequency 2	Set the vibration frequency to suppress if machine vibration occurs. (Valid at 36 or more) When not using, set to "0".	0 to 9000 (Hz)
2247	SV047 EC	Inductive voltage compensation gain	Set the inductive voltage compensation gain. Set to "100" as a standard. If the current FB peak exceeds the current command peak, lower the gain.	0 to 200 (%)
2248	SV048 EMGrt	Vertical axis drop prevention time	Input a length of time to prevent the vertical axis from dropping by delaying Ready OFF until the brake works when the emergency stop occurs. Increase the setting by 100ms at a time and set the value where the axis does not drop.	0 to 20000 (ms)

No.	Items		Details	Setting range
2249	SV049 PGN1sp	Position loop gain 1 in spindle synchronous control	Set the position loop gain during the spindle synchronous control (synchronous tapping, synchronous control with spindle/C axis). Set the same value as the value of the spindle parameter, position loop gain in synchronous control. When performing the SHG control, set this with SV050 (PGN2sp) and SV058 (SHGCsp).	1 to 200 (rad/s)
2250	PGN2sp	Position loop gain 2 in spindle synchronous control	Set this with SV049 (PGN1sp) and SV058 (SHGCsp) if you wish to perform the SHG control in the spindle synchronous control (synchronous tapping, synchronous control with spindle/C axis). When not performing the SHG control, set to “0”.	0 to 999 (rad/s)
2251	SV051 DFBT	Dual feed back control time constant	Set the control time constant in dual feed back. When “0” is set, the actual value that is set is 1ms. The higher the time constant is, the closer it gets to the semi-closed control, so the limit of the position loop gain is raised.	0 to 9999 (ms)
2252	SV052 DFBN	Dual feedback control non-sensitive band	Set the non-sensitive band in the dual feedback control. Set to “0” as a standard.	0 to 9999 (µm)
2253	SV053 OD3	Excessive error detection width in special control	Set the excessive error detection width when servo ON in a special control (initial absolute position setting, stopper control, etc.). If “0” is set, excessive error detection won’t be performed when servo ON during a special control.	0 to 32767 (mm)

No.	Items		Details	Setting range
2254	When SV035 (SSF4)/ bitF (ckab)=0			-1 to 32767 (mm)
	SV054 ORE	Overrun detection width in closed loop control	Set the overrun detection width in the full-closed loop control. If the gap between the motor end detector and the linear scale (machine end detector) exceeds the value set by this parameter, it is judged to be overrun and Alarm 43 will be detected. When "-1" is set, the alarm detection won't be performed. When "0" is set, overrun is detected with a 2mm width.	
	When SV035 (SSF4)/ bitF (ckab)=1 (Note) This applies to only MDS-C1-Vx. The higher order 8bits and lower order 8bits are used for different functions. "Setting value of SV054" =(NSE*256)+ORE			0 to 32767
	SV054 ORE (Low order)	Overrun detection-width in closed loop control	Set the overrun detection width in the full-closed loop control. If the gap between the motor end detector and the linear scale (machine end detector) exceeds the value set by this parameter, it is judged to be overrun and Alarm 43 will be detected. When "255" is set, the alarm detection won't be performed. When "0" is set, overrun is detected with a 2mm width.	0 to 255 (mm)
	SV054 NSE (High order)	Special detection width for No signal 2	When SV035 (SSF4)/ bitF (ckab) =1, this setting is valid. Set the special detection width for No signal 2 (Alarm 21). When "0" is set, overrun is detected with a 15µm width.	0 to 127 (µm)
2255	SV055 EMGx	Max. gate off delay time after emergency stop	Set a length of time from the point when the emergency stop is input to the point when READY OFF is compulsorily executed. Normally, set the same value as the absolute value of SV056. In preventing the vertical axis from dropping, the gate off is delayed for the length of time set by SV048 if SV055's value is smaller than that of SV048.	0 to 20000 (ms)
2256	SV056 EMGt	Deceleration time constant at emergency stop	In the vertical axis drop prevention time control, set the time constant used for the deceleration control at emergency stop. Set a length of time that takes from rapid traverse rate (rapid) to stopping. Normally, set the same value as the rapid traverse acceleration/deceleration time constant. When executing the synchronous operation, put the minus sign to the settings of both of the master axis and slave axis.	-20000 to 20000 (ms)
2257	SV057 SHGC	SHG control gain	When performing the SHG control, set this with S003 (PGN1) and SV004 (PGN2). When not performing the SHG control, set to "0".	0 to 1200 (rad/s)

No.	Items		Details	Setting range
2258	SV058 SHGCsp	SHG control gain in spindle synchronous control	Set this with SV049 (PGN1sp) and SV050 (PGN2sp) if you wish to perform the SHG control in the spindle synchronous control (synchronous tapping, synchronous control with spindle/C axis). When not performing the SHG control, set to “0”.	0 to 1200 (rad/s)
2259	SV059 TCNV	Collision detection torque estimating gain	Set the torque estimating gain when using the collision detection function. After setting as SV035/bitF(clt)=1 and performing acceleration/deceleration, set the value displayed in MPOS of the NC servo monitor screen. Set to “0” when not using the collision detection function.	-32768 to 32767
2260	SV060 TLMT	Collision detection level	When using the collision detection function, set the collision detection level during the G0 feeding. If “0” is set, none of the collision detection function will work.	0 to 999 (Stall [rated] current %)
2261	SV061 DA1NO	D/A output channel 1 data No.	Input the data number you wish to output to D/A output channel. In the case of MDS-C1-V2, set the axis on the side to which the data will not be output to “-1”.	-1 to 127
2262	SV062 DA2NO	D/A output channel 2 data No.		
2263	SV063 DA1MPY	D/A output channel 1 output scale	Set the scale with a 1/256 unit. When “0” is set, output is done with the standard output unit.	-32768 to 32767 (Unit: 1/256)
2264	SV064 DA2MPY	D/A output channel 2 output scale		
2265	SV065 TLC	Tool end compensation spring constant	Set the spring constant of the tool end compensation. In the semi-closed loop control, the tool end compensation amount is calculated with the following equation. $\text{Compensation amount} = \dfrac{F\ (\text{mm/min})^2 * \text{SV065}}{R\ (\text{mm}) * 10^9}\ (\mu\text{m})$ F: Commanded speed R: Radius When not using, set to “0”.	-32768 to 32767

(2) Initial setting value

(a) HC**/HC**R series

Motor		HC 52	HC 102	HC 152	HC 202	HC 352	HC 452		HC 702		HC 902
Drive unit capacity		05	10	20	20	35	45s	45	70s	70	90
SV001	PC1	-	-	-	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-	-	-	-
SV003	PGN1	47	47	47	47	47	47	47	47	47	47
SV004	PGN2	0	0	0	0	0	0	0	0	0	0
SV005	VGN1	200	200	200	200	200	200	200	200	200	200
SV006	VGN2	0	0	0	0	0	0	0	0	0	0
SV007	VIL	0	0	0	0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096
SV010	IDA	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096
SV011	IQG	768	768	768	768	768	768	768	768	768	768
SV012	IDG	768	768	768	768	768	768	768	768	768	768
SV013	ILMT	500	500	500	500	500	500	500	500	500	500
SV014	ILMTsp	500	500	500	500	500	500	500	500	500	500
SV015	FFC	0	0	0	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000	1000	0000	1000	0000	0000
SV018	PIT	-	-	-	-	-	-	-	-	-	-
SV019	RNG1	-	-	-	-	-	-	-	-	-	-
SV020	RNG2	-	-	-	-	-	-	-	-	-	-
SV021	OLT	60	60	60	60	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150	150	150	150	150
SV023	OD1	6	6	6	6	6	6	6	6	6	6
SV024	INP	50	50	50	50	50	50	50	50	50	50
SV025	MTYP	xxB0	xxB1	xxB2	xxB3	xxB4	xx95	xxB5	xx96	xxB6	xxB7
SV026	OD2	6	6	6	6	6	6	6	6	6	6
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0	0	0	0
SV029	VCS	0	0	0	0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0	0	0	0

Motor		HC 52	HC 102	HC 152	HC 202	HC 352	HC 452		HC 702		HC 902
Drive unit capacity		05	10	20	20	35	45s	45	70s	70	90
SV033	SSF2	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV034	SSF3	0003	0003	0003	0003	0003	0003	0003	0003	0003	0003
SV035	SSF4	0000	0000	0040	0040	0040	0040	0040	0040	0040	0000
SV036	PTYP	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV037	JL	0	0	0	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	10240	10240	10240	10240	10240	10240	10240
SV041	LMC2	0	0	0	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0	0	0	0
SV046	FHz2	0	0	0	0	0	0	0	0	0	0
SV047	EC	100	100	100	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0	0	0	0
SV051	DFBT	0	0	0	0	0	0	0	0	0	0
SV052	DFBN	0	0	0	0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0	0	0	0
SV054	ORE	0	0	0	0	0	0	0	0	0	0
SV055	EMGx	0	0	0	0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0	0	0	0
SV065	TLC	0	0	0	0	0	0	0	0	0	0

Motor		HC 53	HC 103	HC 153	HC 203	HC 353		HC 453		HC 703
Drive unit capacity		05	10	20	35	45s	45	70s	70	90
SV001	PC1	-	-	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-	-	-
SV003	PGN1	47	47	47	47	47	47	47	47	47
SV004	PGN2	0	0	0	0	0	0	0	0	0
SV005	VGN1	200	200	200	200	200	200	200	200	200
SV006	VGN2	0	0	0	0	0	0	0	0	0
SV007	VIL	0	0	0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	4096	4096	4096	4096	4096	4096	4096	4096	4096
SV010	IDA	4096	4096	4096	4096	4096	4096	4096	4096	4096
SV011	IQG	768	768	768	768	768	768	768	768	768
SV012	IDG	768	768	768	768	768	768	768	768	768
SV013	ILMT	500	500	500	500	500	500	500	500	500
SV014	ILMTsp	500	500	500	500	500	500	500	500	500
SV015	FFC	0	0	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	1000	0000	1000	0000	0000
SV018	PIT	-	-	-	-	-	-	-	-	-
SV019	RNG1	-	-	-	-	-	-	-	-	-
SV020	RNG2	-	-	-	-	-	-	-	-	-
SV021	OLT	60	60	60	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150	150	150	150
SV023	OD1	6	6	6	6	6	6	6	6	6
SV024	INP	50	50	50	50	50	50	50	50	50
SV025	MTYP	xxC0	xxC1	xxC2	xxC3	xxA4	xxC4	xxA5	xxC5	xxC6
SV026	OD2	6	6	6	6	6	6	6	6	6
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0	0	0
SV029	VCS	0	0	0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0	0	0

Motor		HC 53	HC 103	HC 153	HC 203	HC 353		HC 453		HC 703
Drive unit capacity		05	10	20	35	45s	45	70s	70	90
SV033	SSF2	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV034	SSF3	0003	0003	0003	0003	0003	0003	0003	0003	0003
SV035	SSF4	0000	0000	0040	0040	0040	0040	0040	0040	0000
SV036	PTYP	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV037	JL	0	0	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	10240	10240	10240	10240	10240	10240
SV041	LMC2	0	0	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0	0	0
SV046	FHz2	0	0	0	0	0	0	0	0	0
SV047	EC	100	100	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0	0	0
SV051	DFBT	0	0	0	0	0	0	0	0	0
SV052	DFBN	0	0	0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0	0	0
SV054	ORE	0	0	0	0	0	0	0	0	0
SV055	EMGx	0	0	0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0	0	0
SV065	TLC	0	0	0	0	0	0	0	0	0

Motor		HC 103R	HC 153R	HC 203R	HC 353R
Drive unit capacity		10	10	20	35
SV001	PC1	-	-	-	-
SV002	PC2	-	-	-	-
SV003	PGN1	33	33	33	33
SV004	PGN2	0	0	0	0
SV005	VGN1	15	15	20	40
SV006	VGN2	0	0	0	0
SV007	VIL	0	0	0	0
SV008	VIA	1364	1364	1364	1364
SV009	IQA	4096	4096	4096	4096
SV010	IDA	4096	4096	4096	4096
SV011	IQG	256	256	256	256
SV012	IDG	512	512	512	512
SV013	ILMT	500	500	500	500
SV014	ILMTsp	500	500	500	500
SV015	FFC	0	0	0	0
SV016	LMC1	0	0	0	0
SV017	SPEC	0000	0000	0000	0000
SV018	PIT	-	-	-	-
SV019	RNG1	-	-	-	-
SV020	RNG2	-	-	-	-
SV021	OLT	60	60	60	60
SV022	OLL	150	150	150	150
SV023	OD1	6	6	6	6
SV024	INP	50	50	50	50
SV025	MTYP	xxE1	xxE2	xxE3	xxE4
SV026	OD2	6	6	6	6
SV027	SSF1	4000	4000	4000	4000
SV028		0	0	0	0
SV029	VCS	0	0	0	0
SV030	IVC	0	0	0	0
SV031	OVS1	0	0	0	0
SV032	TOF	0	0	0	0

Motor		HC 103R	HC 153R	HC 203R	HC 353R
Drive unit capacity		10	10	20	35
SV033	SSF2	0200	0200	0200	0200
SV034	SSF3	0000	0000	0000	0000
SV035	SSF4	0000	0000	0000	0000
SV036	PTYP	0000	0000	0000	0000
SV037	JL	0	0	0	0
SV038	FHz1	0	0	0	0
SV039	LMCD	0	0	0	0
SV040	LMCT	0	0	0	0
SV041	LMC2	0	0	0	0
SV042	OVS2	0	0	0	0
SV043	OBS1	0	0	0	0
SV044	OBS2	0	0	0	0
SV045	TRUB	0	0	0	0
SV046	FHz2	0	0	0	0
SV047	EC	100	100	100	100
SV048	EMGrt	0	0	0	0
SV049	PGN1sp	15	15	15	15
SV050	PGN2sp	0	0	0	0
SV051	DFBT	0	0	0	0
SV052	DFBN	0	0	0	0
SV053	OD3	0	0	0	0
SV054	ORE	0	0	0	0
SV055	EMGx	0	0	0	0
SV056	EMGt	0	0	0	0
SV057	SHGC	0	0	0	0
SV058	SHGCsp	0	0	0	0
SV059	TCNV	0	0	0	0
SV060	TLMT	0	0	0	0
SV061	DA1NO	0	0	0	0
SV062	DA2NO	0	0	0	0
SV063	DA1MPY	0	0	0	0
SV064	DA2MPY	0	0	0	0
SV065	TLC	0	0	0	0

(b) HA**N series

Motor		HA 40N	HA 80N	HA 100N	HA 200N	HA 300N	HA 700N	HA 900N
Drive unit capacity		05	10	20	35	45	70	90
SV001	PC1	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	25	25
SV004	PGN2	0	0	0	0	0	0	0
SV005	VGN1	150	150	150	150	150	250	250
SV006	VGN2	0	0	0	0	0	0	0
SV007	VIL	0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	4096	4096	4096	4096	4096	4096	4096
SV010	IDA	4096	4096	4096	4096	4096	4096	4096
SV011	IQG	768	768	768	768	768	768	768
SV012	IDG	768	768	768	768	768	768	768
SV013	ILMT	500	500	500	500	500	500	500
SV014	ILMTsp	500	500	500	500	500	500	500
SV015	FFC	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000	0000	0000
SV018	PIT	-	-	-	-	-	-	-
SV019	RNG1	-	-	-	-	-	-	-
SV020	RNG2	-	-	-	-	-	-	-
SV021	OLT	60	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150	150
SV023	OD1	6	6	6	6	6	6	6
SV024	INP	50	50	50	50	50	50	50
SV025	MTYP	xx00	xx01	xx02	xx03	xx04	xx05	xx06
SV026	OD2	6	6	6	6	6	6	6
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0
SV029	VCS	0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0

Motor		HA 40N	HA 80N	HA 100N	HA 200N	HA 300N	HA 700N	HA 900N
Drive unit capacity		05	10	20	35	45	70	90
SV033	SSF2	0000	0000	0000	0000	0000	0000	0000
SV034	SSF3	0000	0000	0000	0000	0000	0000	0000
SV035	SSF4	0000	0000	0000	0000	0000	0000	0000
SV036	PTYP	0000	0000	0000	0000	0000	0000	0000
SV037	JL	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	0	0	0	0
SV041	LMC2	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0
SV046	FHz2	0	0	0	0	0	0	0
SV047	EC	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0
SV051	DFBT	0	0	0	0	0	0	0
SV052	DFBN	0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0
SV054	ORE	0	0	0	0	0	0	0
SV055	EMGx	0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0
SV065	TLC	0	0	0	0	0	0	0

Motor		HA 43N	HA 83N	HA 93N	HA 103N	HA 203N	HA 303N	HA 703N	HA 053N	HA 13N	HA 23N	HA 33N
Drive unit capacity		05	10	20	35	45	70	90	01	01	03	03
SV001	PC1	-	-	-	-	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	33	25	33	33	33	33
SV004	PGN2	0	0	0	0	0	0	0	0	0	0	0
SV005	VGN1	150	150	150	150	150	150	250	70	70	100	100
SV006		0	0	0	0	0	0	0	0	0	0	0
SV007		0	0	0	0	0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096
SV010	IDA	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096
SV011	IQG	768	768	768	768	768	768	768	768	768	768	768
SV012	IDG	768	768	768	768	768	768	768	768	768	768	768
SV013	ILMT	500	500	500	500	500	500	500	500	500	500	500
SV014	ILMTsp	500	500	500	500	500	500	500	500	500	500	500
SV015	FFC	0	0	0	0	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV018	PIT	-	-	-	-	-	-	-	-	-	-	-
SV019	RNG1	-	-	-	-	-	-	-	-	-	-	-
SV020	RNG2	-	-	-	-	-	-	-	-	-	-	-
SV021	OLT	60	60	60	60	60	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150	150	150	150	150	150
SV023	OD1	6	6	6	6	6	6	6	6	6	6	6
SV024	INP	50	50	50	50	50	50	50	50	50	50	50
SV025	MTYP	xx80	xx81	xx8A	xx82	xx83	xx84	xx85	xx8C	xx8D	xx8E	xx8F
SV026	OD2	6	6	6	6	6	6	6	6	6	6	6
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0	0	0	0	0
SV029		0	0	0	0	0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0	0	0	0	0

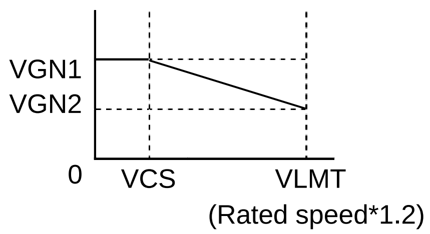
Motor		HA 43N	HA 83N	HA 93N	HA 103N	HA 203N	HA 303N	HA 703N	HA 053N	HA 13N	HA 23N	HA 33N
Drive unit capacity		05	10	20	35	45	70	90	01	01	03	03
SV033	SSF2	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV034	SSF3	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV035	SSF4	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV036	PTYP	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV037	JL	0	0	0	0	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	0	0	0	0	0	0	0	0
SV041	LMC2	0	0	0	0	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0	0	0	0	0
SV046	FHz2	0	0	0	0	0	0	0	0	0	0	0
SV047	EC	100	100	100	100	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0	0	0	0	0
SV051	DFBT	0	0	0	0	0	0	0	0	0	0	0
SV052	DFBN	0	0	0	0	0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0	0	0	0	0
SV054	ORE	0	0	0	0	0	0	0	0	0	0	0
SV055	EMGx	0	0	0	0	0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0	0	0	0	0
SV065	TLC	0	0	0	0	0	0	0	0	0	0	0

7.3 MDS-C1-Vx Standard Specification (MDS-B-Vx Compatible)

(1) Details for servo parameters

For parameters marked with a (PR) in the table, turn the NC power OFF after setting. After the power is turned ON again, the parameter is validated.

> ⚠ **CAUTION**
>
> ⚠ In the explanation on bits, set all bits not used, including blank bits, to “0”.

No.	Items		Details	Setting range
2201 (PR)	SV001 PC1	Motor side gear ratio	Set the motor side and machine side gear ratio. For the rotary axis, set the total deceleration (acceleration) ratio. Even if the gear ratio is within the setting range, the electronic gears may overflow and cause an alarm.	1 to 32767
2202 (PR)	SV002 PC2	Machine side gear ratio		1 to 32767
2203	SV003 PGN1	Position loop gain 1	Set the position loop gain. The standard setting is “33”. The higher the setting value is, the more precisely the command can be followed and the shorter the positioning time gets, however, note that a bigger shock is applied to the machine during acceleration/deceleration. When using the SHG control, also set SV004 (PGN2) and SV057 (SHGC).	1 to 200 (rad/s)
2204	SV004 PGN2	Position loop gain 2	When using the SHG control, also set SV003 (PGN1) and SV057 (SHGC). When not using the SHG control, set to “0”.	0 to 999 (rad/s)
2205	SV005 VGN1	Speed loop gain 1	Set the speed loop gain. Set this according to the load inertia size. The higher the setting value is, the more accurate the control will be, however, vibration tends to occur. If vibration occurs, adjust by lowering by 20 to 30%. The value should be determined to be 70 to 80% of the value at the time when the vibration stops.	1 to 999
2206	SV006 VGN2	Speed loop gain 2	If the noise is bothersome at high speed during rapid traverse, etc, lower the speed loop gain. As in the right figure, set the speed loop gain of the speed 1.2 times as fast as the motor’s rated speed, and use this with SV029 (VCS). When not using, set to “0”.  	-1000 to 1000

No.	Items		Details	Setting range
2207	SV007 VIL	Speed loop delay compensation	Set this when the limit cycle occurs in the full-closed loop, or overshooting occurs in positioning. Select the control method with SV027 (SSF1)/bit1, 0 (vcnt). Normally, use “Changeover type 2”. When you set this parameter, make sure to set the torque offset (SV032 (TOF)). When not using, set to “0”.	0 to 32767
			No changeover When SV027 (SSF1)/ bit1, 0 (vcnt)=00 The delay compensation control is always valid.	
			Changeover type 1 When SV027 (SSF1)/ bit1, 0 (vcnt)=01 The delay compensation control works when the command from the NC is “0”. Overshooting that occurs during pulse feeding can be suppressed.	
			Changeover type 2 When SV027 (SSF1)/ bit1, 0 (vcnt)=10 The delay compensation control works when the command from the NC is “0” and the position droop is “0”. Overshooting or the limit cycle that occurs during pulse feeding or positioning can be suppressed.	
2208	SV008 VIA	Speed loop lead compensation	Set the gain of the speed loop integration control. The standard setting is “1364”. During the SHG control, the standard setting is “1900”. Adjust the value by increasing/decreasing it by about 100 at a time. Raise this value to improve contour tracking precision in high-speed cutting. Lower this value when the position droop vibrates (10 to 20Hz).	1 to 9999
2209	SV009 IQA	Current loop q axis lead compensation	Set the gain of current loop. As this setting is determined by the motor’s electrical characteristics, the setting is fixed for each type of motor. Set the standard values for all the parameters depending on each motor type.	1 to 20480
2210	SV010 IDA	Current loop d axis lead compensation		1 to 20480
2211	SV011 IQG	Current loop q axis gain		1 to 2560
2212	SV012 IDG	Current loop d axis gain		1 to 2560

No.	Items		Details	Setting range
2213	SV013 ILMT	Current limit value	Set the normal current (torque) limit value. (Limit values for both + and - direction.) When the value is "500" (a standard setting), the maximum torque is determined by the specification of the motor.	0 to 999 (Stall [rated] current %)
2214	SV014 ILMTsp	Current limit value in special control	Set the current (torque) limit value in a special control (initial absolute position setting, stopper control, etc). (Limit values for both of the + and - directions.) Set to "500" when not using.	0 to 999 (Stall [rated] current %)
2215	SV015 FFC	Acceleration rate feed forward gain	When a relative error in the synchronous control is large, apply this parameter to the axis that is delaying. The standard setting value is "0". For the SHG control, set to "100". To adjust a relative error in acceleration/deceleration, increase the value by 50 to 100 at a time.	0 to 999 (%)
2216	SV016 LMC1	Lost motion compensation 1	Set this when the protrusion (that occurs due to the non-sensitive band by friction, torsion, backlash, etc) at quadrant change is too large. This compensates the torque at quadrant change. This is valid only when the lost motion compensation (SV027 (SSF1/lmc)) is selected.	
			Type 1: When SV027 (SSF1)/ bit9, 8 (lmc)=01 Set the compensation amount based on the motor torque before the quadrant change. The standard setting is "100". Setting to "0" means the compensation amount is zero. Normally, use Type 2.	-1 to 200 (%)
			Type 2: When SV027 (SSF1)/ bit9, 8 (lmc)=10 Set the compensation amount based on the stall (rated) current of the motor. The standard setting is double of the friction torque. Setting to "0" means the compensation amount is zero.	-1 to 100 (Stall [rated] current %)
			When you wish different compensation amount depending on the direction When SV041 (LMC2) is "0", compensate with the value of SV016 (LMC1) in both of the + and -directions. If you wish to change the compensation amount depending on the command direction, set this and SV041 (LMC2). (SV016: + direction, SV041: - direction. However, the directions may be opposite depending on other settings.) When "-1" is set, the compensation won't be performed in the direction of the command.	

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>2217
(PR)</td><td>SV017
SPEC</td><td>Servo specification selection</td><td colspan="2">
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>mpt3</td><td>mp</td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>abs</td><td></td><td>vdir</td><td>fdir</td><td>spwv</td><td>seqh</td><td>dfbx</td><td>fdir2</td></tr>
</table>
<table>
<tr><th colspan="2">bit</th><th>Meaning when “0” is set</th><th>Meaning when “1” is set</th></tr>
<tr><td>0</td><td>fdir2</td><td>Speed feedback forward polarity</td><td>Speed feedback reverse polarity</td></tr>
<tr><td>1</td><td>dfbx</td><td>Dual feedback control stop</td><td>Dual feedback control start</td></tr>
<tr><td>2</td><td>seqh</td><td>READY/Servo ON time normal</td><td>READY/Servo ON time high speed</td></tr>
<tr><td>3</td><td>spwv</td><td>Normal mode</td><td>High gain servo synchronous mode</td></tr>
<tr><td>4</td><td>fdir</td><td>Position feedback forward polarity</td><td>Position feedback reverse polarity</td></tr>
<tr><td>5</td><td>vdir</td><td>Standard setting</td><td>HA motor (4 pole motor)
Detector installation position 90 degrees (B, D)</td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td>abs</td><td>Incremental control</td><td>Absolute position control</td></tr>
<tr><td>8</td><td>mp</td><td>MP scale 360P (2mm pitch)</td><td>MP scale 720P (1mm pitch)</td></tr>
<tr><td>9</td><td>mpt3</td><td>MP scale ABS detection type 1, 2</td><td>MP scale ABS detection type 3</td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td></td><td></td><td></td></tr>
<tr><td>E</td><td></td><td></td><td></td></tr>
<tr><td>F</td><td></td><td></td><td></td></tr>
</table>
(Note) Set to “0” for bits with no particular description.</td></tr>
<tr><td>2218
(PR)</td><td>SV018
PIT</td><td>Ball screw pitch</td><td>Set the ball screw pitch. Set to “360” for the rotary axis.</td><td>1 to 32767
(mm/rev)</td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td rowspan="2">2219
(PR)</td><td rowspan="2">SV019
RNG1</td><td rowspan="2">Position detector resolution</td><td>In the case of the semi-closed loop control
Set the same value as SV020 (RNG2). (Refer to the explanation of SV020.)</td><td>1 to 9999
(kp/rev)</td></tr>
<tr><td colspan="2">In the case of the full-closed loop control
Set the number of pulses per ball screw pitch.
<table>
<tr><th>Detector model name</th><th>Resolution</th><th>SV019 setting</th></tr>
<tr><td>OHE25K-ET,
OHA25K-ET</td><td>100,000(p/rev)</td><td>100</td></tr>
<tr><td>OSE104-ET,
OSA104-ET</td><td>100,000(p/rev)</td><td>100</td></tr>
<tr><td>OSE105-ET,
OSA105-ET</td><td>1,000,000(p/rev)</td><td>1000</td></tr>
<tr><td>Relative position detection scale</td><td>Refer to specification manual for each detector</td><td>PIT/Resolution (µm)</td></tr>
<tr><td>AT41 (Mitsutoyo)</td><td>1 (µm/p)</td><td>The same as SV018 (PIT)</td></tr>
<tr><td>FME type, FLE type (Futaba)</td><td>Refer to specification manual for each detector</td><td>PIT/Resolution (µm)</td></tr>
<tr><td>MP type (Mitsubishi Heavy Industries)</td><td>Refer to specification manual for each detector</td><td>PIT/Resolution (µm)</td></tr>
<tr><td>AT342 (Mitsutoyo)</td><td>0.5 (µm/p)</td><td>Twice as big as SV018 (PIT)</td></tr>
</table>
(Setting range: 1 to 9999 (kp/pit))</td></tr>
<tr><td>2220
(PR)</td><td>SV020
RNG2</td><td>Speed detector resolution</td><td>Set the number of pulses per one revolution of the motor end detector.
<table>
<tr><th>Detector model name</th><th>SV020 setting</th></tr>
<tr><td>Equipped to HA053, HA13 (Only for MDS-B-Vx)</td><td>10</td></tr>
<tr><td>OHE25K, OHA25K (Only for MDS-B-Vx)</td><td>100</td></tr>
<tr><td>OSE104, OSA104</td><td>100</td></tr>
<tr><td>OSE105, OSA105</td><td>1000</td></tr>
</table></td><td>1 to 9999
(kp/rev)</td></tr>
<tr><td>2221</td><td>SV021
OLT</td><td>Overload detection time constant</td><td>Set the detection time constant of Overload 1 (Alarm 50). Set to “60” as a standard. (For machine tool builder adjustment.)</td><td>1 to 999
(s)</td></tr>
<tr><td>2222</td><td>SV022
OLL</td><td>Overload detection level</td><td>Set the current detection level of Overload 1 (Alarm 50) in respect to the stall (rated) current. Set to “150” as a standard. (For machine tool builder adjustment.)</td><td>110 to 500
(Stall [rated] current %)</td></tr>
<tr><td>2223</td><td>SV023
OD1</td><td>Excessive error detection width during servo ON</td><td>Set the excessive error detection width when servo ON.
<Standard setting value>
$$OD1=OD2=\frac{\text{Rapid traverse rate (mm/min)}}{60*PGN1}/2\ \text{(mm)}$$
When “0” is set, the excessive error detection will not be performed.</td><td>0 to 32767
(mm)</td></tr>
</table>

No.	Items		Details	Setting range
2224	SV024 INP	In-position detection width	Set the in-position detection width. Set the accuracy required for the machine. The lower the setting is, the higher the positioning accuracy gets, however, the cycle time (setting time) becomes longer. The standard setting is “50”.	0 to 32767 (µm)
2225 (PR)	SV025 MTYP	Motor/ Detector type		

F	E	D	C	B	A	9	8
pen				ent			

7	6	5	4	3	2	1	0
mtyp							

bit		Explanation
0	mtyp	Set the motor type.
1		
2		
3		
4		
5		
6		
7		

Setting	0x	1x	2x	3x	4x	5x	6x	7x
x0	HA40N		HA50L	HA53L				
x1	HA80N		HA100L	HA103L				
x2	HA100N		HA200L	HA203L				
x3	HA200N		HA300L	HA303L				
x4	HA300N		HA500L	HA503L				
x5	HA700N							
x6	HA900N							
x7			HA-LH11K2					
x8			HA-LH15K2					
x9								
xA			HA150L	HA153L				
xB								
xC								
xD								
xE								
xF								

Setting	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	HA43N			HC52	HC53			
x1	HA83N			HC102	HC103		HC103R	
x2	HA103N			HC152	HC153		HC153R	
x3	HA203N			HC202	HC203		HC203R	
x4	HA303N			HC352	HC353		HC353R	
x5	HA703N			HC452	HC453		HC503R	
x6				HC702	HC703			
x7				HC902				
x8								
x9								
xA	HA93N							
xB								
xC	HA053(N)							
xD	HA13(N)							
xE	HA23N							
xF	HA33N							

(To be continued to the next page)

No.	Items		Details	Setting range
			(Continued from the previous page)	

bit		Explanation
8 9 A B	ent	Set the detector type. Set position detector type for “pen”, and speed detector type for “ent”. In the case of the semi-closed loop control, set the same value for “pen” and “ent”.
C D E F	pen	

pen setting	ent setting	Detector model name
0	0	OHE25K (Only for MDS-B-Vx), OSE104
1	1	OHA25K (Only for MDS-B-Vx), OSA104
2	2	OSE105, OSA105
3	3	Equipped to HA053, HA13 (Only for MDS-B-Vx)
4	Setting impossible	OHE25K-ET, OSE104-ET
5	Setting impossible	OHA25K-ET, OSA104-ET
6	Setting impossible	OSE105-ET, OSA105-ET
7	Setting impossible	
8	Setting impossible	Relative position detection scale, MP type (Mitsubishi Heavy Industries)
9	Setting impossible	AT41 (Mitsutoyo), FME type, FLE type (Futaba)
A	Setting impossible	AT342 (Mitsutoyo)
B	Setting impossible	
C	C (Current synchroni-zation)	The setting of the slave axis in the speed/current synchronization control. When the master axis is the semi-closed control.
D	Setting impossible	
E	Setting impossible	
F	Setting impossible	

No.	Items		Details	Setting range
2226	SV026 OD2	Excessive error detection width during servo OFF	Set the excessive error detection width when servo ON. For the standard setting, refer to the explanation of SV023 (OD1). When “0” is set, the excessive error detection will not be performed.	0 to 32767 (mm)

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>2227</td><td>SV027
SSF1</td><td>Servo function selection 1</td><td colspan="2">
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td>aflt</td><td>zrn2</td><td colspan="2">afse</td><td colspan="2">ovs</td><td colspan="2">lmc</td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td>zrn3</td><td colspan="2">vfct</td><td></td><td>upc</td><td colspan="2">vcnt</td></tr>
</table>
<table>
<tr><th colspan="2">bit</th><th>Meaning when “0” is set</th><th>Meaning when “1” is set</th></tr>
<tr><td>0
1</td><td>vcnt</td><td colspan="2">Set the execution changeover type of the speed loop delay compensation.
00: Delay compensation changeover invalid
01: Delay compensation changeover type 1
10: Delay compensation type 2
11: Setting prohibited</td></tr>
<tr><td>2</td><td>upc</td><td>Start torque compensation invalid</td><td>Start torque compensation valid</td></tr>
<tr><td>3</td><td></td><td></td><td></td></tr>
<tr><td>4
5</td><td>vfct</td><td colspan="2">Set the number of compensation pulses of the jitter compensation.
00: Jitter compensation invalid
01: Jitter compensation 1 pulse
10: Jitter compensation 2 pulses
11: Jitter compensation 3 pulses</td></tr>
<tr><td>6</td><td>zrn3</td><td colspan="2">ABS scale: Set to “1” in using AT342, AT343, LC191M/491M.</td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8
9</td><td>lmc</td><td colspan="2">Set the compensation amount with SV016 (LMC1) and SV041 (LMC2).
00: Lost motion compensation stop
01: Lost motion compensation type 1
10: Lost motion compensation type 2
11: Setting prohibited</td></tr>
<tr><td>A
B</td><td>ovs</td><td colspan="2">Set the compensation amount with SV031 (OVS1) and SV042 (OVS2).
00: Overshooting compensation stop
01: Overshooting compensation type 1
10: Overshooting compensation type 2
11: Overshooting compensation type 3</td></tr>
<tr><td>C
D</td><td>afse</td><td colspan="2">00: Adoptive filter sensitivity standard
11: Adoptive filter sensitivity increase (Set 2bits at a time)</td></tr>
<tr><td>E</td><td>zrn2</td><td colspan="2">Set to “1”.</td></tr>
<tr><td>F</td><td>aflt</td><td>Adoptive filter stops</td><td>Adoptive filter starts</td></tr>
</table>
(Note) Set to “0” for bits with no particular description.</td></tr>
<tr><td>2228</td><td>SV028</td><td></td><td>Not used. Set to “0”.</td><td>0</td></tr>
<tr><td>2229</td><td>SV029
VCS</td><td>Speed at the change of speed loop gain</td><td>If the noise is bothersome at high speed during rapid traverse, etc, lower the speed loop gain.
Set the speed at which the speed loop gain changes, and use this with SV006 (VGN2). (Refer to SV006.)
When not using, set to “0”.</td><td>0 to 9999
(r/min)</td></tr>
</table>

No.	Items		Details	Setting range
2230	The higher order 8bits and lower order 8bits are used for different functions. "The setting value of SV030" = (Icx*256) + IVC			0 to 32767
	SV030 IVC (Low order)	Voltage dead time compensation	When 100% is set, the voltage equivalent to the logical non-energized time will be compensated. When "0" is set, a 100% compensation will be performed. Adjust in increments of 10% from the default value 100%. If increased too much, vibration or vibration noise may be generated.	0 to 255 (%)
	SV030 Icx (High order)	Current bias 1	Set to "0" as a standard. Use this in combination with SV040 and the high order 8bits of SV045.	0 to 127
2231	SV031 OVS1	Overshooting compensation 1	Set this if overshooting occurs during positioning. This compensates the motor torque during positioning. This is valid only when the overshooting compensation SV027 (SSF1/ovs) is selected.	-1 to 100 (Stall [rated] current%)
			Type 1: When SV027 (SSF1)/ bitB, A (ovs)=01 Set the compensation amount based on the motor's stall current. This compensates overshooting that occurs during pulse feeding. Normally, use Type 2.	
			Type 2: When SV027 (SSF1)/ bitB, A (ovs)=10 Set the compensation amount based on the motor's stall current. Increase by 1% and determine the amount that overshooting doesn't occur. In Type 2, compensation during the feed forward control during circular cutting won't be performed.	
			Type 3: When SV027 (SSF1)/ bitB, A (ovs)=11 Use this to perform the overshooting compensation during circular cutting or the feed forward control. The setting method is the same in Type 2.	
			When you wish different compensation amount depending on the direction When SV042 (OVS2) is "0", compensate with the value of SV031 (OVS1) in both of the + and -directions. If you wish to change the compensation amount depending on the command direction, set this and SV042 (OVS2). (SV031: + direction, SV042: - direction. However, the directions may be opposite depending on other settings.) When "-1" is set, the compensation won't be performed in the direction of the command.	

No.	Items		Details	Setting range
2232	SV032 TOF	Torque offset	Set the unbalance torque of vertical axis and inclined axis.	-100 to 100 (Stall [rated] current %)
2233	SV033 SSF2	Servo function selection 2	See the bit layout and bit meaning tables below.	

Bit layout of SV033 (SSF2):

F	E	D	C	B	A	9	8
dos						hvx	svx

7	6	5	4	3	2	1	0
fhz2				nfd			zck

bit		Meaning when "0" is set	Meaning when "1" is set
0	zck	Z phase check valid (Alarm 42)	Z phase check invalid
1, 2, 3	nfd1	Set the filter depth for Notch filter 1 (SV038). (See the depth table below.)	
4, 5, 6, 7	fhz2	Set the operation frequency of Notch filter 2. 0: Invalid 1: 2250Hz 2: 1125Hz 3: 750Hz 4: 563Hz 5: 450Hz 6: 375Hz 7: 321Hz 8 to F: 281Hz	
8	svx	Set the performance mode of the servo control. (Only for MDS-C1-Vx) 00: By current loop gain 01: MDS-B-Vx compatible mode selected 10: High gain mode selected 11: High gain mode selected	
9	hvx		
A			
B			
C, D, E, F	dos	Digital signal output selection 0 : MP scale absolute position detection, offset demand signal output 1 : Specified speed signal output 2 to F : Setting prohibited	

Notch filter 1 depth (bits 1 to 3):

Value	000	001	010	011	100	101	110	111
Depth (dB)	Infntly deep	-18.1	-12.0	-8.5	-6.0	-4.1	-2.5	-1.2

Deep← → Shallow

(Note) Set to "0" for bits with no particular description.

No.	Items		Details	Setting range
2234	SV034 SSF3	Servo function selection 3	(see bit layout and table below)	

F	E	D	C	B	A	9	8
ovsn							

7	6	5	4	3	2	1	0
	os2	zeg				has2	has1

bit		Meaning when "0" is set	Meaning when "1" is set
0	has1	Setting for normal use (Except for HC)	HAS control 1 valid (HC: High acceleration rate support)
1	has2	Setting for normal use (Except for HC)	HAS control 2 valid (HC: Overshooting support)
2			
3			
4			
5	zeg	Z phase normal edge detection (Setting for normal use)	Z phase reverse edge detection (Valid only when SV027/bit6=1)
6	os2	Setting for normal use	Overspeed detection level changeover
7			
8			
9			
A			
B			
C D E F	ovsn	Set the non-sensitive band of the overshooting compensation type 3 in increments of 2μm at a time. In the feed forward control, the non-sensitive band of the model position droop is set, and overshooting of the model is ignored. Set the same value as the standard SV040.	

(Note) Set to "0" for bits with no particular description.

No.	Items		Details	Setting range
2235	SV035 SSF4	Servo function selection4		

F	E	D	C	B	A	9	8
clt	clG1			cl2n	clet	cltq	

7	6	5	4	3	2	1	0
	iup	tdt					

bit		Meaning when "0" is set	Meaning when "1" is set
0 1 2 3 4 5	tdt	Td creation time setting Set to "0". (For machine tool builder adjustment)	
6	iup	Set to "1" in the case of any motors from HC152 to HC702 and from HC153 to HC453.	
7			
8 9	cltq	Set the retracting torque for collision detection in respect to the maximum torque of the motor. 00: 100% 01: 90% 10: 80% (Standard) 11: 70%	
A	clet	Setting for normal use	The disturbance torque peak of the latest two seconds is displayed in MPOS of the servo monitor screen.
B	cl2n	Collision detection method 2 valid	Collision detection method 2 invalid
C D E	clG1	Collision detection method 1 Set the collision detection level during cutting feed (G1). The G1 collision detection level=SV060*clG1. When clG1=0, the collision detection method 1 during cutting feed won't function.	
F	clt	Setting for normal use	The guide value of the SV059 setting value is displayed in MPOS of the servo monitor screen.

(Note) Set to "0" for bits with no particular description.

No.	Items		Details	Setting range
2236 (PR)	SV036 PTYP	Power supply type	See below	

F	E	D	C	B	A	9	8
amp				rtyp			

7	6	5	4	3	2	1	0
ptyp							

bit		Explanation
0, 1, 2, 3, 4, 5, 6, 7	ptyp	When the CN4 connector of the drive unit and the power supply are connected, setting below is necessary. To validate the external emergency stop function, add 40h.

Setting	0x	1x	2x	3x	4x	5x	6x	7x	8x
x0	Not used			CV-300					
x1		CV-110							CR-10
x2			CV-220						CR-15
x3									CR-22
x4	CV-37								CR-37
x5		CV-150			CV-450	CV-550			
x6	CV-55		CV-260						CR-55
x7				CV-370					
x8	CV-75								CR-75
x9		CV-185							CR-90

bit		Explanation
8, 9, A, B	rtyp	Set the regenerative resistor type when MDS-A-CR is used.

Setting	Regenerative resistor model name	Resistance value	Capacity
0	MDS-C1-CV (Setting when using power supply regeneration)		
1	GZG200W260HMJ	26Ω	80W
2	GZG300W130HMJ×2	26Ω	150W
3	MR-RB30	13Ω	300W
4	MR-RB50	13Ω	500W
5	GZG200W200HMJ×3	6.7Ω	350W
6	GZG300W200HMJ×3	6.7Ω	500W
7	R-UNIT-1	30Ω	700W
8	R-UNIT-2	15Ω	700W
9	R-UNIT-3	15Ω	2100W
A to F	No setting		

bit		Explanation
C, D, E, F	amp	Always set to "0".

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>2237</td><td>SV037 JL</td><td>Load inertia scale</td><td>Set “the motor inertia + motor axis conversion load inertia” in respect to the motor inertia.
$$SV037\ (JL) = \frac{Jl+Jm}{Jm} *100$$
Jm: Motor inertia
Jl: Motor axis conversion load inertia</td><td>0 to 5000
(%)</td></tr>
<tr><td>2238</td><td>SV038
FHz1</td><td>Notch filter frequency 1</td><td>Set the vibration frequency to suppress if machine vibration occurs.
(Valid at 72 or more) When not using, set to “0”.</td><td>0 to 3000
(Hz)</td></tr>
<tr><td>2239</td><td>SV039
LMCD</td><td>Lost motion compensation timing</td><td>Set this when the lost motion compensation timing doest not match.
Adjust by increasing the value by 10 at a time.</td><td>0 to 2000
(ms)</td></tr>
<tr><td rowspan="3">2240</td><td colspan="3">The higher order 8bits and lower order 8bits are used for different functions.
“Setting value of SV040” = (Icy*256) + LMCT</td><td>0 to 32767</td></tr>
<tr><td>SV040
LMCT
(Low order)</td><td>Lost motion compensation non-sensitive band</td><td>Set the non-sensitive band of the lost motion compensation in the feed forward control.
When “0” is set, the actual value that is set is 2μm.
Adjust by increasing by 1μm at a time.</td><td>0 to 100
(μm)</td></tr>
<tr><td>SV040 Icy
(High order)</td><td>Current bias 2</td><td>Normally, set to “40” if you use HC202 to HC902, HC203 to HC703.
Use this in combination with SV030 and the high order 8bits of SV045.</td><td>0 to 127</td></tr>
<tr><td>2241</td><td>SV041
LMC2</td><td>Lost motion compensation 2</td><td>Set this with SV016 (LMC1) only when you wish to set the lost motion compensation amount to be different depending on the command directions.
Set to “0” as a standard.</td><td>-1 to 200
(Stall [rated] current %)</td></tr>
<tr><td>2242</td><td>SV042
OVS2</td><td>Overshooting compensation 2</td><td>Set this with SV031 (OVS1) only when you wish to set the overshooting compensation amount to be different depending on the command directions.
Set to “0” as a standard.</td><td>-1 to 100
(Stall [rated] current %)</td></tr>
<tr><td>2243</td><td>SV043
OBS1</td><td>Disturbance observer filter frequency</td><td>Set the disturbance observer filter band.
Set to “100” as a standard.
To use the disturbance observer, also set SV037 (JL) and SV044 (OBS2). When not using, set to “0”.</td><td>0 to 1000
(rad/s)</td></tr>
<tr><td>2244</td><td>SV044
OBS2</td><td>Disturbance observer gain</td><td>Set the disturbance observer gain. The standard setting is “100” to “300”.
To use the disturbance observer, also set SV037 (JL) and SV043 (OBS1). When not using, set to “0”.</td><td>0 to 500
(%)</td></tr>
<tr><td rowspan="3">2245</td><td colspan="3">The higher order 8bits and lower order 8bits are used for different functions.
“Setting value of SV045” = (Icy*256) + LMCT</td><td>0 to 32767</td></tr>
<tr><td>SV045
TRUB
(Low order)</td><td>Frictional torque</td><td>When you use the collision detection function, set the frictional torque.</td><td>0 to 100
(Stall [rated] current %)</td></tr>
<tr><td>SV045
Ib1
(High order)</td><td>Current bias 3</td><td>Set to “0” as a standard.
Use this in combination with SV030 and the high order 8bits of SV040.</td><td>0 to 127</td></tr>
</table>

No.	Items		Details	Setting range
2246	SV046		Not used. Set to “0”.	0
2247	SV047 EC	Inductive voltage compensation gain	Set the inductive voltage compensation gain. Set to “100” as a standard. If the current FB peak exceeds the current command peak, lower the gain.	0 to 200 (%)
2248	SV048 EMGrt	Vertical axis drop prevention time	Input a length of time to prevent the vertical axis from dropping by delaying Ready OFF until the brake works when the emergency stop occurs. Increase the setting by 100ms at a time and set the value where the axis does not drop.	0 to 20000 (ms)
2249	SV049 PGN1sp	Position loop gain 1 in spindle synchronous control	Set the position loop gain during the spindle synchronous control (synchronous tapping, synchronous control with spindle/C axis). Set the same value as the value of the spindle parameter, position loop gain in synchronous control. When performing the SHG control, set this with SV050 (PGN2sp) and SV058 (SHGCsp).	1 to 200 (rad/s)
2250	PGN2sp	Position loop gain 2 in spindle synchronous control	Set this with SV049 (PGN1sp) and SV058 (SHGCsp) if you wish to perform the SHG control in the spindle synchronous control (synchronous tapping, synchronous control with spindle/C axis). When not performing the SHG control, set to “0”.	0 to 999 (rad/s)
2251	SV051 DFBT	Dual feed back control time constant	Set the control time constant in dual feed back. When “0” is set, the actual value that is set is 1ms. The higher the time constant is, the closer it gets to the semi-closed control, so the limit of the position loop gain is raised.	0 to 9999 (ms)
2252	SV052 DFBN	Dual feedback control non-sensitive band	Set the non-sensitive band in the dual feedback control. Set to “0” as a standard.	0 to 9999 (µm)
2253	SV053 OD3	Excessive error detection width in special control	Set the excessive error detection width when servo ON in a special control (initial absolute position setting, stopper control, etc.). If “0” is set, excessive error detection won’t be performed when servo ON during a special control.	0 to 32767 (mm)
2254	SV054 ORE	Overrun detection width in closed loop control	Set the overrun detection width in the full-closed loop control. If the gap between the motor end detector and the linear scale (machine end detector) exceeds the value set by this parameter, it is judged to be overrun and Alarm 43 will be detected. When “-1” is set, the alarm detection won’t be performed. When “0” is set, overrun is detected with a 2mm width.	-1 to 32767 (mm)

No.	Items		Details	Setting range
2255	SV055 EMGx	Max. gate off delay time after emergency stop	Set a length of time from the point when the emergency stop is input to the point when READY OFF is compulsorily executed. Normally, set the same value as the absolute value of SV056. In preventing the vertical axis from dropping, the gate off is delayed for the length of time set by SV048 if SV055's value is smaller than that of SV048.	0 to 20000 (ms)
2256	SV056 EMGt	Deceleration time constant at emergency stop	In the vertical axis drop prevention control, set the time constant used for the deceleration control at emergency stop. Set a length of time that takes from rapid traverse rate (rapid) to stopping. Normally, set the same value as the rapid traverse acceleration/deceleration time constant. When executing the synchronous operation, put the minus sign to the settings of both of the master axis and slave axis.	-20000 to 20000 (ms)
2257	SV057 SHGC	SHG control gain	When performing the SHG control, set this with S003 (PGN1) and SV004 (PGN2). When not performing the SHG control, set to "0".	0 to 999 (rad/s)
2258	SV058 SHGCsp	SHG control gain in spindle synchronous control	Set this with SV049 (PGN1sp) and SV050 (PGN2sp) if you wish to perform the SHG control in the spindle synchronous control (synchronous tapping, synchronous control with spindle/C axis). When not performing the SHG control, set to "0".	0 to 999 (rad/s)
2259	SV059 TCNV	Collision detection torque estimating gain	Set the torque estimating gain when using the collision detection function. After setting as SV035/bitF(clt)=1 and performing acceleration/deceleration, set the value displayed in MPOS of the NC servo monitor screen. Set to "0" when not using the collision detection function.	-32768 to 32767
2260	SV060 TLMT	Collision detection level	When using the collision detection function, set the collision detection level during the G0 feeding. If "0" is set, none of the collision detection function will work.	0 to 999 (Stall [rated] current %)
2261	SV061 DA1NO	D/A output channel 1 data No.	Input the data number you wish to output to D/A output channel. In the case of MDS-C1-V2, set the axis on the side to which the data will not be output to "-1".	-1 to 127
2262	SV062 DA2NO	D/A output channel 2 data No.		
2263	SV063 DA1MPY	D/A output channel 1 output scale	Set the scale with a 1/256 unit. When "0" is set, output is done with the standard output unit.	-32768 to 32767 (Unit: 1/256)
2264	SV064 DA2MPY	D/A output channel 2 output scale		
2265	SV065		Not used. Set to "0".	0

(2) Initial setting value

(a) HC**/HC**R series

Motor		HC 52	HC 102	HC 152	HC 202	HC 352	HC 452	HC 702	HC 902
Drive unit capacity		05	10	20	20	35	45	70	90
SV001	PC1	-	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	33	33	33
SV004	PGN2	0	0	0	0	0	0	0	0
SV005	VGN1	100	100	100	100	100	100	150	150
SV006	VGN2	0	0	0	0	0	0	0	0
SV007	VIL	0	0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	2048	2048	2048	2048	2048	2048	2048	2048
SV010	IDA	2048	2048	2048	2048	2048	2048	2048	2048
SV011	IQG	512	512	512	256	256	256	200	200
SV012	IDG	512	512	512	512	512	512	256	256
SV013	ILMT	500	500	500	500	500	500	500	500
SV014	ILMTsp	500	500	500	500	500	500	500	500
SV015	FFC	0	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000	0000	0000	0000
SV018	PIT	-	-	-	-	-	-	-	-
SV019	RNG1	-	-	-	-	-	-	-	-
SV020	RNG2	-	-	-	-	-	-	-	-
SV021	OLT	60	60	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150	150	150
SV023	OD1	6	6	6	6	6	6	6	6
SV024	INP	50	50	50	50	50	50	50	50
SV025	MTYP	xxB0	xxB1	xxB2	xxB3	xxB4	xxB5	xxB6	xxB7
SV026	OD2	6	6	6	6	6	6	6	6
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0	0
SV029	VCS	0	0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0	0

Motor		HC 52	HC 102	HC 152	HC 202	HC 352	HC 452	HC 702	HC 902
Drive unit capacity		05	10	20	20	35	45	70	90
SV033	SSF2	0000	0000	0000	0000	0000	0000	0000	0000
SV034	SSF3	0003	0003	0003	0003	0003	0003	0003	0003
SV035	SSF4	0000	0000	0040	0040	0040	0040	0040	0040
SV036	PTYP	0000	0000	0000	0000	0000	0000	0000	0000
SV037	JL	0	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	10240	10240	10240	10240	10240
SV041	LMC2	0	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0	0
SV046		0	0	0	0	0	0	0	0
SV047	EC	100	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0	0
SV051	DFBT	0	0	0	0	0	0	0	0
SV052	DFBN	0	0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0	0
SV054	ORE	0	0	0	0	0	0	0	0
SV055	EMGx	0	0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0	0
SV065		0	0	0	0	0	0	0	0

Motor		HC 53	HC 103	HC 153	HC 203	HC 353	HC 453	HC 703	HC 103R	HC 153R	HC 203R	HC 353R
Drive unit capacity		05	10	20	35	45	70	90	10	10	20	35
SV001	PC1	-	-	-	-	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	33	33	33	33	33	33
SV004	PGN2	0	0	0	0	0	0	0	0	0	0	0
SV005	VGN1	100	100	100	100	100	100	100	15	15	20	40
SV006	VGN2	0	0	0	0	0	0	0	0	0	0	0
SV007	VIL	0	0	0	0	0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	2048	2048	2048	2048	2048	2048	2048	4096	4096	4096	4096
SV010	IDA	2048	2048	2048	2048	2048	2048	2048	4096	4096	4096	4096
SV011	IQG	256	256	256	256	256	256	256	256	256	256	256
SV012	IDG	512	512	512	512	512	512	512	512	512	512	512
SV013	ILMT	500	500	500	500	500	500	500	500	500	500	500
SV014	ILMTsp	500	500	500	500	500	500	500	500	500	500	500
SV015	FFC	0	0	0	0	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV018	PIT	-	-	-	-	-	-	-	-	-	-	-
SV019	RNG1	-	-	-	-	-	-	-	-	-	-	-
SV020	RNG2	-	-	-	-	-	-	-	-	-	-	-
SV021	OLT	60	60	60	60	60	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150	150	150	150	150	150
SV023	OD1	6	6	6	6	6	6	6	6	6	6	6
SV024	INP	50	50	50	50	50	50	50	50	50	50	50
SV025	MTYP	xxC0	xxC1	xxC2	xxC3	xxC4	xxC5	xxC6	xxE1	xxE2	xxE3	xxE4
SV026	OD2	6	6	6	6	6	6	6	6	6	6	6
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0	0	0	0	0
SV029	VCS	0	0	0	0	0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0	0	0	0	0

Motor		HC 53	HC 103	HC 153	HC 203	HC 353	HC 453	HC 703	HC 103R	HC 153R	HC 203R	HC 353R
Drive unit capacity		05	10	20	35	45	70	90	10	10	20	35
SV033	SSF2	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV034	SSF3	0003	0003	0003	0003	0003	0003	0003	0000	0000	0000	0000
SV035	SSF4	0000	0000	0040	0040	0040	0040	0040	0000	0000	0000	0000
SV036	PTYP	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV037	JL	0	0	0	0	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	1024 0	1024 0	1024 0	1024 0	0	0	0	0
SV041	LMC2	0	0	0	0	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0	0	0	0	0
SV046		0	0	0	0	0	0	0	0	0	0	0
SV047	EC	100	100	100	100	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0	0	0	0	0
SV051	DFBT	0	0	0	0	0	0	0	0	0	0	0
SV052	DFBN	0	0	0	0	0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0	0	0	0	0
SV054	ORE	0	0	0	0	0	0	0	0	0	0	0
SV055	EMGx	0	0	0	0	0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0	0	0	0	0
SV065		0	0	0	0	0	0	0	0	0	0	0

(b) HA**N series

Motor		HA 40N	HA 80N	HA 100N	HA 200N	HA 300N	HA 700N	HA 900N
Drive unit capacity		05	10	20	35	45	70	90
SV001	PC1	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	25	25
SV004	PGN2	0	0	0	0	0	0	0
SV005	VGN1	150	150	150	150	150	250	250
SV006	VGN2	0	0	0	0	0	0	0
SV007	VIL	0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	2048	2048	2048	2048	2048	2048	2048
SV010	IDA	2048	2048	2048	2048	2048	2048	2048
SV011	IQG	512	512	256	256	256	200	200
SV012	IDG	512	512	512	512	512	256	256
SV013	ILMT	500	500	500	500	500	500	500
SV014	ILMTsp	500	500	500	500	500	500	500
SV015	FFC	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000	0000	0000
SV018	PIT	-	-	-	-	-	-	-
SV019	RNG1	-	-	-	-	-	-	-
SV020	RNG2	-	-	-	-	-	-	-
SV021	OLT	60	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150	150
SV023	OD1	6	6	6	6	6	6	6
SV024	INP	50	50	50	50	50	50	50
SV025	MTYP	xx00	xx01	xx02	xx03	xx04	xx05	xx06
SV026	OD2	6	6	6	6	6	6	6
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0
SV029	VCS	0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0

Motor		HA 40N	HA 80N	HA 100N	HA 200N	HA 300N	HA 700N	HA 900N
Drive unit capacity		05	10	20	35	45	70	90
SV033	SSF2	0000	0000	0000	0000	0000	0000	0000
SV034	SSF3	0000	0000	0000	0000	0000	0000	0000
SV035	SSF4	0000	0000	0000	0000	0000	0000	0000
SV036	PTYP	0000	0000	0000	0000	0000	0000	0000
SV037	JL	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	0	0	0	0
SV041	LMC2	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0
SV046		0	0	0	0	0	0	0
SV047	EC	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0
SV051	DFBT	0	0	0	0	0	0	0
SV052	DFBN	0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0
SV054	ORE	0	0	0	0	0	0	0
SV055	EMGx	0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0
SV065		0	0	0	0	0	0	0

Motor		HA 43N	HA 83N	HA 93N	HA 103N	HA 203N	HA 303N	HA 703N
Drive unit capacity		05	10	20	35	45	70	90
SV001	PC1	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	33	25
SV004	PGN2	0	0	0	0	0	0	0
SV005	VGN1	150	150	150	150	150	150	250
SV006	VGN2	0	0	0	0	0	0	0
SV007	VIL	0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	2048	2048	2048	2048	2048	2048	2048
SV010	IDA	2048	2048	2048	2048	2048	2048	2048
SV011	IQG	256	256	256	256	256	256	200
SV012	IDG	512	512	512	512	512	512	256
SV013	ILMT	500	500	500	500	500	500	500
SV014	ILMTsp	500	500	500	500	500	500	500
SV015	FFC	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000	0000	0000
SV018	PIT	-	-	-	-	-	-	-
SV019	RNG1	-	-	-	-	-	-	-
SV020	RNG2	-	-	-	-	-	-	-
SV021	OLT	60	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150	150
SV023	OD1	6	6	6	6	6	6	6
SV024	INP	50	50	50	50	50	50	50
SV025	MTYP	xx80	xx81	xx8A	xx82	xx83	xx84	xx85
SV026	OD2	6	6	6	6	6	6	6
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0
SV029	VCS	0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0

Motor		**HA 43N**	**HA 83N**	**HA 93N**	**HA 103N**	**HA 203N**	**HA 303N**	**HA 703N**
Drive unit capacity		05	10	20	35	45	70	90
SV033	SSF2	0000	0000	0000	0000	0000	0000	0000
SV034	SSF3	0000	0000	0000	0000	0000	0000	0000
SV035	SSF4	0000	0000	0000	0000	0000	0000	0000
SV036	PTYP	0000	0000	0000	0000	0000	0000	0000
SV037	JL	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	0	0	0	0
SV041	LMC2	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0
SV046		0	0	0	0	0	0	0
SV047	EC	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0
SV051	DFBT	0	0	0	0	0	0	0
SV052	DFBN	0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0
SV054	ORE	0	0	0	0	0	0	0
SV055	EMGx	0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0
SV065		0	0	0	0	0	0	0

Motor		HA 053	HA 13	HA 053N	HA 13N	HA 23N	HA 33N
Drive unit capacity		01	01	01	01	03	03
SV001	PC1	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	33
SV004	PGN2	0	0	0	0	0	0
SV005	VGN1	70	70	70	70	100	100
SV006	VGN2	0	0	0	0	0	0
SV007	VIL	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364
SV009	IQA	2048	2048	2048	2048	2048	2048
SV010	IDA	2048	2048	2048	2048	2048	2048
SV011	IQG	256	256	256	256	224	224
SV012	IDG	256	256	256	256	224	224
SV013	ILMT	500	500	500	500	500	500
SV014	ILMTsp	500	500	500	500	500	500
SV015	FFC	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000	0000
SV018	PIT	-	-	-	-	-	-
SV019	RNG1	10	10	-	-	-	-
SV020	RNG2	10	10	-	-	-	-
SV021	OLT	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150
SV023	OD1	6	6	6	6	6	6
SV024	INP	50	50	50	50	50	50
SV025	MTYP	338C	338D	xx8C	xx8D	xx8E	xx8F
SV026	OD2	6	6	6	6	6	6
SV027	SSF1	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0
SV029	VCS	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0

(Note) The HA053 and HA13 are dedicated for the MDS-B-Vx.

Motor		HA 053	HA 13	HA 053N	HA 13N	HA 23N	HA 33N
Drive unit capacity		01	01	01	01	03	03
SV033	SSF2	0000	0000	0000	0000	0000	0000
SV034	SSF3	0000	0000	0000	0000	0000	0000
SV035	SSF4	0000	0000	0000	0000	0000	0000
SV036	PTYP	0000	0000	0000	0000	0000	0000
SV037	JL	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0
SV040	LMCT	0	0	0	0	0	0
SV041	LMC2	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0
SV046		0	0	0	0	0	0
SV047	EC	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0
SV051	DFBT	0	0	0	0	0	0
SV052	DFBN	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0
SV054	ORE	0	0	0	0	0	0
SV055	EMGx	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0
SV065		0	0	0	0	0	0

(Note) The HA053 and HA13 are dedicated for the MDS-B-Vx.

(c) HA**L series

Motor		HA 50L	HA 100L	HA 150L	HA 200L	HA 300L	HA 500L	HA-A11KL	HA-A15KL
Drive unit capacity		05	10	10	20	35	45	110	150
SV001	PC1	-	-	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	33	33	33
SV004	PGN2	0	0	0	0	0	0	0	0
SV005	VGN1	30	30	30	30	30	50	150	150
SV006	VGN2	0	0	0	0	0	0	0	0
SV007	VIL	0	0	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364	1364	1364
SV009	IQA	2048	2048	2048	2048	2048	2048	2048	2048
SV010	IDA	2048	2048	2048	2048	2048	2048	2048	2048
SV011	IQG	512	512	512	512	256	256	512	512
SV012	IDG	512	512	512	512	512	512	512	512
SV013	ILMT	500	500	500	500	500	500	500	500
SV014	ILMTsp	500	500	500	500	500	500	500	500
SV015	FFC	0	0	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000	0000	0000	0000
SV018	PIT	-	-	-	-	-	-	-	-
SV019	RNG1	-	-	-	-	-	-	-	-
SV020	RNG2	-	-	-	-	-	-	-	-
SV021	OLT	60	60	60	60	60	60	60	3
SV022	OLL	150	150	150	150	150	150	150	150
SV023	OD1	6	6	6	6	6	6	6	6
SV024	INP	50	50	50	50	50	50	50	50
SV025	MTYP	xx20	xx21	xx2A	xx22	xx23	xx24	xx27	xx28
SV026	OD2	6	6	6	6	6	6	6	6
SV027	SSF1	4000	4000	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0	0	0
SV029	VCS	0	0	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0	0	0

Motor		HA 50L	HA 100L	HA 150L	HA 200L	HA 300L	HA 500L	HA-A11KL	HA-A15KL
Drive unit capacity		05	10	10	20	35	45	110	150
SV033	SSF2	0000	0000	0000	0000	0000	0000	0000	0000
SV034	SSF3	0000	0000	0000	0000	0000	0000	0000	0000
SV035	SSF4	0000	0000	0000	0000	0000	0000	0000	0000
SV036	PTYP	0000	0000	0000	0000	0000	0000	0000	0000
SV037	JL	0	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	0	0	0	0	0
SV041	LMC2	0	0	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0	0	0
SV046		0	0	0	0	0	0	0	0
SV047	EC	100	100	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0	0	0
SV051	DFBT	0	0	0	0	0	0	0	0
SV052	DFBN	0	0	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0	0	0
SV054	ORE	0	0	0	0	0	0	0	0
SV055	EMGx	0	0	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0	0	0
SV065		0	0	0	0	0	0	0	0

Motor		HA 53L	HA 103L	HA 153L	HA 203L	HA 303L	HA 503L
Drive unit capacity		10	20	20	35	45	70
SV001	PC1	-	-	-	-	-	-
SV002	PC2	-	-	-	-	-	-
SV003	PGN1	33	33	33	33	33	33
SV004	PGN2	0	0	0	0	0	0
SV005	VGN1	30	30	30	30	30	50
SV006	VGN2	0	0	0	0	0	0
SV007	VIL	0	0	0	0	0	0
SV008	VIA	1364	1364	1364	1364	1364	1364
SV009	IQA	2048	2048	2048	2048	2048	2048
SV010	IDA	2048	2048	2048	2048	2048	2048
SV011	IQG	512	512	512	512	256	256
SV012	IDG	512	512	512	512	512	512
SV013	ILMT	500	500	500	500	500	500
SV014	ILMTsp	500	500	500	500	500	500
SV015	FFC	0	0	0	0	0	0
SV016	LMC1	0	0	0	0	0	0
SV017	SPEC	0000	0000	0000	0000	0000	0000
SV018	PIT	-	-	-	-	-	-
SV019	RNG1	-	-	-	-	-	-
SV020	RNG2	-	-	-	-	-	-
SV021	OLT	60	60	60	60	60	60
SV022	OLL	150	150	150	150	150	150
SV023	OD1	6	6	6	6	6	6
SV024	INP	50	50	50	50	50	50
SV025	MTYP	xx30	xx31	xx3A	xx32	xx33	xx34
SV026	OD2	6	6	6	6	6	6
SV027	SSF1	4000	4000	4000	4000	4000	4000
SV028		0	0	0	0	0	0
SV029	VCS	0	0	0	0	0	0
SV030	IVC	0	0	0	0	0	0
SV031	OVS1	0	0	0	0	0	0
SV032	TOF	0	0	0	0	0	0
SV033	SSF2	0000	0000	0000	0000	0000	0000

Motor		HA 53L	HA 103L	HA 153L	HA 203L	HA 303L	HA 503L
Drive unit capacity		10	20	20	35	45	70
SV034	SSF3	0000	0000	0000	0000	0000	0000
SV035	SSF4	0000	0000	0000	0000	0000	0000
SV036	PTYP	0000	0000	0000	0000	0000	0000
SV037	JL	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0
SV040	LMCT	0	0	0	0	0	0
SV041	LMC2	0	0	0	0	0	0
SV042	OVS2	0	0	0	0	0	0
SV043	OBS1	0	0	0	0	0	0
SV044	OBS2	0	0	0	0	0	0
SV045	TRUB	0	0	0	0	0	0
SV046		0	0	0	0	0	0
SV047	EC	100	100	100	100	100	100
SV048	EMGrt	0	0	0	0	0	0
SV049	PGN1sp	15	15	15	15	15	15
SV050	PGN2sp	0	0	0	0	0	0
SV051	DFBT	0	0	0	0	0	0
SV052	DFBN	0	0	0	0	0	0
SV053	OD3	0	0	0	0	0	0
SV054	ORE	0	0	0	0	0	0
SV055	EMGx	0	0	0	0	0	0
SV056	EMGt	0	0	0	0	0	0
SV057	SHGC	0	0	0	0	0	0
SV058	SHGCsp	0	0	0	0	0	0
SV059	TCNV	0	0	0	0	0	0
SV060	TLMT	0	0	0	0	0	0
SV061	DA1NO	0	0	0	0	0	0
SV062	DA2NO	0	0	0	0	0	0
SV063	DA1MPY	0	0	0	0	0	0
SV064	DA2MPY	0	0	0	0	0	0
SV065		0	0	0	0	0	0

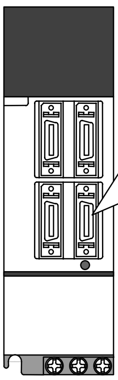
7.4 Supplement

7.4.1 D/A Output Specifications

(1) MDS-B-SVJ2

(a) D/A output specifications

Item	Explanation
No. of channels	2ch
Output cycle	888µs (min. value)
Output precision	8bit
Output voltage range	-10V to 0 to +10V
Output scale setting	±1/256 to ±128 times
Output pins	CN3 connector MO1 = pin 4 MO2 = pin 14 GND = pin 1,11
Function	Offset amount adjustment function Output clamp function Low path filter function
Option	Relay terminal: MR-J2CN3TM Connect from the CN3 connector using the SH21 cable as a lead-in wire.



CN3 Connector

Pin	Signal	Pin	Signal
1	LG	11	LG
2		12	
3	SG	13	MBR
4	MO1	14	MO2
5	COM	15	MC
6		16	
7		17	
8		18	
9		19	
10	VDD	20	EMGX

(b) Setting the output data

Set the No. of the data to be outputted to each D/A output channel.

#	No.	Abbrev	Parameter name
2261	SV061	DA1NO	D/A output channel 1 data No.
2262	SV062	DA2NO	D/A output channel 2 data No.

No.	Output data	Standard output unit	Output cycle
0	0V test output	For offset amount adjustment	
1	Speed feedback	1000rpm / 2V	888µs
2	Current feedback	Stall (rated) 100% / 2V	888µs
3	Speed command	1000rpm / 2V	888µs
4	Current command	Stall (rated) 100% / 2V	888µs
5	V-phase current value	10A / V	888µs
6	W-phase current-value	10A / V	888µs
7	Estimated disturbance torque	Stall (rated) 100% / 2V	888µs
8	Collision detection disturbance torque	Stall (rated) 100% / 2V	888µs
9	Position feedback (stroke)	100mm / V	3.55ms
10	Position feedback (pulse)	10µm / V	3.55ms
11	Position droop	mm / V	3.55ms
12	Position droop (x10)	100µm / V	3.55ms
13	Position droop (x100)	10µm / V	3.55ms
14	Feedrate (F∆T)	10000(mm/min) / V	888µs
15	Feedrate (F∆T x 10)	1000(mm/min) / V	888µs
16	Model position droop	mm / V	3.55ms
17	Model position droop (x10)	100µm / V	3.55ms
18	Model position droop (x100)	10µm / V	3.55ms
19	q-axis current cumulative value	–	888µs
20	d-axis current cumulative value	–	888µs
21	Motor load level	100% / 5V	113.7ms
22	Amplifier load level	100% / 5V	113.7ms
23	Regenerative load level	100% / 5V	910.2ms
24	PN bus wire voltage	50V / V (1/50)	888µs
25	Speed cumulative item	–	888µs
26	Cycle counter	0-5V (Regardless of resolution)	888µs
27	Excessive error detection amount	mm / V	3.55ms
28	Collision detection estimated torque	Stall (rated) 100% / 2V	888µs
29	Position command (stroke)	100mm / V	3.55ms
30	Position command (pulse)	10µm / V	3.55ms
31 to 99	-		
100	5V test output	-	-
101	Saw-tooth wave test output	-5 to 5V Cycle: 113.7ms	888µs
102	Rectangular wave test output	0 to 5V Cycle: 227.5ms	888µs
103 to	Setting prohibited		

(c) Setting the output scale

When “0“ is set, the output will be made with the standard output unit. To change the output unit, set a value other than “0”.
The scale is set with a 1/256 unit. When 256 is set, the unit will be the same as the standard output.

#	No.	Abbrev	Parameter name
2263	SV063	DA1MPY	D/A output channel 1 output scale
2264	SV064	DA2MPY	D/A output channel 2 output scale

(Example 1) When SV061 = 5, SV063 = 2560
The V-phase current value will be output with 1 A/V unit to D/A output ch.1.

(Example 2) When SV063 = 11, SV064 = 128
The position droop will be output with a 2mm/Vunit to D/A output ch.2.

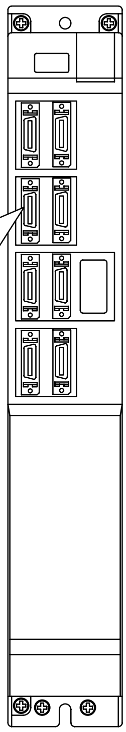
(2) MDS-C1-Vx, MDS-B-Vx, MDS-B-Vx4

(a) D/A Output specifications

Item	Explanation
No. of channels	2ch
Output cycle	888µs (min. value)
Output precision	8bit
Output voltage	0V to 2.5V to +5V
Output scale setting	±1/256 to ±128 times
Output pins	CN9 connector MO1 = pin 9 MO2 = pin 19 GND = pin 1,11
Function	Phase current feed back output function L-axis U-phase current FB : pin 7 L-axis V-phase current FB : pin 17 M-axis U-phase current FB : pin 6 M-axis V-phase current FB : pin 16
Option	An drive unit with 2 axes also has 2 channels for D/A output. Therefore, set the output data of the axis (SV061,62), which is not observed, to "-1".

CN9 Connector

Pin	Signal	Pin	Signal
1	LG	11	LG
2		12	
3		13	
4		14	
5		15	
6	MUIFB	16	MVIFB
7	LUIFB	17	LVIFB
8		18	
9	MO1	19	MO2
10		20	



(b) Setting the output data

Set the No. of the data to be outputted to each data D/A output channel.

#	No.	Abbrev	Parameter name
2261	SV061	DA1NO	D/A output channel 1 data No.
2262	SV062	DA2NO	D/A output channel 2 data No.

No.	Output data	Standard output unit	Standard setting value of output scale (Setting values in SV063, SV064)	Standard output unit	Output cycle
-1	D/A output non-selected	For a drive unit. with 2 axes (MDS-C1-V2). Set for the parameter of the axis which is not used.			
0	ch1: Speed feedback	r/min	13 (in case of 2000rpm)	1000rpm / V	3.55ms
			9 (in case of 3000rpm)	1500rpm / V	3.55ms
	ch2: Current command	Stall%	131	Stall 100% / V	3.55ms
1	Current command	Stall%	131	Stall 100% / V	3.55ms
2	–				
3	Current feedback	Stall%	131	Stall 100% / V	3.55ms
4	–				
5	–				
6	Position droop	NC display unit / 2	328 (When the display unit=1µm)	10µm / 0.5V	3.55ms
7	–				
8	Feedrate (FΔT)	(NC display unit / 2) / communication cycle	55 (When 1µm, 3.5ms)	1000 (mm/min) / 0.5V	3.55ms
9	–				
10	Position command	NC display unit / 2	328 (When the display unit=1µm)	10µm / 0.5V	3.55ms
11	–				
12	Position feedback	NC display unit / 2	328 (When the display unit=1µm)	10µm / 0.5V	3.55ms
13	–				
14	Collision detection estimated torque	Stall%	131	Stall 100% / V	3.55ms
15	Collision detection disturbance torque	Stall%	131	Stall 100% / V	3.55ms
64	Current command (High-speed)	Internal unit	8 (adjustment required)	–	888µs
65	Current feedback (High-speed)	Internal unit	8 (adjustment required)	–	888µs

(To be continued to the next page)

(Continued from the previous page)

No.	Output data	Standard output unit	Standard setting value of output scale (Setting values in SV063, SV064)	Standard output unit	Output cycle
77	Estimated disturbance torque	Internal unit	8 (adjustment required)	–	888µs
125	Saw-tooth wave test output	0V to 5V	0 (256)	Cycle: 227.5ms	888µs
126	Rectangular wave test output	0V to 5V	0 (256)	Cycle: 1.7ms	888µs
127	2.5V (data 0) test output	2.5V	0 (256)	–	888µs

(c) Setting the output scale

#	No.	Abbrev	Parameter name
2263	SV063	DA1MPY	D/A output channel 1 output scale
2264	SV064	DA2MPY	D/A output channel 2 output scale

Usually, the standard setting value is set for the output scale (SV063, SV 064). When “0” is set, the output will be made as well as when “256” is set.

$$\text{DATA} \times \frac{\text{SV063}}{256} \times \frac{5\ [\text{V}]}{256\ (8\text{bit})} + 2.5\ [\text{V}]\ (\text{offset}) = \text{Output voltage}\ [\text{V}]$$

(Example) When outputting the current FB with 100%/V–stall (SV061=3, SV063=131)

$$100 \times \frac{131}{256} \times \frac{5}{256} + 2.5 = 3.499\ [\text{V}]$$

7.4.2 Electronic Gears

The servo drive unit has internal electronic gears. The command value from the NC is converted into a detector resolution unit to carry out position control. The electronic gears are single gear ratios calculated from multiple parameters as shown below. However, each value (ELG1, ELG2) must be less than 32767.

If the value overflows, the initial parameter error (alarm 37) or error parameter No. 2301 will be output.

If an alarm occurs, the mechanical specifications and electrical specifications must be revised so that the electronic gears are within the specifications range.

<Semi-closed loop>

$$\frac{\text{ELG1}}{\text{ELG2}} = \frac{\text{RNG1 x PC2}}{\text{PIT x PC1 x IUNIT}} \quad \text{(Reduced fraction)}$$

<Closed loop>

$$\frac{\text{ELG1}}{\text{ELG2}} = \frac{\text{PGN x RNG2 x PC2}}{\text{30 x RNG1 x PC1}} \quad \text{(Reduced fraction)}$$

IUNIT = 2/NC command unit (µm)
1µm : IUNIT = 2, 0.1µm : IUNIT = 20

When the above is calculated, the following conditions must be satisfied.

ELG1 ≤ 32767
ELG2 ≤ 32767

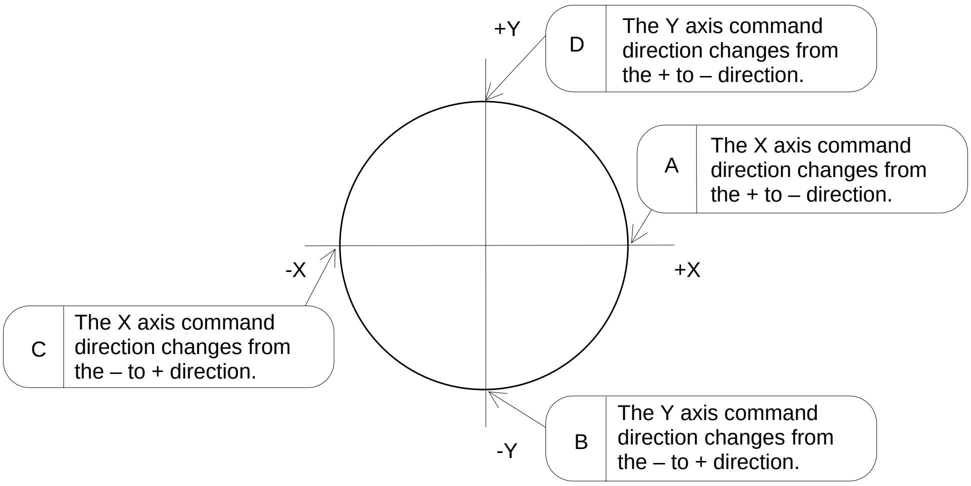
7.4.3 Lost Motion Compensation

When the motor is to rotate in the clockwise direction (looking from the load side) at the command for the + direction, the command direction is CW. Conversely, when the motor is to rotate in the counterclockwise direction, the command direction is CCW.
This rotation direction can be set with the CNC machine parameters. Note that the meaning of the ± will differ for some servo parameters according to this motor rotation direction. The servo parameters affected by CW/CCW are shown below.

SV016 (LMC1), SV041 (LMC2) (When different values are set for SV016 and SV041)
SV031 (OVS1), SV042 (OVS2) (When different values are set for SV031 and SV042)

<Example> If the lost motion compensation amount is to be changed according to the direction, the compensation amount at the quadrant changeover point of each arc where the lost motion compensation is applied will be as shown below according to the command polarity.

	CW	CCW
A	X: SV041	X: SV016
B	Y: SV016	Y: SV041
C	X: SV016	X: SV041
D	Y: SV041	Y: SV016



(Note) The setting value for the parameter is “0” or “-1”, the compensation amount is determined as shown below.

Setting value for SV016 (Setting value for SV031)	Setting value for SV041 (Setting value for SV041)	Compensation amount in + direction	Compensation amount in - direction
0	0	No compensation	No compensation
n	0	n	n
0	m	m	m
n	m	n	m
n	-1	n	No compensation
-1	m	No compensation	m

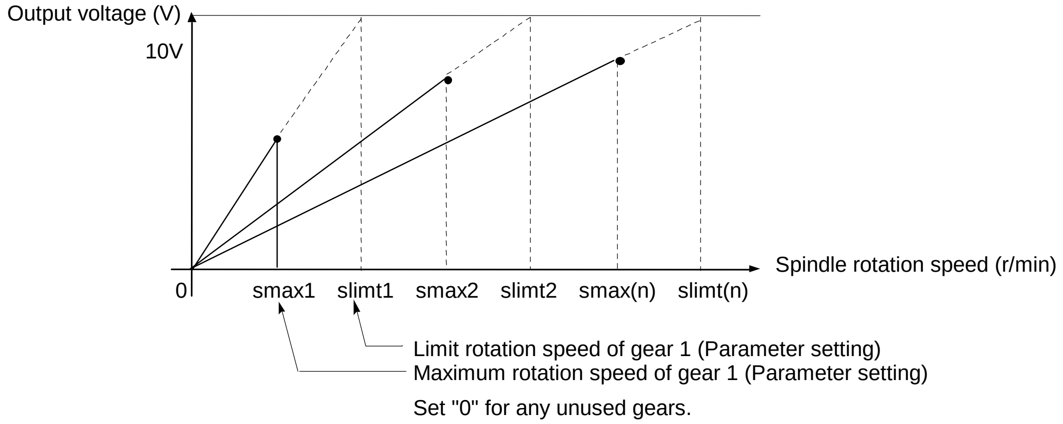
8. Spindle Parameters

8.1 Spindle Base Specifications Parameters

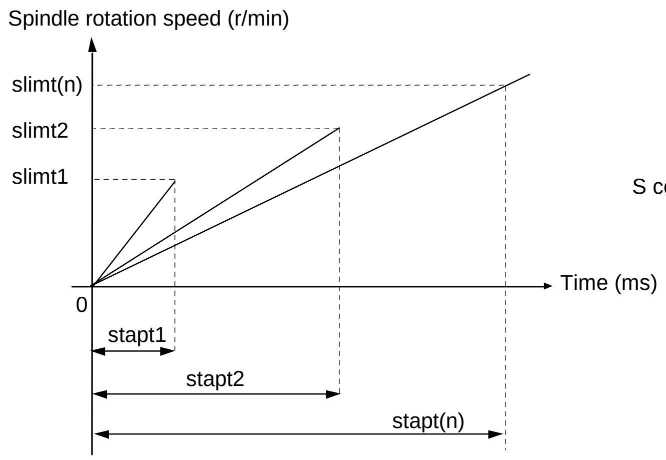
For parameters indicated with a (PR) in the table, turn the NC power OFF after setting. The setting is validated after the power is turned ON again.

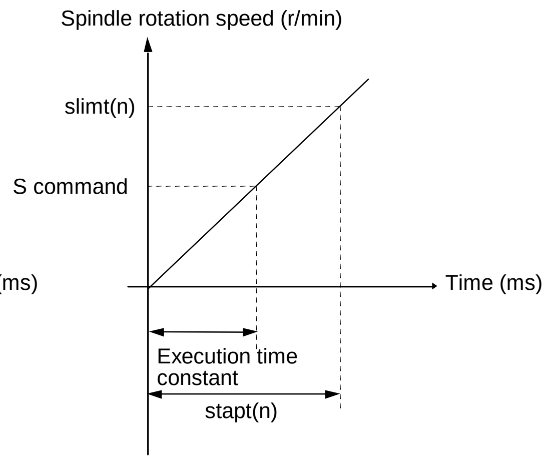
No.	Items		Details	Setting range (Unit)
3001 3002 3003 3004	slimit 1 2 3 4	Limit rotation speed	Set spindle rotation speed for maximum motor rotation speed with gears 00, 01, 10, 11. (Set the spindle rotation speed for the S analog output 10V.)	0 to 99999 (r/min)
3005 3006 3007 3008	smax 1 2 3 4	Maximum rotation speed	Set maximum spindle speed with gears 00, 01, 10, 11. Set the value that is equal to or larger than "slimit" value. By comparing the S command value of gear 1 to 4, a spindle gear shift command will be output automatically.	
3009 3010 3011 3012	ssift 1 2 3 4	Shift rotation speed	Set spindle rotation speed for gear shifting with gears 00, 01, 10, 11. (Note) Setting too large value may cause a gear nicks when changing gears.	0 to 32767 (r/min)
3013 3014 3015 3016	stap 1 2 3 4	Tap rotation speed	Set maximum spindle rotation speed during tap cycle with gears 00, 01, 10, 11.	0 to 99999 (r/min)
3017 3018 3019 3020	stapt 1 2 3 4	Tap time constant	Set time constants for constant inclination synchronized tapping for gears 00, 01, 10, 11 (linear acceleration/deceleration pattern).	1 to 5000 (ms)

Relationship between spindle limit rotation speed and maximum spindle rotation speed



Relation between the spindle limit rotation speed and the spindle tap time constant (for the constant inclination synchronized tapping)





#	Items		Details	Setting range (Unit)
3021	sori	Orientation rotation speed	Set the spindle orientation rotation speed. Set the rotation speed for when the spindle rotates at the constant rotation speed.	0 to 32767 (r/min)
3022	sgear	Encoder gear ratio	Set the gear ratio of the spindle to the encoder.	0: 1/1 1: 1/2 2: 1/4 3: 1/8
3023	smini	Minimum rotation speed	Set the minimum rotation speed of the spindle. If an S command instructs the rotation speed below this setting, the spindle rotates at the minimum rotation speed set with this parameter.	0 to 32767 (r/min)
3024 (PR)	sout	Spindle connection	Set the type of the spindle to be connected. 0: No connection with the spindle 1: Serial connection (bus) 2 to 5: Analog output	0 to 5
3025	enc-on	Spindle encoder	Set connection information of the spindle encoder. 0: No connection 1: Spindle connection (Spindle encoder connection check function valid.) 2: Serial connection of encoder	0 to 2
3026	cs_ori	Selection of winding in orientation mode	0: Perform orientation using the winding selected when the orientation command is issued. 1: Use winding L whenever the orientation command is issued.	0/1
3027	cs_syn	Selection of winding in spindle synchronous mode	0: The winding H/L is selected by the actual spindle rotation speed (calculated from commanded rotation speed) when spindle synchronous control starts. (The winding is not switched during synchronous control. The control is carried out with the winding selected at start.) If the actual spindle rotation speed is less than SP020, the winding L is selected, and if more than the value, the winding H is selected. 1: Use winding H whenever the spindle synchronous command is issued.	0/1
3028	sprcmm	L system tap cycle spindle forward run/ reverse run M command	Set the M code of the spindle forward run/reverse run command. High-order three digits : The spindle forward run command's M code is set. Low-order three digits : The spindle reverse run command's M code is set.	0 to 999999

#	Items		Details	Setting range (Unit)
3037 3038 3039 3040	tapt 21 22 23 24	Synchronized tapping Switching spindle rotation speed 2	Set the spindle rotation speed at which the step-2 acceleration/deceleration time constant is to be switched at gear 00, 01, 10, or 11.	0 to 99999 (r/min)
3041 3042 3043 3044	tapt 21 22 23 24	Synchronized tapping Switching time constant 2	Set the time constant to reach Synchronized tapping switching spindle rotation speed 2 (#3037 to #3040) at gear 00, 01, 10, or 11.	1 to 5000 (ms)
3045 3046 3047 3048	tapt 31 32 33 34	Synchronized tapping Switching time constant 3	Set the time constant to reach the maximum rotation spindle speed (#3005 to #3008) at gear 00, 01, 10, or 11.	1 to 5000 (ms)
3049	spt	Spindle synchronization acceleration/ deceleration time constant	Set the acceleration/deceleration time constant for when the spindle synchronization command's rotation speed changes during spindle synchronous control.	0 to 9999 (ms)
3050	sprlv	Spindle synchronization rotation speed attainment level	The spindle rotation speed synchronization complete signal will turn ON when the difference of the reference spindle and synchronous spindle actual rotation speeds is less than the level set for the synchronous spindle rotation speed command value during spindle synchronous control.	0 to 4095 (pulse) (1 pulse = 0.088°)
3051	spplv	Spindle phase synchronization attainment level	The spindle phase synchronization complete signal will turn ON when the phase difference of the reference spindle and synchronous spindle is less than the set level during spindle phase synchronization control.	0 to 4095 (pulse) (1 pulse = 0.088°)
3052	spplr	Spindle motor spindle relative polarity	Set the spindle motor and spindle's relative polarity. Spindle CW rotation at motor CW rotation : Positive polarity Spindle CCW rotation at motor CW rotation : Negative polarity	0: Positive polarity 1: Negative polarity
3053	sppst	Spindle encoder Z -phase position	Set the deviation amount from the spindle's reference position to the spindle encoder's Z phase. The deviation amount is obtained using the clockwise direction looking from the front of the spindle as the positive direction.	0 to 359999 (1/1000°)

#	Items		Details	Setting range (Unit)
3054	sptc1	Spindle synchronization multi-step acceleration/ deceleration changeover speed 1	Set the spindle speed for changing the 1st step's acceleration/deceleration time constant.	0 to 99999 (r/min)
3055	sptc2	Spindle synchronization multi-step acceleration/ deceleration changeover speed 2	Set the spindle speed for changing the 2nd step's acceleration/deceleration time constant.	0 to 99999 (r/min)
3056	sptc3	Spindle synchronization multi-step acceleration/ deceleration changeover speed 3	Set the spindle speed for changing the 3rd step's acceleration/deceleration time constant.	0 to 99999 (r/min)
3057	sptc4	Spindle synchronization multi-step acceleration/ deceleration changeover speed 4	Set the spindle speed for changing the 4th step's acceleration/deceleration time constant.	0 to 99999 (r/min)
3058	sptc5	Spindle synchronization multi-step acceleration/ deceleration changeover speed 5	Set the spindle speed for changing the 5th step's acceleration/deceleration time constant.	0 to 99999 (r/min)
3059	sptc6	Spindle synchronization multi-step acceleration/ deceleration changeover speed 6	Set the spindle speed for changing the 6th step's acceleration/deceleration time constant.	0 to 99999 (r/min)

#	Items		Details	Setting range (Unit)
3060	sptc7	Spindle synchronization multi-step acceleration/ deceleration changeover speed 7	Set the spindle speed for changing the 7th step's acceleration/deceleration time constant.	0 to 99999 (r/min)
3061	spdiv1	Magnification for time constant changeover speed 1	Set the acceleration/deceleration time constant between the spindle synchronization multi-step acceleration/deceleration changeover speed 1 (sptc1) to the spindle synchronization multi-step acceleration/deceleration changeover speed 2 (sptc2) as a magnification in respect to the spindle synchronization acceleration/deceleration time constant (spt).	0 to 127
3062	spdiv2	Magnification for time constant changeover speed 2	Set the acceleration/deceleration time constant between the spindle synchronization multi-step acceleration/deceleration changeover speed 2 (sptc2) to the spindle synchronization multi-step acceleration/deceleration changeover speed 3 (sptc3) as a magnification in respect to the spindle synchronization acceleration/deceleration time constant (spt).	0 to 127
3063	spdiv3	Magnification for time constant changeover speed 3	Set the acceleration/deceleration time constant between the spindle synchronization multi-step acceleration/deceleration changeover speed 3 (sptc3) to the spindle synchronization multi-step acceleration/deceleration changeover speed 4 (sptc4) as a magnification in respect to the spindle synchronization acceleration/deceleration time constant (spt).	0 to 127
3064	spdiv4	Magnification for time constant changeover speed 4	Set the acceleration/deceleration time constant between the spindle synchronization multi-step acceleration/deceleration changeover speed 4 (sptc4) to the spindle synchronization multi-step acceleration/deceleration changeover speed 5 (sptc5) as a magnification in respect to the spindle synchronization acceleration/deceleration time constant (spt).	0 to 127
3065	spdiv5	Magnification for time constant changeover speed 5	Set the acceleration/deceleration time constant between the spindle synchronization multi-step acceleration/deceleration changeover speed 5 (sptc5) to the spindle synchronization multi-step acceleration/deceleration changeover speed 6 (sptc6) as a magnification in respect to the spindle synchronization acceleration/deceleration time constant (spt).	0 to 127

#	Items		Details	Setting range (Unit)
3066	spdiv6	Magnification for time constant changeover speed 6	Set the acceleration/deceleration time constant between the spindle synchronization multi-step acceleration/deceleration changeover speed 6 (sptc6) to the spindle synchronization multi-step acceleration/deceleration changeover speed 7 (sptc7) as a magnification in respect to the spindle synchronization acceleration/deceleration time constant (spt).	0 to 127
3067	spdiv7	Magnification for time constant changeover speed 7	Set the acceleration/deceleration time constant for the spindle synchronization multi-step acceleration/deceleration changeover speed 7 (sptc7) and higher as a magnification in respect to the spindle synchronization acceleration/deceleration time constant (spt).	0 to 127
3068	symtm1	Phase synchroniza-tion start confirmation time	Set the time to confirm that synchronization is attained before phase synchronization control is started. When "0" is set, the time will be 2 seconds. When "100" or less is set, the time will be 100ms.	0 to 9999 (ms)
3069	symtm2	Phase synchroniza-tion end confirmation time	Set the time to wait for phase synchronization control to end as the time for the rotation speed to reach the attainment range. When "0" is set, the time will be 2 seconds. When "100" or less is set, the time will be 100ms.	0 to 9999 (ms)
3070	syprt	Phase synchroniza-tion speed	Set the fluctuation amount to change the synchronous spindle rotation speed during phase synchronization control as the command speed and rate. When "0" is set, the amount will be 100%.	0 to 100 (%)
3071		(Not used.)		
3072		(Not used.)		

8.2 MDS-B-SPJ2

For parameters marked with a (PR) in the tables, turn the NC power OFF after setting. The parameters will be valid after the power is turned ON again.
The valid spindle parameters will differ according to the motor and amplifier type. Follow the correspondence table given below, and set the correct parameters.
The spindle parameter setting and display method will differ according to the NC being used, so refer to Instruction Manual for each NC and the following spindles.

MELDAS AC Servo and Spindle MDS-A Series MDS-B Series Specifications Manual ...BNP-B3759

The "fixed control constants" and "fixed control bits" in this section are set by Mitsubishi.

⚠CAUTION

⚠ Do not make remarkable adjustments or changes of the parameters as the operation may become unstable.

⚠ In the explanation on bits, set all bits not used, including blank bits, to “0”.

No.	Items			Details	Setting range	Standard setting
3201	SP001	PGM	Magnetic detector and motor built-in encoder orientation-mode position loop gain	As the set value is larger, the orientation time becomes shorter and servo rigidity is increased. On the contrary, however, vibration is increased and the machine becomes likely to overshoot.	0 to 1000 (0.1 1/s)	100
3202	SP002	PGE	Encoder orientation-mode position loop gain	As the set value is larger, the orientation time becomes shorter and servo rigidity is increased. On the contrary, however, vibration is increased and the machine becomes likely to overshoot.	0 to 1000 (0.1 1/s)	100
3203	SP003			Not used. Set to “0”.	0	0
3204	SP004	OINP	Orientation in-position width	Set the position error range in which an orientation completion signal is output.	1 to 2880 (1/16°)	16
3205 (PR)	SP005	OSP	Orientation mode changing speed limit value	Set the motor speed limit value to be used when the speed loop is changed to the position loop in orientation mode. When this parameter is set to "0", SP017 (TSP) becomes the limit value.	0 to 32767 (r/min)	0
3206	SP006	CSP	Orientation mode deceleration rate	As the set value is larger, the orientation time becomes shorter. On the contrary, however, the machine becomes likely to overshoot.	1 to 1000	20
3207	SP007	OPST	In-position shift amount for orientation	Set the stop position for orientation. Set the value by dividing 360° by 4096.	0 to 4095	0
3208	SP008			Not used. Set to "0".	0	0
3209	SP009	PGT	Synchronous tapping position loop gain	Set the spindle position loop gain in synchronous tapping mode.	1 to 100 (1/s)	15

No.	Items			Details	Setting range	Standard setting
3210	SP010	PGS	Spindle synchronous position loop gain	Set the spindle position loop gain in spindle synchronization mode.	1 to 100 (1/s)	15
3211 to 3216	SP011 to SP016			Use not possible.	0	0
3217 (PR)	SP017	TSP	Maximum motor speed	Set the maximum motor speed of the spindle.	1 to 32767 (r/min)	6000
3218 (PR)	SP018	ZSP	Motor zero speed	Set the motor speed for which zero-speed output is performed.	1 to 1000 (r/min)	50
3219 (PR)	SP019	CSN1	Speed cushion 1	Set the time constant for a speed command from "0" to the maximum speed. (This parameter is invalid in position loop mode.)	0 to 32767 (10ms)	30
3220 (PR)	SP020	SDTS	Speed detection set value	Set the motor speed so for which speed detection output is performed. Usually, the setting value is 10% of SP017 (TSP).	0 to 32767 (r/min)	600
3221	SP021	TLM1	Torque limit 1	Set the torque limit rate for torque limit signal 001.	0 to 120 (%)	10
3222 (PR)	SP022	VGNP1	Speed loop gain proportional term under speed control	Set the speed loop proportional gain in speed control mode. When the gain is increased, response is improved but vibration and sound become larger.	0 to 1000 (1/s)	63
3223 (PR)	SP023	VGNI1	Speed loop gain integral term under speed control	Set the speed loop integral gain in speed control mode. Usually, set a value in proportion to SP022 (VGNP1).	0 to 1000 (0.1 1/s)	60
3224	SP024			Not used. Set to "0".	0	0
3225 (PR)	SP025	GRA1	Spindle gear teeth count 1	Set the number of gear teeth of the spindle corresponding to gear 000.	1 to 32767	1
3226 (PR)	SP026	GRA2	Spindle gear teeth count 2	Set the number of gear teeth of the spindle corresponding to gear 001.	1 to 32767	1
3227 (PR)	SP027	GRA3	Spindle gear teeth count 3	Set the number of gear teeth of the spindle corresponding to gear 010.	1 to 32767	1
3228 (PR)	SP028	GRA4	Spindle gear teeth count 4	Set the number of gear teeth of the spindle corresponding to gear 011.	1 to 32767	1
3229 (PR)	SP029	GRB1	Motor shaft gear teeth count 1	Set the number of gear teeth of the motor shaft corresponding to gear 000.	1 to 32767	1
3230 (PR)	SP030	GRB2	Motor shaft gear teeth count 2	Set the number of gear teeth of the motor shaft corresponding to gear 001.	1 to 32767	1
3231 (PR)	SP031	GRB3	Motor shaft gear teeth count 3	Set the number of gear teeth of the motor shaft corresponding to gear 010.	1 to 32767	1
3232 (PR)	SP032	GRB4	Motor shaft gear teeth count 4	Set the number of gear teeth of the motor shaft corresponding to gear 011.	1 to 32767	1

No.	Items			Details	Setting range	Standard setting
3233 (PR)	SP033	SFNC1	Spindle function 1	Set the spindle function 1 in bit units.	0000 to FFFF HEX setting	0000

F	E	D	C	B	A	9	8
poff	hzs		ront				

7	6	5	4	3	2	1	0
					sftk	dflt	1a2m

(Note) Always set "0" for the empty bits.

bit	Name	Meaning when set to 0	Meaning when set to 1
0	1a2m	1 amplifier 2 motor function: Invalid	1 amplifier 2 motor function: Valid
1	dflt	Default motor: Main	Default motor: Sub
2	sftk	SF-TK card invalid	SF-TK card valid
3			
4			
5			
6			
7			
8			
9			
A			
B		This is a fixed control bit.	
C	ront		
D			
E	hzs		
F	poff		

No.	Items			Details	Setting range	Standard setting
3234 (PR)	SP034	SFNC2	Spindle function 2	Set the spindle function 2 in bit units.	0000 to FFFF HEX setting	0000

F	E	D	C	B	A	9	8

7	6	5	4	3	2	1	0
							mts1

(Note) Always set "0" for the empty bits.

bit	Name	Meaning when set to 0	Meaning when set to 1
0	mts1	Special motor constant invalid	Special motor constant setting valid
1			
2			
3			
4			
5			
6			
7			
8			
9			
A			
B			
C			
D			
E			
F			

(Note1) To validate bit3(mkc2), NC side needs to prepare.

(Note1) Always turn the bit2 at the same time to use bit3.

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3235
(PR)</td><td>SP035</td><td>SFNC3</td><td>Spindle function3</td><td>Set the spindle function 3 in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>hbsd</td><td></td><td>hwid</td></tr>
</table>
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>hwid</td><td>H-coil wide-range constant output invalid</td><td>H-coil wide-range constant output valid</td></tr>
<tr><td>1</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>hbsd</td><td>H-coil base slide invalid</td><td>H-coil base slide valid</td></tr>
<tr><td>3</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td></td><td></td><td></td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td></td><td></td><td></td></tr>
<tr><td>9</td><td></td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td></td><td></td><td></td></tr>
<tr><td>E</td><td></td><td></td><td></td></tr>
<tr><td>F</td><td></td><td></td><td></td></tr>
</table>
</td><td>0000 to FFFF
HEX setting</td><td>0000</td></tr>
<tr><td>3236
(PR)</td><td>SP036</td><td>SFNC4</td><td>Spindle function 4</td><td>Set the spindle function 4 in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>dslm</td><td>dssm</td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td></td><td>enc2</td><td>enc1</td><td>mag2</td><td>mag1</td><td>plg2</td><td>plg1</td></tr>
</table>
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>plg1</td><td>PLG of motor 1 valid</td><td>PLG of motor 1 invalid</td></tr>
<tr><td>1</td><td>plg2</td><td>PLG of motor 2 valid</td><td>PLG of motor 2 invalid</td></tr>
<tr><td>2</td><td>mag1</td><td>MAG of motor 1 valid</td><td>MAG of motor 1 invalid</td></tr>
<tr><td>3</td><td>mag2</td><td>MAG of motor 2 valid</td><td>MAG of motor 2 invalid</td></tr>
<tr><td>4</td><td>enc1</td><td>ENC of motor 1 valid</td><td>ENC of motor 1 invalid</td></tr>
<tr><td>5</td><td>enc2</td><td>ENC of motor 2 valid</td><td>ENC of motor 2 invalid</td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td>dssm</td><td>Speedometer valid</td><td>Speedometer invalid</td></tr>
<tr><td>9</td><td>dslm</td><td>Load meter valid</td><td>Load meter invalid</td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td></td><td></td><td></td></tr>
<tr><td>E</td><td></td><td></td><td></td></tr>
<tr><td>F</td><td></td><td></td><td></td></tr>
</table>
</td><td></td><td></td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
3237 (PR)	SP037	SFNC5	Spindle function 5	Set the spindle function 5 in bit units. F: – , E: – , D: – , C: – , B: – , A: – , 9: – , 8: nstv 7: – , 6: – , 5: – , 4: – , 3: – , 2: plgo , 1: – , 0: enco **(Note)** Always set "0" for the empty bits.	0000 to FFFF HEX setting	0000

F	E	D	C	B	A	9	8
							nstv

7	6	5	4	3	2	1	0
					plgo		enco

(Note) Always set "0" for the empty bits.

bit	Name	Meaning when set to 0	Meaning when set to 1
0	enco	Encoder orientation invalid	Encoder orientation valid
1			
2	plgo	PLG orientation invalid	PLG orientation valid
3			
4			
5			
6			
7			
8	nstv	No-signal detection type (Always monitoring)	Monitoring only in position loop or orientation-mode
9			
A			
B			
C			
D			
E			
F			

No.	Items			Details	Setting range	Standard setting
3238 (PR)	SP038	SFNC6	Spindle function 6	Set the spindle function 6 in bit units.	0000 to FFFF HEX setting	0000

F	E	D	C	B	A	9	8
oplp							

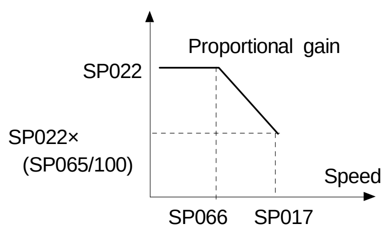
7	6	5	4	3	2	1	0
					pftm		alty

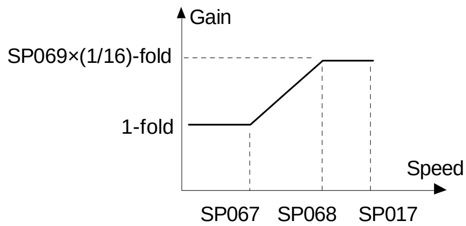
(Note) Always set "0" for the empty bits.

bit	Name	Meaning when set to 0	Meaning when set to 1
0	alty	Deceleration stop during special alarm invalid	Deceleration stop during special alarm valid
1			
2	pftm	Thread cutting position data invalid	Thread cutting position data valid
3			
4			
5			
6			
7			
8			
9			
A			
B			
C			
D			
E			
F	oplp	Open loop operation invalid	Open loop operation valid

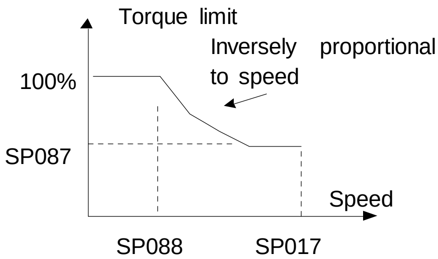
<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3239
(PR)</td><td>SP039</td><td>ATYP</td><td>Amplifier type</td><td>Set the amplifier type.
Set each amplifier type or "0".
This parameter corresponds to MDS-B-SPJ2.
<table><tr><th>Parameter setting</th><th>Amplifier type</th></tr><tr><td>0000</td><td>--</td></tr><tr><td>0001</td><td>SPJ2-02</td></tr><tr><td>0002</td><td>SPJ2-04</td></tr><tr><td>0003</td><td>SPJ2-075</td></tr><tr><td>0004</td><td>SPJ2-15</td></tr><tr><td>0005</td><td>SPJ2-22</td></tr><tr><td>0006</td><td>SPJ2-37</td></tr><tr><td>0007</td><td>SPJ2-55</td></tr><tr><td>0008</td><td>SPJ2-75</td></tr><tr><td>0009</td><td>SPJ2-110/110C</td></tr></table></td><td>0000 to FFFF
HEX setting</td><td>0000</td></tr>
<tr><td>3240
(PR)</td><td>SP040</td><td>MTYP</td><td>Motor type</td><td>This is valid when SP034 (SFNC2) bit 0 is set to 0.
Refer to the following standard motors, and set the applicable motor number.
<table><tr><th>Parameter setting</th><th>Motor type</th><th>Maximum speed</th><th>Corresponding amplifier</th></tr><tr><td>1000</td><td></td><td></td><td></td></tr><tr><td>1001</td><td>SJ-P0.2A</td><td>10000 r/min</td><td>SPJ2-02</td></tr><tr><td>1002</td><td>SJ-P0.4A</td><td>10000 r/min</td><td>SPJ2-04</td></tr><tr><td>1003</td><td>SJ-P0.75A</td><td>10000 r/min</td><td>SPJ2-075</td></tr><tr><td>1004</td><td>SJ-P1.5A</td><td>10000 r/min</td><td>SPJ2-15</td></tr><tr><td>1005</td><td>SJ-P2.2A</td><td>8000 r/min</td><td>SPJ2-22</td></tr><tr><td>1006</td><td>SJ-P3.7A</td><td>8000 r/min</td><td>SPJ2-37</td></tr><tr><td>1007</td><td>SJ-PF5.5-01</td><td>8000 r/min</td><td>SPJ2-55</td></tr><tr><td>1008</td><td>SJ-PF7.5-01</td><td>8000 r/min</td><td>SPJ2-75</td></tr><tr><td>1009</td><td>SJ-PF11-01</td><td>6000 r/min</td><td>SPJ2-110/110C</td></tr></table></td><td>0000 to FFFF
HEX setting</td><td>0000</td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3241
(PR)</td><td>SP041</td><td>PTYP</td><td>Power supply type</td><td>When this unit is a signal connection axis with power supply unit, set this parameter.
Set "0" for this parameter for the unit which is not a signal connection axis.
Select a value from the following table according to the regenerative resistance being used.
<table>
<tr><th>Setting value</th><th>Regenerative resistance type</th><th>Resistance value (Ω)</th><th>Capacity (W)</th></tr>
<tr><td>0000</td><td>–</td><td>–</td><td>–</td></tr>
<tr><td>2000</td><td>Not connected</td><td>–</td><td>–</td></tr>
<tr><td>2100</td><td>FCUA-RB04</td><td>200</td><td>60</td></tr>
<tr><td>2200</td><td>FCUA-RB075</td><td>100</td><td>80</td></tr>
<tr><td>2300</td><td>FCUA-RB15</td><td>60</td><td>120</td></tr>
<tr><td>2400</td><td>FCUA-RB22</td><td>40</td><td>155</td></tr>
<tr><td>2500</td><td>FCUA-RB37</td><td>25</td><td>185</td></tr>
<tr><td>2600</td><td>FCUA-RB55</td><td>20</td><td>340</td></tr>
<tr><td>2700</td><td>FCUA-RB75/2</td><td>30/15</td><td>340/680</td></tr>
<tr><td>2800</td><td>R–UNIT–1</td><td>30</td><td>700</td></tr>
<tr><td>2900</td><td>R–UNIT–2</td><td>15</td><td>700</td></tr>
<tr><td>2A00</td><td>R–UNIT–3</td><td>15</td><td>2100</td></tr>
<tr><td>2B00</td><td>R–UNIT–4</td><td>10</td><td>2100</td></tr>
<tr><td>2C00</td><td>R–UNIT–5</td><td>10</td><td>3100</td></tr>
</table>
(Note 1) This setting is used when using one FCUA-RB75/2 and when using two in parallel.</td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
<tr><td>3242
(PR)</td><td>SP042</td><td></td><td></td><td>Not used. Set to “0”.</td><td>0</td><td>0</td></tr>
<tr><td>3243
(PR)</td><td>SP043</td><td></td><td></td><td>Not used. Set to “0”.</td><td>0</td><td>0</td></tr>
<tr><td>3244
(PR)</td><td>SP044</td><td>TRANS</td><td>NC communi-cation frequency</td><td>Set a frequency of data communication with NC.</td><td>0 to 32767</td><td>Standard:
0
Special:
1028</td></tr>
<tr><td>3245</td><td>SP045</td><td></td><td></td><td>Not used. Set to “0”.</td><td>0</td><td>0</td></tr>
<tr><td>3246
(PR)</td><td>SP046</td><td>CSN2</td><td>Speed command dual cushion</td><td>For an acceleration/deceleration time constant defined in SP019 (CSN1) , this parameter is used to provide smooth movement only at the start of acceleration/deceleration.
As the value of this parameter is smaller, it moves smoother but the acceleration/deceleration time becomes longer.
To make this parameter invalid, set "0".</td><td>0 to 1000</td><td>0</td></tr>
<tr><td>3247
(PR)</td><td>SP047</td><td>SDTR</td><td>Speed detection reset value</td><td>Set the reset hysteresis width for a speed detection set value defined in SP020 (SDTS).</td><td>0 to 1000
(r/min)</td><td>30</td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
3248 (PR)	SP048	SUT	Speed reach range	Set the speed deviation rate with respect to the commanded speed for output of the speed reach signal.	0 to 100 (%)	15
3249	SP049	TLM2	Torque limit 2	Set the torque limit rate for the torque limit signal 010.	1 to 120 (%)	20
3250	SP050	TLM3	Torque limit 3	Set the torque limit rate for the torque limit signal 011.	1 to 120 (%)	30
3251	SP051	TLM4	Torque limit 4	Set the torque limit rate for the torque limit signal 100.	1 to 120 (%)	40
3252	SP052	TLM5	Torque limit 5	Set the torque limit rate for the torque limit signal 101.	1 to 120 (%)	50
3253	SP053	TLM6	Torque limit 6	Set the torque limit rate for the torque limit signal 110.	1 to 120 (%)	60
3254	SP054	TLM7	Torque limit 7	Set the torque limit rate for the torque limit signal 111.	1 to 120 (%)	70
3255 (PR)	SP055	SETM	Excessive speed deviation timer	Set the timer value until the excessive speed deviation alarm is output. The value of this parameter should be longer than the acceleration/deceleration time.	0 to 60 (s)	12
3256	SP056	PYVR	Variable excitation (min value)	Set the minimum value of the variable excitation rate. Select a smaller value when gear noise is too high. However, a larger value is effective for impact response.	0 to 100 (%)	50
3257 (PR)	SP057	STOD	Fixed control constant	Set by Mitsubishi. Set "0" unless designated in particular.	0	0
3258 to 3262	SP058 to SP062			Not used. Set to "0".	0	0
3263 (PR)	SP063	OLT	Overload alarm detection time	Set the time constant for detection of the motor overload alarm.	0 to 1000 (s)	60
3264 (PR)	SP064	OLL	Overload alarm detection level	Set the detection level of the motor overload alarm.	0 to 120 (%)	110
3265 (PR)	SP065	VCGN1	Target value of variable speed loop proportional gain	Set the magnification of speed loop proportional gain with respect to SP022 (VGNP1) at the maximum motor speed defined in SP017 (TSP).	0 to 100 (%)	100
3266 (PR)	SP066	VCSN1	Change starting speed of variable speed loop proportional gain	Set the speed for starting change of speed loop proportional gain.  	0 to 32767 (r/min)	0

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3267 (PR)</td><td>SP067</td><td>VIGWA</td><td>Change starting speed of variable current loop gain</td><td>Set the speed for starting change of current loop gain.</td><td>0 to 32767 (r/min)</td><td>0</td></tr>
<tr><td>3268 (PR)</td><td>SP068</td><td>VIGWB</td><td>Change ending speed of variable current loop gain</td><td>Set the speed for ending change of current loop gain.</td><td>0 to 32767 (r/min)</td><td>0</td></tr>
<tr><td>3269 (PR)</td><td>SP069</td><td>VIGN</td><td>Target value of variable current loop gain</td><td>Set the magnification of current loop gain (torque component and excitation component) for a change ending speed defined in SP068 (VIGWB).
When this parameter is set to "0", the magnification is 1.


<table>
<tr><th>SP017 (TSP) Maximum motor speed</th><th>SP067 (VIGWA)</th><th>SP068 (VIGWB)</th><th>SP069 (VIGN)</th></tr>
<tr><td>0 to 6000</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>6001 to 8000</td><td>5000</td><td>8000</td><td>45</td></tr>
<tr><td>8001 or more</td><td>5000</td><td>10000</td><td>64</td></tr>
</table></td><td>0 to 32767 (1/16 -fold)</td><td>0</td></tr>
<tr><td>3270</td><td>SP070</td><td></td><td></td><td>Not used. Set to “0”.</td><td>0</td><td>0</td></tr>
<tr><td>3271 (PR)</td><td>SP071</td><td>VR2WA</td><td rowspan="5">Fixed control constant</td><td rowspan="5">Set by Mitsubishi.
Set "0" unless designated in particular.</td><td rowspan="5">0</td><td rowspan="5">0</td></tr>
<tr><td>3272 (PR)</td><td>SP072</td><td>VR2WB</td></tr>
<tr><td>3273 (PR)</td><td>SP073</td><td>VR2GN</td></tr>
<tr><td>3274 (PR)</td><td>SP074</td><td>IGDEC</td></tr>
<tr><td>3275</td><td>SP075</td><td>R2KWS</td></tr>
</table>

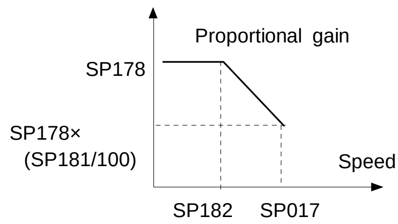
No.	Items			Details	Setting range	Standard setting
3276	SP076			Not used. Set to “0”.	0	0
3277	SP077	TDSL	Fixed control constant	Set by Mitsubishi. Set "0" unless designated in particular.	0	0
3278 (PR)	SP078	FPWM				
3279 (PR)	SP079	ILMT				
3280	SP080					
3281	SP081	LMCA				
3282	SP082	LMCB				
3283 to 3286	SP083 to SP086			Not used. Set to "0".	0	0
3287 (PR)	SP087	DIQM	Target value of variable torque limit magnification at deceleration	Set the minimum value of variable torque limit at deceleration.	0 to 150 (%)	75
3288 (PR)	SP088	DIQN	Speed for starting change of variable torque limit magnifica-tion at deceleration	Set the speed for starting change of torque limit value at deceleration.  	0 to 32767 (r/min)	3000
3289 to 3292	SP089 to SP092			Not used. Set to "0".	0	0
3293 (PR)	SP093	ORE	Fixed control constant	Set by Mitsubishi. Set "0" unless designated in particular.	0	0
3294 (PR)	SP094			Not used. Set to “0”.	0	0
3295 (PR)	SP095	VFAV	Fixed control constant	Set by Mitsubishi. Set "0" unless designated in particular.	0	0

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3296
(PR)</td><td>SP096</td><td>EGAR</td><td>Encoder gear ratio</td><td>Set the gear ratio between the spindle end and the encoder end (except for the motor-built-in encoder) as indicated below.
<table>
<tr><th>Setting value</th><th>Gear ratio (deceleration)</th><th>Setting value</th><th>Gear ratio (Acceleration)</th></tr>
<tr><td>0</td><td>1 : 1</td><td>–1</td><td>1 : 2</td></tr>
<tr><td>1</td><td>1 : 1/2</td><td>–2</td><td>1 : 4</td></tr>
<tr><td>2</td><td>1 : 1/4</td><td>–3</td><td>1 : 3</td></tr>
<tr><td>3</td><td>1 : 1/8</td><td></td><td></td></tr>
<tr><td>4</td><td>1 : 1/16</td><td></td><td></td></tr>
</table></td><td>–3 to 4</td><td>0</td></tr>
<tr><td>3297
(PR)</td><td>SP097</td><td>SPECO</td><td>Orientation specifica-
tion</td><td>Set the orientation specifications in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>tlet</td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td></td><td>fdir</td><td></td><td>pyfx</td><td>dmin</td><td>odi2</td><td>odi1</td></tr>
</table>
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>odi1</td><td colspan="2" rowspan="2">Orientation rotation direction
00: Previous (the direction in which the motor has so far rotated under speed control)
01: Forward rotation
10: Backward rotation
11: Prohibited (Same as setting value = 10)</td></tr>
<tr><td>1</td><td>odi2</td></tr>
<tr><td>2</td><td>dmin</td><td>Dummy in-position invalid</td><td>Dummy in-position valid</td></tr>
<tr><td>3</td><td>pyfx</td><td>Excitation min. (50%) during orientation servo lock invalid</td><td>Excitation min. (50%) during orientation servo lock valid</td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td>fdir</td><td>Encoder detector polarity: +</td><td>Encoder detector polarity: –</td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td>tlet</td><td>Turret indexing invalid</td><td>Turret indexing valid</td></tr>
<tr><td>9</td><td></td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td></td><td></td><td></td></tr>
<tr><td>E</td><td></td><td></td><td></td></tr>
<tr><td>F</td><td></td><td></td><td></td></tr>
</table></td><td>0000 to FFFF
HEX setting</td><td>0000</td></tr>
<tr><td>3298
(PR)</td><td>SP098</td><td>VGOP</td><td>Speed loop gain propor-
tional term in orientation mode</td><td>Set the speed loop proportional gain in orientation mode.
When the gain is increased, rigidity is improved in the orientation stop but vibration and sound become larger.</td><td>0 to 1000
(1/s)</td><td></td></tr>
<tr><td>3299
(PR)</td><td>SP099</td><td>VGOI</td><td>Orientation mode speed loop gain integral term</td><td>Set the speed loop integral gain in orientation mode.</td><td>0 to 1000
(0.1 1/s)</td><td>60</td></tr>
<tr><td>3300
(PR)</td><td>SP100</td><td>VGOD</td><td>Orientation mode speed loop gain delay advance term</td><td>Set the a loop gain delay advance gain in orientation mode.
When this parameter is set to "0", PI control is exercised.</td><td>0 to 1000
(0.1 1/s)</td><td>15</td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
3301 (PR)	SP101	DINP	Orientation advance in-position width	When using the orientation in-position advance function, set the in-position width that is larger than the normal in-position width defined in SP004 (OINP).	1 to 2880 (1/16°)	16
3302 (PR)	SP102	OODR	Excessive error value in orientation mode	Set the excessive error width in orientation mode.	1 to 32767 (1/4 pulse) (1 pulse= 0.088°)	32767
3303 (PR)	SP103	FTM	Index positioning completion OFF time timer	Set the time for forcedly turn OFF the index positioning completion signal (different from the orientation completion signal) after the leading edge of the indexing start signal.	1 to 10000 (ms)	200
3304 (PR)	SP104	TLOR	Torque limit value for orientation servo locking	Set the torque limit value for orientation in-position output. If the external torque limit signal is input the torque limit value set by this parameter is made invalid.	1 to 120 (%)	100
3305 (PR)	SP105	IQG0	Current loop gain magnifica-tion 1 in orientation mode	Set the magnification for current loop gain (torque component) at orientation completion.	1 to 1000 (%)	100
3306	SP106	IDG0	Current loop gain magnifica-tion 2 in orientation mode	Set the magnification for current loop gain (excitation component) at orientation completion.	1 to 1000 (%)	100
3307	SP107	CSP2	Deceleration rate 2 in orientation mode	Set the deceleration rate in orientation mode corresponding to the gear 001. When this parameter is set to "0", same as SP006 (CSP).	0 to 1000	0
3308	SP108	CSP3	Deceleration rate 3 in orientation mode	Set the deceleration rate in orientation mode corresponding to the gear 010. When this parameter is set to "0", same as SP006 (CSP).	0 to 1000	0
3309 (PR)	SP109	CSP4	Deceleration rate 4 in orientation mode	Set the deceleration rate in orientation mode corresponding to the gear 011. When this parameter is set to "0", same as SP006 (CSP).	0 to 1000	0
3310 (PR)	SP110	WCML	Turret index command magnifica-tion	The integer magnification (gear ratio 1 : N) for the index position command (0 to 359) is set.	0 to 32767 (fold)	0
3311	SP111	WDEL	Turret index deceleration magnifica-tion	The magnification for the orientation deceleration rate is set using 256 as 1.	0 to 32767 (1/256 -fold)	0
3312	SP112	WCLP	Turret index clamp speed	The max. speed during indexing is set. This becomes the max. speed of the motor when set to "0".	0 to 32767 (r/min)	0

No.	Items			Details	Setting range	Standard setting
3313 (PR)	SP113	WINP	Turret index in-position width	The position error range is set in which an orientation (indexing) completed signal is output during turret indexing. This becomes the same as SP004 (OINP) when set to "0".	0 to 32767 (1/16°)	0
3314	SP114	OPER	Orientation pulse miss check value	An alarm "5C" will occur if the pulse miss value in the orientation stop exceed this setting value. (Note that this is invalid when set to "0".) In this parameter, set the value to fulfill the following conditions. SP114 setting value > 1.5 × SP004 (orientation in-position width)	0 to 32767 (360°/4096)	0
3315	SP115	OSP2	Orientation changeover speed limit value 2	When the door interlock spindle speed clamp signal is ON, this setting is used instead of OSP(SP005), CZRN(SP149) and TZRN(SP214). (Note that SP149 and SP214 are used only for the M65V.)	0 to 32767 (r/min)	0
3316	SP116	OPYVR	Fixed control constants	Set by Mitsubishi. Set "0" unless designated in particular.	0	0
3317	SP117	ORUT				
3318	SP118	ORCT	Number of orientation retry times	Set the number of times to retry when an orientation or feedback error occurs. The warning (A9) is issued while retrying orientation, and an alarm (5C) is issued when the set number of times is exceeded.	0 to 100 (time)	0
3319 to 3376	SP119 to SP176			Not used. Set to “0”.	0	0

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3377
(PR)</td><td>SP177</td><td>SPECS</td><td>Spindle synchronous specifica-tions</td><td>Set the spindle synchronous specifications in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td></td><td></td><td>odx8</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td></td><td>fdir</td><td></td><td>pyfx</td><td></td><td></td><td>fclx</td></tr>
</table>
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>fclx</td><td>Closed loop</td><td>Semi-closed loop</td></tr>
<tr><td>1</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td></td><td></td><td></td></tr>
<tr><td>3</td><td>pyfx</td><td>Normal excitation</td><td>Position loop excitation fixed (strong)</td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td>fdir</td><td>Position detector polarity (+)</td><td>Position detector polarity (–)</td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td></td><td></td><td></td></tr>
<tr><td>9</td><td></td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td>odx8</td><td>Magnification of excessive error width × 8 times invalid</td><td>Magnification of excessive error width × 8 times valid</td></tr>
<tr><td>E</td><td></td><td></td><td></td></tr>
<tr><td>F</td><td></td><td></td><td></td></tr>
</table></td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
<tr><td>3378
(PR)</td><td>SP178</td><td>VGSP</td><td>Spindle synchronous speed loop gain propor-tional term</td><td>Set the speed loop proportional gain in spindle synchronization mode.</td><td>0 to 1000
(1/s)</td><td>63</td></tr>
<tr><td>3379
(PR)</td><td>SP179</td><td>VGSI</td><td>Spindle synchronous speed loop gain integral term</td><td>Set the speed loop integral gain in spindle synchronization mode.</td><td>0 to 1000
(0.1 1/s)</td><td>60</td></tr>
<tr><td>3380
(PR)</td><td>SP180</td><td>VGSD</td><td>Spindle synchronous speed loop gain delay advance term</td><td>Set the speed loop delay advance gain in spindle synchronization mode.
When this parameter is set to "0", PI control is exercised.</td><td>0 to 1000
(0.1 1/s)</td><td>15</td></tr>
<tr><td>3381
(PR)</td><td>SP181</td><td>VCGS</td><td>Target value of variable speed loop proportional gain at spindle synchroniza-tion</td><td>Set the magnification of speed loop proportional gain with respect to SP178 (VGSP) at the maximum speed defined in SP017 (TSP) at spindle synchronization.</td><td>0 to 100
(%)</td><td>100</td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
3382 (PR)	SP182	VCSS	Change starting speed of variable speed loop proportional gain at spindle synchroniza-tion	Set the speed for starting change of speed loop proportional gain at spindle synchronization.  	0 to 32767 (r/min)	0
3383	SP183	SYNV	Sync match-ing speed at spindle syn-chronization	For changeover from the speed loop to the position loop at spindle synchronization, set a speed command error range for output of the sync speed matching signal.	0 to 1000 (r/min)	20
3384 (PR)	SP184	FFCS	Acceleration rate feed forward gain at spindle synchronization	Set the acceleration rate feed forward gain at spindle synchronization. This parameter is used only with the SPJ2.	0 to 1000 (%)	0
3385	SP185	SINP	Spindle sync in-position width	Set the position error range for output of the in-position signal at spindle synchronization.	1 to 2880 (1/16°)	16
3386 (PR)	SP186	SODR	Excessive error width at spindle synchronization	Set the excessive error width at spindle synchronization.	1 to 32767 (1/4 pulse) (1 pulse =0.088°)	32767
3387 (PR)	SP187	IQGS	Current loop gain magnifi-cation1 at spindle syn-chronization	Set the magnification of current loop gain (torque component) at spindle synchronization.	1 to 1000 (%)	100
3388 (PR)	SP188	IDGS	Current loop gain magnifi-cation 2 at spindle syn-chronization	Set the magnification of current loop gain (excitation component) at spindle synchronization.	1 to 1000 (%)	100
3389 to 3392	SP189 to SP192			Not used. Set to "0".	0	0

No.	Items			Details	Setting range	Standard setting
3393 (PR)	SP193	SPECT	Synchronous tapping specifications	Set the synchronous tapping specifications in bit units. (see bit table below)	0000 to FFFF HEX setting	0000
3394 (PR)	SP194	VGTP	Synchronous tapping speed loop gain proportional term	Set the speed loop proportional gain in synchronous tapping mode.	0 to 1000 (1/s)	63
3395 (PR)	SP195	VGTI	Synchronous tapping speed loop gain integral term	Set the speed loop integral gain in synchronous tapping mode.	0 to1000 (0.1 1/s)	60
3396 (PR)	SP196	VGTD	Synchronous tapping speed loop gain delay advance term	Set the speed loop delay advance gain in synchronous tapping mode. When this parameter is set to "0", PI control is exercised.	0 to1000 (0.1 1/s)	15
3397	SP197			Not used. Set to "0".	0	0
3398 (PR)	SP198	VCGT	Target value of variable speed loop proportional gain at synchronous tapping	Set the magnification of speed loop proportional gain with respect to SP194 (VGTP) at the maximum motor speed defined in SP017 (TSP) at synchronous tapping.	0 to 100 (%)	100

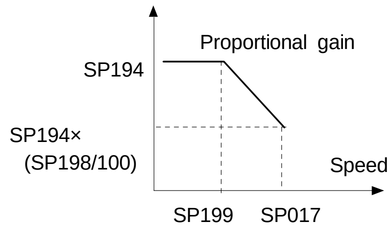
SP193 (SPECT) bits:

F	E	D	C	B	A	9	8
zrtn	ptyp	od8x					

7	6	5	4	3	2	1	0
		fdir	cdir	pyfx			fclx

(Note) Always set "0" for the empty bits.

bit	Name	Meaning when set to 0	Meaning when set to 1
0	fclx	Closed loop	Semi-closed loop
1			
2			
3	pyfx	Normal excitation	Position loop excitation fixed (strong)
4	cdir	Command polarity (+)	Command polarity (–)
5	fdir	Position detector polarity (+)	Position detector polarity (–)
6			
7			
8			
9			
A			
B			
C			
D	od8x	Magnification of excessive error width × 8 times invalid	Magnification of excessive error width × 8 times valid
E	ptyp	Position control switch type: After zero point return	Position control switch type: After deceleration stop
F	zrtn	Zero point return direction: CCW	Zero point return direction: CW

No.	Items			Details	Setting range	Standard setting
3399 (PR)	SP199	VCST	Change starting speed of variable speed loop proportional gain at synchronous tapping	Set the speed for starting change of speed loop proportional gain at synchronous tapping. 	0 to 32767 (r/min)	0
3400 (PR)	SP200	FFC1	Synchronous tapping acceleration feed forward gain (gear 1)	Set the acceleration feed-forward gain for selection of gear 000 at synchronous tapping. This parameter should be used when an error of relative position to Z-axis servo is large.	0 to 1000 (%)	0
3401 (PR)	SP201	FFC2	Synchronous tapping acceleration feed forward gain (gear 2)	Set the acceleration feed-forward gain for selection of gear 001 at synchronous tapping.	0 to 1000 (%)	0
3402 (PR)	SP202	FFC3	Synchronous tapping acceleration feed forward gain (gear 3)	Set the acceleration feed-forward gain for selection of gear 010 at synchronous tapping.	0 to 1000 (%)	0
3403 (PR)	SP203	FFC4	Synchronous tapping acceleration feed forward gain (gear 4)	Set the acceleration feed-forward gain for selection of gear 011 at synchronous tapping.	0 to 1000 (%)	0
3404 to 3413	SP204 to SP213			Not used. Set to "0".	0	0
3414	SP214	TZRN	Synchronous tapping zero point return speed	This parameter is valid when SP193 (SPECT) bitE is set to "0". Set the zero point return speed used when the speed loop changes to the position loop.	0 to 500 (r/min)	50
3415	SP215	TPDT	Synchronous tapping zero point return deceleration rate	This parameter is valid when SP193 (SPECT) bitE is set to "0". Set the deceleration rate where the machine starts to decelerate when it returns to the target stop point during synchronous tapping zero point return. When the machine tends to overshoot at the stop point set a smaller value.	1 to 10000 (pulse)	1
3416	SP216	TPST	Synchronous tapping zero point return shift amount	This parameter is valid when SP193 (SPECT) bitE is set to "0". Set the synchronous tapping zero point position.	0 to 4095	0

No.	Items			Details	Setting range	Standard setting
3417	SP217	TINP	Synchronous tapping in-position width	Set the position error range in which in-position signal is output during synchronize tapping.	1 to 2880 (1/16°)	16
3418 (PR)	SP218	TODR	Excessive error width at synchronous tapping	Set the excessive error width at synchronous tapping.	1 to 32767 (pulse) (1 pulse =0.088°)	32767
3419 (PR)	SP219	IQGT	Current loop gain magnification 1 at synchronous tapping	Set the magnification of current loop gain (torque component) during synchronous tapping.	1 to 1000 (%)	100
3420 (PR)	SP220	IDGT	Current loop gain magnification 2 at synchronous tapping	Set the magnification of current loop gain (excitation component) during synchronous tapping.	1 to 1000 (%)	100
3421 to 3424	SP221 to SP224			Not used. Set to "0".	0	0
3425	SP225	OXKPH	Fixed control constant	Set by Mitsubishi. Set "0" unless designated in particular.	0	0
3426	SP226	OXKPL				
3427	SP227	OXVKP				
3428	SP228	OXVKI				
3429	SP229	OXSFT				
3430	SP230					
3431	SP231					
3432	SP232					
3433 (PR)	SP233	JL	Disturbance observer general inertia scale	Set the ratio of the motor inertia + load inertia and motor inertia. $\text{Setting value} = \dfrac{\text{Motor inertia + load inertia}}{\text{Motor inertia}} \times 100$ (Normally, set "100" or more. When less than "50" is set, the setting will be invalid.)	0 to 5000 (%)	0

No.	Items			Details	Setting range	Standard setting
3434 (PR)	SP234	OBS1	Disturbance observer low path filter frequency	Set the frequency of the low path filter for when the disturbance observer is valid. Setting (1/s) = 2πf f: Approx. 1.5 times the disturbance frequency	0 to 1000 (1/s)	0
3435 (PR)	SP235	OBS2	Disturbance observer gain	Set the gain for the disturbance observer.	0 to 500 (%)	0
3436 to 3452	SP236 to SP252			Not used. Set to "0".	0	0
3453	SP253	DA1NO	D/A output channel 1 data number	Set the output data number for channel 1 of the D/A output function. When the setting value is "0", the output is speedometer. Refer to "8.5.1 D/A OUTPUT SPESIFICATIONS".	–32768 to 32767	0
3454	SP254	DA2NO	D/A output channel 2 data number	Set the output data number for channel 2 of the D/A output function. When the setting value is "0", the output is load meter. Refer to "8.5.1 D/A OUTPUT SPESIFICATIONS ".	–32768 to 32767	0
3455	SP255	DA1MPY	DA output channel 1 magnifica-tion	Set the data magnification for channel 1 of the D/A output function. The output magnification is (setting value)/256. When set to "0", the output magnification becomes 1-fold, in the same manner as when "256" is set. Refer to "8.5.1 D/A OUTPUT SPESIFICATIONS ".	–32768 to 32767 (1/256-fold)	0
3456	SP256	DA2MPY	DA output channel 2 magnifica-tion	Set the data magnification for channel 2 of the D/A output function. The output magnification is (setting value)/256. When set to "0", the output magnification becomes 1-fold, in the same manner as when "256" is set. Refer to "8.5.1 D/A OUTPUT SPESIFICATIONS ".	–32768 to 32767 (1/256-fold)	0

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3457
(PR)
to
3520
(PR)</td><td>SP257

to
SP320</td><td>RPM

BSD</td><td>Motor constant (H coil)</td><td>This parameter is valid only in the following two conditional cases:

(a) In case that SP034 (SFNC2) bit0=1 and SP034 (SFNC2) bit2=0
Set the motor constants when using a special motor, not described in the SP040 (MTYP) explanation and when not using the coil changeover motor.
(b) In case that SP034 (SFNC2) bit0=1 and SP034 (SFNC2) bit2=1
Set the motor constant of the H coil of the coil changeover motor.

(Note) It is not allowed for the user to change the setting.</td><td>0000 to
FFFF
HEX setting</td><td>0000</td></tr>
<tr><td>3521
(PR)
to
3584
(PR)</td><td>SP321

to
SP384</td><td>RPML

BSDL</td><td>Motor constant (L coil)</td><td>This parameter is valid only in the following conditional case:
(a) In case that SP034 (SFNC2) bit0=1 and SP034 (SFNC2) bit2=1
Set the motor constant of the L coil of the coil changeover motor.

(Note) It is not allowed for the user to change the setting.</td><td>0000 to
FFFF
HEX setting</td><td>0000</td></tr>
</table>

8.3 MDS-B-SP/SPH, MDS-C1-SP/SPH

The spindle parameter setting and display method will differ according to the NC being used, so refer to Instruction Manual for each NC and the following spindles.

MELDAS AC Servo and Spindle MDS-A Series MDS-B Series Specifications Manual . BNP-B3759
MELDAS AC Servo and Spindle MDS-C1 Series Specifications Manual BNP-C3000

For parameters marked with a (PR) in the tables, turn the NC power OFF after setting. The parameters will be valid after the power is turned ON again.
The "fixed control constants" and "fixed control bits" in this section are set by Mitsubishi.

CAUTION

- Do not make remarkable adjustments or changes of the parameters as the operation may become unstable.
- In the explanation on bits, set all bits not used, including blank bits, to “0”.

No.	Items			Details	Setting range	Standard setting
3201	SP001	PGM	Magnetic sensor and motor built-in encoder orientation position loop gain	As the set value is larger, the orientation time becomes shorter and servo rigidity is increased. However, vibration is increased and the machine becomes likely to overshoot.	0 to 1000 (0.1 1/s)	100
3202	SP002	PGE	Encoder orientation position loop gain	As the set value is larger, the orientation time becomes shorter and servo rigidity is increased. However, vibration is increased and the machine becomes likely to overshoot.	0 to 1000 (0.1 1/s)	100
3203	SP003	PGC0	C-axis non-cutting position loop gain	Set the position loop gain in C-axis non-cutting mode. During non-cutting (rapid traverse, etc.) with the C axis control, this position loop gain setting is valid.	1 to 100 (1/s)	15
3204	SP004	OINP	Orientation in-position width	Set the position error range in which an orientation completion signal is output.	1 to 2880 (1/16 °)	16
3205 (PR)	SP005	OSP	Orientation mode changing speed limit value	Set the motor speed limit value to be used when the speed loop is changed to the position loop in orientation mode. When this parameter is set to "0", SP017 (TSP) becomes the limit value.	0 to 32767 (r/min)	0
3206	SP006	CSP	Orientation mode deceleration rate	As the set value is larger, the orientation time becomes shorter. However, the machine becomes likely to overshoot.	1 to 1000	20

No.	Items			Details	Setting range	Standard setting
3207	SP007	OPST	In-position shift amount for orientation	Set the stop position for orientation. (i)Motor built-in encoder, encoder: Set the value by dividing 360° by 4096. (ii)Magnetic sensor: Divide –5° to +5° by 1024 and put 0° for 0.	(i) 0 to 4095 (ii) –512 to 512	0
3208	SP008			Not used. Set to "0".	0	0
3209	SP009	PGT	Synchronized tapping Position loop gain	Set the spindle position loop gain in synchronized tapping mode.	1 to 100 (1/s)	15
3210	SP010	PGS	Spindle synchronous position loop gain	Set the spindle position loop gain in spindle synchronization mode.	1 to 100 (1/s)	15
3211 to 3216	SP011 to SP016			Use not possible.	0	0
3217 (PR)	SP017	TSP	Maximum motor speed	Set the maximum motor speed of the spindle.	1 to 32767 (r/min)	6000
3218 (PR)	SP018	ZSP	Motor zero speed	Set the motor speed for which zero-speed output is performed.	1 to 1000 (r/min)	50
3219 (PR)	SP019	CSN1	Speed cushion 1	Set the time constant for a speed command from "0" to the maximum speed. (This parameter is invalid in position loop mode.)	1 to 32767 (10ms)	30
3220 (PR)	SP020	SDTS	Speed detection set value	Set the motor speed so for which speed detection output is performed. Usually, the setting value is 10% of SP017 (TSP).	0 to 32767 (r/min)	600
3221	SP021	TLM1	Torque limit 1	Set the torque limit rate for torque limit signal 001.	0 to 120 (%)	10
3222 (PR)	SP022	VGNP1	Speed loop gain proportional term under speed control	Set the speed loop proportional gain in speed control mode. When the gain is increased, response is improved but vibration and sound become larger.	0 to 1000 (1/s)	63
3223 (PR)	SP023	VGNI1	Speed loop gain integral term under speed control	Set the speed loop integral gain in speed control mode. Usually, set a value in proportion to SP022 (VGNP1).	0 to 1000 (0.1 1/s)	60

No.	Items			Details	Setting range	Standard setting
3224	SP024			Use not possible.	0	0
3225 (PR)	SP025	GRA1	Spindle gear teeth count 1	Set the number of gear teeth of the spindle corresponding to gear 000.	1 to 32767	1
3226 (PR)	SP026	GRA2	Spindle gear teeth count 2	Set the number of gear teeth of the spindle corresponding to gear 001.	1 to 32767	1
3227 (PR)	SP027	GRA3	Spindle gear teeth count 3	Set the number of gear teeth of the spindle corresponding to gear 010.	1 to 32767	1
3228 (PR)	SP028	GRA4	Spindle gear teeth count 4	Set the number of gear teeth of the spindle corresponding to gear 011.	1 to 32767	1
3229 (PR)	SP029	GRB1	Motor shaft gear teeth count 1	Set the number of gear teeth of the motor shaft corresponding to gear 000.	1 to 32767	1
3230 (PR)	SP030	GRB2	Motor shaft gear teeth count 2	Set the number of gear teeth of the motor shaft corresponding to gear 001.	1 to 32767	1
3231 (PR)	SP031	GRB3	Motor shaft gear teeth count 3	Set the number of gear teeth of the motor shaft corresponding to gear 010.	1 to 32767	1
3232 (PR)	SP032	GRB4	Motor shaft gear teeth count 4	Set the number of gear teeth of the motor shaft corresponding to gear 011.	1 to 32767	1

No.	Items			Details	Setting range	Standard setting
3233 (PR)	SP033	SFNC1	Spindle function 1	Set the spindle function 1 in bit units. F: poff, E: hzs, D: (empty), C: ront, B: (empty), A: (empty), 9: pycal, 8: pychg 7: pyst, 6: pyoff, 5: (empty), 4: (empty), 3: (empty), 2: sftk, 1: dflt, 0: 1a2m **(Note)** Always set "0" for the empty bits.	0000 to FFFF HEX setting	0000

bit	Name	Meaning when set to 0	Meaning when set to 1
0	1a2m	1 amplifier 2 motor function: Invalid	1 amplifier 2 motor function: Valid
1	dflt	Default motor: Main	Default motor: Sub
2	sftk	SF-TK card invalid	SF-TK card valid
3			
4			
5			
6	pyoff	This is used by Mitsubishi. Set to "0" unless particularly designated.	
7	pyst		
8	pychg		
9	pycal	(Conventional specifications)	High-speed rate deceleration method valid for minimum excitation rate
A			
B		This is used by Mitsubishi. Set to "0" unless particularly designated.	
C	ront	Normal ready ON	High-speed ready ON
D		This is used by Mitsubishi. Set to "0" unless particularly designated.	
E	hzs	Gate OFF by high-cycle zero speed invalid	Gate OFF by high-cycle zero speed valid
F	poff	Contactor hold at NC power OFF invalid	Contactor hold at NC power OFF valid

(Note) When SPH is used, bit 0 and bit 1 will be invalid.

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3234
(PR)</td><td>SP034</td><td>SFNC2</td><td>Spindle function 2</td><td>Set the spindle function 2 in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td></td><td></td><td></td><td>mkc2</td><td>mkch</td><td>invm</td><td>mts1</td></tr>
</table>
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>mts1</td><td>Special motor constant invalid</td><td>Special motor constant setting valid</td></tr>
<tr><td>1</td><td>invm</td><td>A general-purpose motor FV control invalid</td><td>A general-purpose motor FV control valid</td></tr>
<tr><td>2</td><td>mkch</td><td>Coil switch function invalid</td><td>Coil switch function valid</td></tr>
<tr><td>3</td><td>mkc2</td><td>Coil switch specification 2 invalid</td><td>Coil switch specification 2 valid (Note1) (Note2)</td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td></td><td></td><td></td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td></td><td></td><td></td></tr>
<tr><td>9</td><td></td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td></td><td></td><td></td></tr>
<tr><td>E</td><td></td><td></td><td></td></tr>
<tr><td>F</td><td></td><td></td><td></td></tr>
</table>
(Note1) To validate bit3(mkc2), NC side needs to prepare.
(Note2) Always turn the bit2 at the same time to use bit3.</td><td>0000 to
FFFF
HEX setting</td><td>000C</td></tr>
<tr><td>3235
(PR)</td><td>SP035</td><td>SFNC3</td><td>Spindle function 3</td><td>Set the spindle function 3 in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td></td><td></td><td></td><td>lbsd</td><td>hbsd</td><td>lwid</td><td>hwid</td></tr>
</table>
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>hwid</td><td>H-coil wide-range constant output invalid</td><td>H-coil wide-range constant output valid</td></tr>
<tr><td>1</td><td>lwid</td><td>L-coil wide-range constant output invalid</td><td>L-coil wide-range constant output valid</td></tr>
<tr><td>2</td><td>hbsd</td><td>H-coil base slide invalid</td><td>H-coil base slide valid</td></tr>
<tr><td>3</td><td>lbsd</td><td>L-coil base slide invalid</td><td>L-coil base slide valid</td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td></td><td></td><td></td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td></td><td colspan="2" rowspan="8">(Used with SPJ.)</td></tr>
<tr><td>9</td><td></td></tr>
<tr><td>A</td><td></td></tr>
<tr><td>B</td><td></td></tr>
<tr><td>C</td><td></td></tr>
<tr><td>D</td><td></td></tr>
<tr><td>E</td><td></td></tr>
<tr><td>F</td><td></td></tr>
</table></td><td>0000 to
FFFF
HEX setting</td><td>0000</td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3236
(PR)</td><td>SP036</td><td>SFNC4</td><td>Spindle function 4</td><td>Set the spindle function 4 in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>dslm</td><td>dssm</td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td></td><td>enc2</td><td>enc1</td><td>mag2</td><td>mag1</td><td>plg2</td><td>plg1</td></tr>
</table>
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>plg1</td><td>PLG of motor 1 valid</td><td>PLG of motor 1 invalid</td></tr>
<tr><td>1</td><td>plg2</td><td>PLG of motor 2 valid</td><td>PLG of motor 2 invalid</td></tr>
<tr><td>2</td><td>mag1</td><td>MAG of motor 1 valid</td><td>MAG of motor 1 invalid</td></tr>
<tr><td>3</td><td>mag2</td><td>MAG of motor 2 valid</td><td>MAG of motor 2 invalid</td></tr>
<tr><td>4</td><td>enc1</td><td>ENC of motor 1 valid</td><td>ENC of motor 1 invalid</td></tr>
<tr><td>5</td><td>enc2</td><td>ENC of motor 2 valid</td><td>ENC of motor 2 invalid</td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td>dssm</td><td>Speedometer output valid</td><td>Speedometer output invalid</td></tr>
<tr><td>9</td><td>dslm</td><td>Load meter output valid</td><td>Load meter output invalid</td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td></td><td></td><td></td></tr>
<tr><td>E</td><td></td><td></td><td></td></tr>
<tr><td>F</td><td></td><td></td><td></td></tr>
</table></td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
<tr><td>3237
(PR)</td><td>SP037</td><td>SFNC5</td><td>Spindle function 5</td><td>Set the spindle function 5 in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td>splg</td><td>dplg</td><td></td><td></td><td></td><td>noplg</td><td>nsno</td><td>nosg</td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>plgo</td><td>mago</td><td>enco</td></tr>
</table>
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>enco</td><td>Encoder orientation invalid</td><td>Encoder orientation valid</td></tr>
<tr><td>1</td><td>mago</td><td>Magnetic sensor orientation invalid</td><td>Magnetic sensor orientation valid</td></tr>
<tr><td>2</td><td>plgo</td><td>PLG orientation invalid</td><td>PLG orientation valid</td></tr>
<tr><td>3</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td></td><td></td><td></td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td>nosg</td><td>No-signal detection type (Always monitoring)</td><td>Monitoring only in position loop or orientation-mode</td></tr>
<tr><td>9</td><td>nsno</td><td>No-signal detection valid</td><td>No-signal detection invalid</td></tr>
<tr><td>A</td><td>noplg</td><td>Constant monitor of PLG-Z phase no-signal invalid</td><td>Constant monitor of PLG-Z phase no-signal valid</td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td></td><td></td><td></td></tr>
<tr><td>E</td><td>dplg</td><td colspan="2" rowspan="2">This is used by Mitsubishi.
Set to "0" unless particularly designated.</td></tr>
<tr><td>F</td><td>splg</td></tr>
</table>
(Note) For bit0 to 2, do not set two bits or more to "1" at the same time.</td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
3238 (PR)	SP038	SFNC6	Spindle function 6	Set the spindle function 6 in bit units. (see bit tables below) **(Note)** Always set "0" for the empty bits.	0000 to FFFF HEX setting	0000

F	E	D	C	B	A	9	8
oplp	lmx	iqsv	XFzs	dcsn	lmnp	pl80	sdt2

7	6	5	4	3	2	1	0
vfbs	orm	adin	tdn	plg2	pftm		alty

(Note) Always set "0" for the empty bits.

For MDS-C1-SP/SPH

bit	Name	Meaning when set to 0	Meaning when set to 1
0	alty	Deceleration stop during special alarm invalid	Deceleration stop during special alarm valid
1			
2	pftm	Encoder feedback serial communication invalid	Encoder feedback serial communication valid
3	plg2	Semi-closed pulse output signal ×2 invalid	Semi-closed pulse output signal ×2 valid
4			
5	adin	Interpolation during thread cutting invalid	Interpolation during thread cutting valid
6	orm	Orientation start memo invalid	Orientation start memo valid
7	vfbs	This is used by Mitsubishi. Set to "0" unless particularly designated.	
8	sdt2	(Follows SFNC6-bitC setting)	Set output 2 to 2nd speed detection output
9	pl80	MHE90K detector's 180 wave PLG	180 wave PLG other than MHE90K
A	lmnp	This is used by Mitsubishi. Set to "0" unless particularly designated.	
B	dcsn	Dual cushion during acceleration/ deceleration valid	Dual cushion during acceleration/ deceleration invalid
C	XFzs	Set output 2 to MP scale low (L) speed mode	Set output 2 to zero speed output
D	iqsv	This is used by Mitsubishi. Set to "0" unless particularly designated	
E	lmx		
F	oplp	Open loop operation invalid	Open loop operation valid

For MDS-B-SP/SPH

bit	Name	Meaning when set to 0	Meaning when set to 1
0	alty	Deceleration stop during special alarm invalid	Deceleration stop during special alarm valid
1			
2	pftm	Encoder feedback serial communication invalid	Encoder feedback serial communication valid
3	plg2	Semi-closed pulse output signal ×2 invalid	Semi-closed pulse output signal ×2 valid
4	tdn	Fixed control bit	
5	adin		
6	orm	Orientation start memo invalid	Orientation start memo valid
7	vfbs	Fixed control bit	
8	sdt2		
9	pl80		
A	lmnp		
B	dcsn		
C	XFzs		
D	iqsv		
E	lmx		
F	oplp	Open loop operation invalid	Open loop operation valid

No.	Items			Details	Setting range	Standard setting
3239 (PR)	SP039	ATYP	Amplifier type	Set the amplifier type. Set each amplifier type or "0"	0000 to FFFF HEX setting	0000

Parameter setting	Amplifier type
0000	——
0001	SP-075
0002	SP-15
0003	SP-22
0004	SP-37
0005	SP-55
0006	SP-75
0007	SP-110
0008	SP-150
0009	SP-185
000A	SP-220
000B	SP-260
000C	SP-300
000D	SP (H)-370
000E	SP (H)-450
000F	SP-04
0010	SP-550

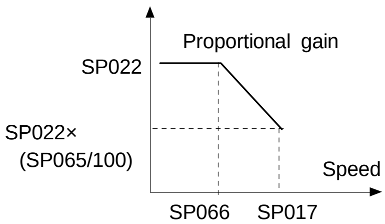
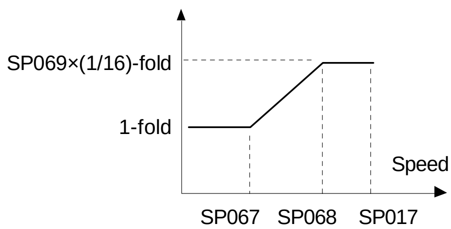
<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3240
(PR)</td><td>SP040</td><td>MTYP</td><td>Motor type</td><td>This parameter is valid when SP034 (SFNC2) bit0 is set to "0".
Set the appropriate motor number from the standard motors listed below.</td><td>0000 to
FFFF
HEX
setting</td><td>0000</td></tr>
</table>

Parameter setting	Motor type	Maximum speed	Corre-sponding amplifier
0000			
0001	SJ-2.2A	10000 r/min	SP-22
0002	SJ-3.7A	10000 r/min	SP-37
0003	SJ-5.5A	8000 r/min	SP-55
0004	SJ-7.5A	8000 r/min	SP-75
0005	SJ-11A	6000 r/min	SP-110
0006	SJ-15A	6000 r/min	SP-150
0007	SJ-18.5A	6000 r/min	SP-185
0008	SJ-22A	4500 r/min	SP-220
0009	SJ-26A	4500 r/min	SP-260
000A	SJ-30A	4500 r/min	SP-300
000B			
000C			
000D			
000E			
000F			
0010			
0011	SJ-N0.75A	10000 r/min	SP-075
0012	SJ-N1.5A	10000 r/min	SP-15
0013	SJ-N2.2A	10000 r/min	SP-22
0014	SJ-N3.7A	10000 r/min	SP-37
0015	SJ-N5.5A	8000 r/min	SP-55
0016	SJ-N7.5A	8000 r/min	SP-75
0017			
0018			
0019			
001A			
001B	SJ-J2.2A	10000 r/min	SP-22
001C	SJ-J3.7A	10000 r/min	SP-37
001D	SJ-J5.5A	8000 r/min	SP-55
001E	SJ-J7.5A	8000 r/min	SP-75
001F			

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3241
(PR)</td><td>SP041</td><td>PTYP</td><td>Power supply type</td><td>
Power supply type
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td colspan="4">amp</td><td colspan="4">rtyp</td></tr>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td colspan="8">ptyp</td></tr>
</table>
<table>
<tr><th colspan="2">bit</th><th>Explanation</th></tr>
<tr><td>0
1
2
3
4
5
6
7</td><td>ptyp</td><td>
When the CN4 connector of the drive unit and the power supply are connected, setting below is necessary.
To validate the external emergency stop function, add 40h.
<table>
<tr><th>Set-ting</th><th>0x</th><th>1x</th><th>2x</th><th>3x</th><th>4x</th><th>5x</th><th>6x</th><th>7x</th><th>8x</th></tr>
<tr><td>x0</td><td>Not used</td><td></td><td></td><td>CV-300</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>x1</td><td></td><td>CV-110</td><td></td><td></td><td></td><td></td><td></td><td></td><td>CR-10</td></tr>
<tr><td>x2</td><td></td><td></td><td>CV-220</td><td></td><td></td><td></td><td></td><td></td><td>CR-15</td></tr>
<tr><td>x3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>CR-22</td></tr>
<tr><td>x4</td><td>CV-37</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>CR-37</td></tr>
<tr><td>x5</td><td></td><td>CV-150</td><td></td><td></td><td>CV-450</td><td>CV-550</td><td></td><td></td><td></td></tr>
<tr><td>x6</td><td>CV-55</td><td></td><td>CV-260</td><td></td><td></td><td></td><td></td><td></td><td>CR-55</td></tr>
<tr><td>x7</td><td></td><td></td><td></td><td>CV-370</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>x8</td><td>CV-75</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>CR-75</td></tr>
<tr><td>x9</td><td></td><td>CV-185</td><td></td><td></td><td></td><td></td><td></td><td></td><td>CR-90</td></tr>
</table>
</td></tr>
<tr><td>8
9
A
B</td><td>rtyp</td><td>
Set the regenerative resistor type when MDS-A-CR is used.
<table>
<tr><th>Set-ting</th><th>Regenerative resistor model name</th><th>Resistance value</th><th>Capacity</th></tr>
<tr><td>0</td><td colspan="3">MDS-C1-CV (Setting when using power supply regeneration)</td></tr>
<tr><td>1</td><td>GZG200W260HMJ</td><td>26Ω</td><td>80W</td></tr>
<tr><td>2</td><td>GZG300W130HMJ×2</td><td>26Ω</td><td>150W</td></tr>
<tr><td>3</td><td>MR-RB30</td><td>13Ω</td><td>300W</td></tr>
<tr><td>4</td><td>MR-RB50</td><td>13Ω</td><td>500W</td></tr>
<tr><td>5</td><td>GZG200W200HMJ×3</td><td>6.7Ω</td><td>350W</td></tr>
<tr><td>6</td><td>GZG300W200HMJ×3</td><td>6.7Ω</td><td>500W</td></tr>
<tr><td>7</td><td>R-UNIT-1</td><td>30Ω</td><td>700W</td></tr>
<tr><td>8</td><td>R-UNIT-2</td><td>15Ω</td><td>700W</td></tr>
<tr><td>9</td><td>R-UNIT-3</td><td>15Ω</td><td>2100W</td></tr>
<tr><td>A to D</td><td>No setting</td><td></td><td></td></tr>
<tr><td>E</td><td colspan="3">Large capacity + ready ON high-speed sequence</td></tr>
<tr><td>F</td><td colspan="3">Ready ON high-speed sequence</td></tr>
</table>
</td></tr>
<tr><td>C
D
E
F</td><td>amp</td><td>Always set to “0”.</td></tr>
</table>
</td><td>0000 to FFFF
HEX setting</td><td>0000</td></tr>
<tr><td>3242
(PR)</td><td>SP042</td><td>CRNG</td><td>C-axis detector range</td><td>This parameter is used to set the C-axis detector range.
Set "0" for this parameter.
"2" is used by Mitsubishi for testing.</td><td>0 to 7</td><td>0</td></tr>
</table>

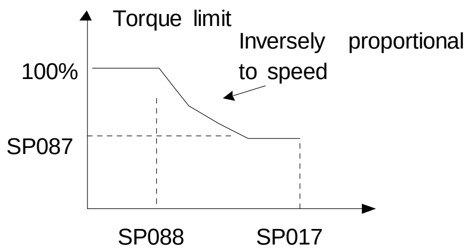
No.	Items			Details	Setting range	Standard setting
3243 (PR)	SP043	TRNG	Synchro-nous tapping, spindle synchro-nous detector range	This parameter is used to set the synchronous tapping or spindle synchronous detector range. Set "0" for this parameter.	0 to 7	0
3244 (PR)	SP044	TRANS	NC communi-cation frequency	Set a frequency of data communication with NC.	0 to 32767	Standard: 0 Special: 1028
3245	SP045	CSNT	Dual cushion timer	Set the cycle to add the increment values in the dual cushion process. When this setting value is increased, the dual cushion will increase, and the changes in the speed during acceleration/deceleration will become gradual.	0 to 1000 (ms)	0
3246 (PR)	SP046	CSN2	Speed command dual cushion	For an acceleration/deceleration time constant defined in SP019 (CSN1) , this parameter is used to provide smooth movement only at the start of acceleration/deceleration. As the value of this parameter is smaller, it moves smoother but the acceleration/deceleration time becomes longer. To make this parameter invalid, set "0".	0 to 1000	0
3247 (PR)	SP047	SDTR	Speed detection reset value	Set the reset hysteresis width for a speed detection set value defined in SP020 (SDTS).	0 to 1000 (r/min)	30
3247 (PR)	SP047	SDTR	Speed detection reset value	Set the reset hysteresis width for a speed detection set value defined in SP020 (SDTS).	0 to 1000 (r/min)	30
3248 (PR)	SP048	SUT	Speed reach range	Set the speed deviation rate with respect to the commanded speed for output of the speed reach signal.	0 to 100 (%)	15
3249	SP049	TLM2	Torque limit 2	Set the torque limit rate for the torque limit signal 010.	1 to 120 (%)	20
3250	SP050	TLM3	Torque limit 3	Set the torque limit rate for the torque limit signal 011.	1 to 120 (%)	30
3251	SP051	TLM4	Torque limit 4	Set the torque limit rate for the torque limit signal 100.	1 to 120 (%)	40
3252	SP052	TLM5	Torque limit 5	Set the torque limit rate for the torque limit signal 101.	1 to 120 (%)	50
3253	SP053	TLM6	Torque limit 6	Set the torque limit rate for the torque limit signal 110.	1 to 120 (%)	60
3254	SP054	TLM7	Torque limit 7	Set the torque limit rate for the torque limit signal 111.	1 to 120 (%)	70

No.	Items			Details	Setting range	Standard setting
3255 (PR)	SP055	SETM	Excessive speed deviation timer	Set the timer value until the excessive speed deviation alarm is output. The value of this parameter should be longer than the acceleration/deceleration time.	0 to 60 (s)	12
3256	SP056	PYVR	Variable excitation (min value)	Set the minimum value of the variable excitation rate. Select a smaller value when gear noise is too high. However, a larger value is effective for impact response.	0 to 100 (%)	50
3257 (PR)	SP057	STOD	Constant → excessive judgment value	Set the value for judging when changing from a constant to excessive speed command.	0 to 50 (r/min)	0
3258 (PR)	SP058	SDT2	Fixed control constant	Set by Mitsubishi. Set "0" unless designated in particular.	0	0
3259 (PR)	SP059	MKT	Winding changeover base shut-off timer	Set the base shut-off time for contactor switching at winding changeover. Note that the contactor may be damaged with burning if the value of this parameter is too small.	50 to 10000 (ms)	150
3260 (PR)	SP060	MKT2	Current limit timer after winding changeover	Set the current limit time to be taken after completion of contactor switching at winding changeover.	0 to 10000 (ms)	500
3261 (PR)	SP061	MKIL	Current limit value after winding changeover	Set the current limit value during a period defined in SP060 (MKT2) after completion of contactor switching at winding changeover.	0 to 120 (%)	75
3262	SP062			Not used. Set to "0".	0	0

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3263
(PR)</td><td>SP063</td><td>OLT</td><td>Overload alarm detection time</td><td>Set the time constant for detection of the motor overload alarm.</td><td>0 to 1000
(s)</td><td>60</td></tr>
<tr><td>3264
(PR)</td><td>SP064</td><td>OLL</td><td>Overload alarm detection level</td><td>Set the detection level of the motor overload alarm.</td><td>0 to 120
(%)</td><td>110</td></tr>
<tr><td>3265
(PR)</td><td>SP065</td><td>VCGN1</td><td>Target value of variable speed loop proportional gain</td><td>Set the magnification of speed loop proportional gain with respect to SP022 (VGNP1) at the maximum motor speed defined in SP017 (TSP).</td><td>0 to 100
(%)</td><td>100</td></tr>
<tr><td>3266
(PR)</td><td>SP066</td><td>VCSN1</td><td>Change starting speed of variable speed loop proportional gain</td><td>Set the speed when the speed loop proportional gain change starts.
</td><td>0 to 32767
(r/min)</td><td>0</td></tr>
<tr><td>3267
(PR)</td><td>SP067</td><td>VIGWA</td><td>Change starting speed of variable current loop gain</td><td>Set the speed where the current loop gain change starts.</td><td>0 to 32767
(r/min)</td><td>0</td></tr>
<tr><td>3268
(PR)</td><td>SP068</td><td>VIGWB</td><td>Change ending speed of variable current loop gain</td><td>Set the speed where the current loop gain change ends.</td><td>0 to 32767
(r/min)</td><td>0</td></tr>
<tr><td>3269
(PR)</td><td>SP069</td><td>VIGN</td><td>Target value of variable current loop gain</td><td>Set the magnification of current loop gain (torque component and excitation component) for a change ending speed defined in SP068 (VIGWB).
When this parameter is set to "0", the magnification is 1.

<table>
<tr><th>SP017 (TSP)
Maximum motor speed</th><th>SP067
(VIGWA)</th><th>SP068
(VIGWB)</th><th>SP069
(VIGN)</th></tr>
<tr><td>0 to 6000</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>6001 to 8000</td><td>5000</td><td>8000</td><td>45</td></tr>
<tr><td>8001 or more</td><td>5000</td><td>10000</td><td>64</td></tr>
</table></td><td>0 to 32767

(1/16-fold)</td><td>0</td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3270</td><td>SP070</td><td>FHz</td><td>Machine resonance suppression filter frequency</td><td>When machine vibration occurs in speed and position control, set the frequency of the required vibration suppression.
Note that a value of 100Hz or more is set.
Set to "0" when not used.</td><td>0 to 3000 (Hz)</td><td>0</td></tr>
<tr><td>3271 (PR)</td><td>SP071</td><td>VR2WA</td><td rowspan="4">Fixed control constant</td><td rowspan="4">Set by Mitsubishi.
Set "0" unless designated in particular.</td><td rowspan="4">0</td><td rowspan="4">0</td></tr>
<tr><td>3272 (PR)</td><td>SP072</td><td>VR2WB</td></tr>
<tr><td>3273 (PR)</td><td>SP073</td><td>VR2GN</td></tr>
<tr><td>3274 (PR)</td><td>SP074</td><td>IGDEC</td></tr>
<tr><td>3275</td><td>SP075</td><td>R2KWS</td><td></td><td colspan="3">
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>r2ini</td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td></td><td></td><td>r2am</td><td>r2lm</td><td>r2dn</td><td>no51</td><td>r2ch</td></tr>
</table>
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>r2ch</td><td colspan="2" rowspan="5">This is used by Mitsubishi.
Set to "0" unless particularly designated.</td></tr>
<tr><td>1</td><td>no51</td></tr>
<tr><td>2</td><td>r2dm</td></tr>
<tr><td>3</td><td>r2lm</td></tr>
<tr><td>4</td><td>r2am</td></tr>
<tr><td>5</td><td></td><td></td><td></td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td>r2ini</td><td colspan="2">This is used by Mitsubishi.
Set to "0" unless particularly designated</td></tr>
<tr><td>9</td><td></td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td></td><td></td><td></td></tr>
<tr><td>E</td><td></td><td></td><td></td></tr>
<tr><td>F</td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>3276</td><td>SP076</td><td>FONS</td><td>Machine resonance suppression filter operation speed</td><td>When the vibration increases in motor stop (ex. in orientation stop) when the machine vibration suppression filter is operated by SP070, operate the machine vibration suppression filter at a speed of this parameter or more.
When set to "0", this is validated for all speeds.</td><td>0 to 32767 (r/min)</td><td>0</td></tr>
<tr><td>3277 (PR)</td><td>SP077</td><td>TDSL</td><td>Fixed control constant</td><td>Set by Mitsubishi.
Set "14" unless designated in particular.</td><td></td><td>14</td></tr>
<tr><td>3278 (PR)</td><td>SP078</td><td>FPWM</td><td rowspan="2">Fixed control constant</td><td rowspan="2">Set by Mitsubishi.
Set "0" unless designated in particular.</td><td rowspan="2">0</td><td rowspan="2">0</td></tr>
<tr><td>3279 (PR)</td><td>SP079</td><td>ILMT</td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
3280	SP080			Use not possible.	0	0
3281	SP081	LMCA	Fixed control constant	This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
3282	SP082	LMCB				
3283	SP083					
3284 to 3286	SP084 to SP086			Use not possible.	0	0
3287 (PR)	SP087	DIQM	Target value of variable torque limit magnifica-tion at deceleration	Set the minimum value of variable torque limit at deceleration.	0 to 150 (%)	75
3288 (PR)	SP088	DIQN	Speed for starting change of variable torque limit magnifica-tion at deceleration	Set the speed where the torque limit value at deceleration starts to change. 	0 to 32767 (r/min)	3000
3289	SP089			Use not possible.	0	0
3290	SP090			Use not possible.	0	0
3291	SP091	OFSN	Motor PLG forward rotation offset compensa-tion	Set the PLG offset value for the forward rotation. Normally set to "0".	–2048 to 2047 (–1mv)	0
3292	SP092	OFSI	Motor PLG reverse rotation offset compensa-tion	Set the PLG offset value for the reverse rotation. Normally set to "0".	–2048 to 2047 (–1mv)	0
3293 (PR)	SP093	ORE	Tolerable pulse check error	Set this when detecting the pulse detector's pulse mistakes. (Valid only for full close control.)	0 to 32767	0
3294 (PR)	SP094	LMAV	Load meter output filter	Set the filter time constant of load meter output. When "0" is set, a filter time constant is set to 100ms.	0 to 32767 (2ms)	0
3295 (PR)	SP095	VFAV	Fixed control constant	Set by Mitsubishi. Set "0" unless designated in particular.	0	0

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3296
(PR)</td><td>SP096</td><td>EGAR</td><td>Encoder gear ratio</td><td>Set the gear ratio between the spindle end and the encoder end (except for the motor-built-in encoder) as indicated below.
<table>
<tr><th>Setting value</th><th>Gear ratio (deceleration)</th><th>Setting value</th><th>Gear ratio (acceleration)</th></tr>
<tr><td>0</td><td>1 : 1</td><td>–1</td><td>1 : 2</td></tr>
<tr><td>1</td><td>1 : 1/2</td><td>–2</td><td>1 : 4</td></tr>
<tr><td>2</td><td>1 : 1/4</td><td>–3</td><td>1 : 3</td></tr>
<tr><td>3</td><td>1 : 1/8</td><td></td><td></td></tr>
<tr><td>4</td><td>1 : 1/16</td><td></td><td></td></tr>
</table></td><td>–3 to 4</td><td>0</td></tr>
<tr><td>3297
(PR)</td><td>SP097</td><td>SPECO</td><td>Orientation specifica-tion</td><td>Set the orientation specifications in bit units.
<table>
<tr><th>F</th><th>E</th><th>D</th><th>C</th><th>B</th><th>A</th><th>9</th><th>8</th></tr>
<tr><td>ostp</td><td>orze</td><td>ksft</td><td>gchg</td><td></td><td>ips2</td><td>zdir</td><td></td></tr>
</table>
<table>
<tr><th>7</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th>0</th></tr>
<tr><td>vg8x</td><td>mdir</td><td>fdir</td><td>osc1</td><td>pyfx</td><td>dmin</td><td>odi2</td><td>odi1</td></tr>
</table>
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>odi1</td><td colspan="2" rowspan="2">Orientation rotation direction
00: Previous (the direction in which the motor has so far rotated under speed control)
01: Forward rotation
10: Backward rotation
11: Prohibited (Same as setting value = 10)</td></tr>
<tr><td>1</td><td>odi2</td></tr>
<tr><td>2</td><td>dmin</td><td>Orientation in-position advance invalid</td><td>Orientation in-position advance valid</td></tr>
<tr><td>3</td><td>pyfx</td><td>Excitation min. (50%) during orientation servo lock invalid</td><td>Excitation min. (50%) during orientation servo lock valid</td></tr>
<tr><td>4</td><td>osc1</td><td>Indexing speed clamp invalid</td><td>Indexing speed clamp valid</td></tr>
<tr><td>5</td><td>fdir</td><td>Encoder detector polarity: +</td><td>Encoder detector polarity: –</td></tr>
<tr><td>6</td><td>mdir</td><td>Magnetic sensor polarity: +</td><td>Magnetic sensor polarity: –</td></tr>
<tr><td>7</td><td>vg8x</td><td>Speed gain *1/8 during torque limit valid</td><td>Speed gain *1/8 during torque limit invalid</td></tr>
<tr><td>8</td><td></td><td></td><td></td></tr>
<tr><td>9</td><td>zdir</td><td colspan="2">This is used by Mitsubishi.
Set to "0" unless particularly designated.</td></tr>
<tr><td>A</td><td>ips2</td><td>2nd in-position invalid</td><td>2nd in-position valid</td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td>gchg</td><td>Gain changeover during orientation invalid</td><td>Gain changeover during orientation valid</td></tr>
<tr><td>D</td><td>ksft</td><td>Orientation virtual target shift invalid</td><td>Orientation virtual target shift valid</td></tr>
<tr><td>E</td><td>orze</td><td colspan="2" rowspan="2">This is used by Mitsubishi.
Set to "0" unless particularly designated.</td></tr>
<tr><td>F</td><td>ostp</td></tr>
</table>
<table>
<tr><td></td><td></td><td colspan="2">In-position advance (bit 2)</td></tr>
<tr><td></td><td></td><td>0 (invalid)</td><td>1 (valid)</td></tr>
<tr><td rowspan="2">Second in-position</td><td>0
(Invalid)</td><td rowspan="2">In-position signal in OINP width=1
Control output 4/ bit 4=1
Second in-position signal=0
Control output 4/ bit F=1</td><td>In-position signal in OINP width=1
Control output 4/ bit 4=1
Second in-position signal=0
Control output 4/ bit F=0</td></tr>
<tr><td>1
(Valid)</td><td>In-position signal in DINP width=1
Control output 4/ bit 4=1
Second in-position signal in OINP width = 0
Control output 4/ bit F=1</td></tr>
</table></td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
3298 (PR)	SP098	VGOP	Speed loop gain proportional term in orientation mode	Set the speed loop proportional gain in orientation mode. When the gain is increased, rigidity is improved in the orientation stop but vibration and sound become larger.	0 to 1000 (1/s)	63
3299 (PR)	SP099	VGOI	Orientation mode speed loop gain integral term	Set the speed loop integral gain in orientation mode.	0 to 1000 (0.1 1/s)	60
3300 (PR)	SP100	VGOD	Orientation mode speed loop gain delay advance term	Set a loop gain delay advance gain in orientation mode. When this parameter is set to "0", PI control is applied.	0 to 1000 (0.1 1/s)	15
3301 (PR)	SP101	DINP	Orientation advance in-position width	When using the orientation in-position advance function, set the in-position width that is larger than the normal in-position width defined in SP004 (OINP).	1 to 2880 (1/16°)	16
3302 (PR)	SP102	OODR	Excessive error value in orientation mode	Set the excessive error width in orientation mode.	0 to 32767 (1/4 pulse) (1 pulse= 0.088°)	32767
3303 (PR)	SP103	FTM	Index positioning completion OFF time timer	Set the time for forcedly turn OFF the index positioning completion signal (different from the orientation completion signal) after the leading edge of the indexing start signal.	0 to 10000 (ms)	200
3304 (PR)	SP104	TLOR	Torque limit value for orientation servo locking	Set the torque limit value for orientation in-position output. If the external torque limit signal is input, the torque limit value set by this parameter is made invalid.	0 to 120 (%)	100
3305 (PR)	SP105	IQG0	Current loop gain magnification 1 in orientation mode	Set the magnification for current loop gain (torque component) at orientation completion.	1 to 1000 (%)	100
3306 (PR)	SP106	IDG0	Current loop gain magnification 2 in orientation mode	Set the magnification for current loop gain (excitation component) at orientation completion.	1 to 1000 (%)	100
3307	SP107	CSP2	Deceleration rate 2 in orientation mode	Set the deceleration rate in orientation mode corresponding to the gear 001. When this parameter is set to "0", same as SP006 (CSP).	0 to 1000	0

No.	Items			Details	Setting range	Standard setting
3308	SP108	CSP3	Deceleration rate 3 in orientation mode	Set the deceleration rate in orientation mode corresponding to the gear 010. When this parameter is set to "0", same as SP006 (CSP).	0 to 1000	0
3309	SP109	CSP4	Deceleration rate 4 in orientation mode	Set the deceleration rate in orientation mode corresponding to the gear 011. When this parameter is set to "0", same as SP006 (CSP).	0 to 1000	0
3310 to 3313	SP110 to SP113			Use not possible.		0
3314	SP114	OPER	Orientation pulse miss check value	An alarm "5C" will occur if the pulse miss value at the orientation stop exceeds this setting value. (Note that this is invalid when set to "0".) In this parameter, set the value to fulfill the following conditions. SP114 setting value > 1.5 × SP004 (orientation in-position width)	0 to 32767 (360°/4096)	0
3315	SP115	OSP2	Orientation motor speed clamp value 2	When the orientation clamp speed is changed by the control input, this parameter setting will be used instead of SP005: OSP. Indexing speed clamp valid This parameter is used when (SP097: SPEC0-bit4 = 1).	0 to 32767 (r/min)	0
3316	SP116	OPYVR	Minimum excitation value after changeover (2nd minimum excitation rate)	Minimum excitation rate when position control input or external input is selected.	0 to 100 (%)	0
3317	SP117	ORUT		This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
3318	SP118	ORCT	Number of orientation retry times	Set the number of times to retry when an orientation or feedback error occurs. The warning (A9) is issued while retrying orientation, and an alarm (5C) is issued when the set number of times is exceeded.	0 to 100 (time)	0
3319	SP119	MPGH	Orientation position gain H winding compensation magnification	Set the compensation magnification of the orientation position loop gain for the H winding. H winding orientation position loop gain = SP001 (or SP002) × SP119/256 When set to "0", will become the same as SP001 or SP002.	0 to 2560 (1/256-fold)	0

No.	Items			Details	Setting range	Standard setting
3320	SP120	MPGL	Orientation position gain L winding compensa-tion magnifi-cation	Set the compensation magnification of the orientation position loop gain for the L winding. L winding orientation position loop gain = SP001 (or SP002) × SP120/256 When set to "0", will become the same as SP001 or SP002.	0 to 2560 (1/256-fold)	0
3321	SP121	MPCSH	Orientation deceleration rate H winding compensa-tion magnifi-cation	Set the compensation magnification of the orientation deceleration rate for the H winding. Orientation deceleration rate for the H winding = SP006 × SP121/256 When set to "0", will become the same as SP006.	0 to 2560 (1/256-fold)	0
3322	SP122	MPCSL	Orientation deceleration rate L winding compensa-tion magnifi-cation	Set the compensation magnification of the orientation deceleration rate for the L winding. Orientation deceleration rate for the L winding = SP006 × SP122/256 When set to "0", will become the same as SP006.	0 to 2560 (1/256-fold)	0
3323	SP123	MGD0	Magnetic sensor output peak value	This parameter is used for adjustment of orientation operation of the magnetic sensor. Set the output peak value of the magnetic sensor. If a gap between the sensor and the magnetizing element is small, increase the value of this parameter. If it is large, decrease the value of this parameter.	1 to 10000	Standard magnetizing element: 542 Small magnetizing element: 500
3324	SP124	MGD1	Magnetic sensor linear zone width	This parameter is used for adjustment of orientation operation of the magnetic sensor. Set the linear zone width of the magnetic sensor. If the radius of the mounted magnetizing element is large, decrease the value of this parameter. If it is small, increase the value of this parameter.	1 to 10000	Standard magnetizing element: 768 Small magnetizing element: 440

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3325</td><td>SP125</td><td>MGD2</td><td>Magnetic sensor switching point</td><td>This parameter is used for adjustment of orientation operation of the magnetic sensor.
Set the distance dimension from the target stop point at switching from position feedback to magnetic sensor output.
Normally, set a value that is approx. 1/2 of the value defined in SP124.</td><td>1 to 10000</td><td>Standard magnetizing element: 384
Small magnetizing element: 220</td></tr>
<tr><td>3326
to
3328</td><td>SP126
to
SP128</td><td></td><td></td><td>Use not possible.</td><td>0</td><td>0</td></tr>
<tr><td>3329
(PR)</td><td>SP129</td><td>SPECC</td><td>C-axis specifications</td><td>Set the C-axis specifications in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td>zrtn</td><td>ptyp</td><td>fb9x</td><td>zrtd</td><td>zrn2</td><td></td><td>zdir</td><td>ztyp</td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>vg8x</td><td></td><td>fdir</td><td></td><td>phos</td><td>rtrn</td><td>adin</td><td>fclx</td></tr>
</table>
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>fclx</td><td>Closed loop</td><td>Semi-closed loop
(Gear 1 : 1 only)</td></tr>
<tr><td>1</td><td>adin</td><td>Interpolation A/D compensation invalid</td><td>Interpolation A/D compensation valid</td></tr>
<tr><td>2</td><td>rtrn</td><td>Position monitor during ready OFF invalid</td><td>Position monitor during ready OFF valid</td></tr>
<tr><td>3</td><td>phos</td><td>Normal
(no compensation)</td><td>Vx4 synchronization compensation valid</td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td>fdir</td><td>Position detector polarity (+)</td><td>Position detector polarity (–)</td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td>vg8x</td><td>Speed gain × 1/8 during torque limit valid</td><td>Speed gain × 1/8 during torque limit invalid</td></tr>
<tr><td>8</td><td>ztyp</td><td>Z-phase type: Normal start up</td><td>Z-phase type: Start up only</td></tr>
<tr><td>9</td><td>zdir</td><td>Z-phase rising polarity (+)</td><td>Z-phase rising polarity (–)</td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td>zrn2</td><td colspan="2" rowspan="2">This is used by Mitsubishi.
Set to "0" unless particularly designated.</td></tr>
<tr><td>C</td><td>zrtd</td></tr>
<tr><td>D</td><td>fb9x</td><td>Speed feedback
Standard (PLG)</td><td>Speed feedback
90,000 pulse detector</td></tr>
<tr><td>E</td><td>ptyp</td><td>Position control switch type: After zero point return</td><td>Position control switch type: After deceleration stop</td></tr>
<tr><td>F</td><td>zrtn</td><td>Zero point return direction: CCW</td><td>Zero point return direction: CW</td></tr>
</table></td><td></td><td>0000</td></tr>
<tr><td>3330</td><td>SP130</td><td>PGC1</td><td>First position loop gain for cutting on C-axis</td><td>Set the position loop gain when the first gain is selected for C axis cutting.</td><td>1 to 100
(1/s)</td><td>15</td></tr>
<tr><td>3331</td><td>SP131</td><td>PGC2</td><td>Second position loop gain for cutting on C-axis</td><td>Set the position loop gain when the second gain is selected for C axis cutting.</td><td>1 to 100
(1/s)</td><td>15</td></tr>
</table>

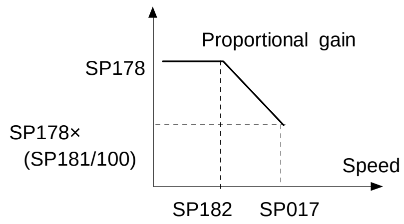
No.	Items			Details	Setting range	Standard setting
3332	SP132	PGC3	Third position loop gain for cutting on C-axis	Set the position loop gain when the third gain is selected for C-axis cutting.	1 to 100 (1/s)	15
3333	SP133	PGC4	Stop position loop gain for cutting on C-axis	Set the position loop gain for stopping when carrying out C-axis cutting.	1 to 100 (1/s)	15
3334 (PR)	SP134	VGCP0	C-axis non-cutting speed loop gain proportional item	Set the speed loop proportional gain in C-axis non-cutting mode.	0 to 5000 (1/s)	63
3335 (PR)	SP135	VGCI0	C-axis non-cutting speed loop gain integral item	Set the speed loop integral gain in C-axis non-cutting mode.	0 to 5000 (0.1 1/s)	60
3336 (PR)	SP136	VGCD0	C-axis non-cutting speed loop gain delay advance item	Set the speed loop delay advance gain in C-axis non-cutting mode. When this parameter is set to "0", PI control is exercised.	0 to 5000 (0.1 1/s)	15
3337 (PR)	SP137	VGCP1	First speed loop gain proportional item for C-axis cutting	Set the speed loop proportional gain when the first gain is selected for C-axis cutting.	0 to 5000 (1/s)	63
3338 (PR)	SP138	VGCI1	First speed loop gain integral item for cutting on C-axis	Set the speed loop integral gain when the first gain is selected for C-axis cutting.	0 to 5000 (0.1 1/s)	60
3339 (PR)	SP139	VGCD1	First speed loop gain delay advance item for cutting on C-axis	Set the speed loop delay advance gain when the first gain is selected for curing on the C-axis. When this parameter is set to "0", PI control is applied.	0 to 5000 (0.1 1/s)	15
3340 (PR)	SP140	VGCP2	Second speed loop gain proportional item for cutting on C-axis	Set the speed loop proportional gain when the second gain is selected for C-axis cutting.	0 to 5000 (1/s)	63

No.	Items			Details	Setting range	Standard setting
3341 (PR)	SP141	VGCI2	Second speed loop gain integral item for cutting on C-axis	Set the speed loop integral gain when the second gain is selected for C-axis cutting.	0 to 5000 (0.1 1/s)	60
3342 (PR)	SP142	VGCD2	Second speed loop gain delay advance item for cutting on C-axis	Set the speed loop delay advance gain when the second gain is selected for C-axis cutting. When this parameter is set to "0", PI control is applied.	0 to 5000 (0.1 1/s)	15
3343 (PR)	SP143	VGCP3	Third speed loop gain proportional item for cutting on C-axis	Set the speed loop proportional gain when the third gain is selected for C-axis cutting.	0 to 5000 (1/s)	63
3344 (PR)	SP144	VGCI3	Third speed loop gain integral item for cutting on C-axis	Set the speed loop integral gain when the third gain is selected for C-axis cutting.	0 to 5000 (0.1 1/s)	60
3345 (PR)	SP145	VGCD3	Third speed loop gain delay advance item for cutting on C-axis	Set the speed loop delay advance gain when the third gain is selected for C-axis cutting. When this parameter is set to "0", PI control is applied.	0 to 5000 (0.1 1/s)	15
3346 (PR)	SP146	VGCP4	Speed loop gain propor-tional item for stop of cutting on C-axis	Set the speed loop proportional gain when C-axis cutting is stopped.	0 to 5000 (1/s)	63
3347 (PR)	SP147	VGCI4	Speed loop gain integral item for stop of cutting on C-axis	Set the speed loop integral gain when C-axis cutting is stopped.	0 to 5000 (0.1 1/s)	60
3348 (PR)	SP148	VGCD4	Speed loop gain delay advance item for stop of cutting on C-axis	Set the speed loop delay advance gain when C-axis cutting is stopped. When this parameter is set to "0", PI control is applied.	0 to 5000 (0.1 1/s)	15

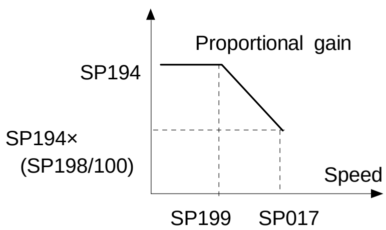
No.	Items			Details	Setting range	Standard setting
3349	SP149	CZRN	C-axis zero point return speed	This parameter is valid when SP129 (SPECC) bitE is set to "0". Set the zero point return speed used when the speed loop changes to the position loop.	1 to 500 (r/min)	50
3350	SP150	CPDT	C-axis zero point return deceleration point	This parameter is valid when SP129 (SPECC) bitE is set to "0". Set the deceleration rate where the machine starts to decelerate when it returns to the target stop point during C-axis zero point return. When the machine tends to overshoot at the stop point, set the smaller value.	1 to 10000	1
3351	SP151	CPSTL	C-axis zero point return shift amount (low byte)	This parameter is valid when SPECC (SP129) bitE is set to "0". Set the C-axis zero point position.	HEX setting 00000000 to FFFFFFFF (1/1000°)	H: 0000 L: 0000
3352	SP152	CPSTH	C-axis zero point return shift amount (high byte)			
3354 (PR)	SP154	CODRL	Excessive error width on C-axis (low byte)	Set the excessive error width on the C-axis.	HEX setting 00000000 to FFFFFFFF (1/1000°)	H: 0001 L: D4C0
3355 (PR)	SP155	CODRH	Excessive error width on C-axis (high byte)			
3356	SP156	OVSH	C-axis overshoot compensa-tion	Set this to prevent overshooting when shifting from movement to stopping with C-axis control. (Set this referring to the load meter display when overshooting occurred.)	0 to 1000 (0.1%)	0
3357 to 3358	SP157 to SP158			Not used. Set to "0".	0	0
3359	SP159	CPY0	C-axis non-cutting variable excitation ratio	Set the minimum value of variable excitation ratio for non-cutting on the C-axis .	0 to 100 (%)	50
3360	SP160	CPY1	C-axis cutting variable excitation ratio	Set the minimum variable excitation ratio for cutting on the C-axis.	0 to 100 (%)	100

No.	Items			Details	Setting range	Standard setting
3361 (PR)	SP161	IQGC0	Current loop gain magnification 1 for non-cutting on C-axis	Set the magnification of current loop gain (torque component) for C-axis non-cutting.	1 to 1000 (%)	100
3362 (PR)	SP162	IDGC0	Current loop gain magnification 2 for non-cutting on C-axis	Set the magnification of current loop gain (excitation component) for C-axis non-cutting.	1 to 1000 (%)	100
3363 (PR)	SP163	IQGC1	Current loop gain magnification 1 for cutting on C-axis	Set the magnification of current loop gain (torque component) for C-axis cutting.	1 to 1000 (%)	100
3364 (PR)	SP164	IDGC1	Current loop gain magnification 2 for cutting on C-axis	Set the magnification of current loop gain (excitation component) for C-axis cutting.	1 to 1000 (%)	100
3365	SP165	PG2C	C-axis position loop gain 2	Set the second position loop gain when high-gain control is carried out for control of the C-axis. This parameter is applied to all the operation modes of C-axis control. When this function is not used, assign "0".	0 to 999 (1/s)	0
3366	SP166	PG3C	C-axis position loop gain 3	Set the third position loop gain when high-gain control is carried out for control of the C-axis. This parameter is applied to all the operation modes of C-axis control. When this function is not used, assign "0".	0 to 999 (1/s)	0
3367 (PR)	SP167	PGU	Position loop gain for increased spindle holding force	Set the position loop gain for when the disturbance observer is valid.	0 to 100 (1/s)	15
3368 (PR)	SP168	VGUP	Speed loop gain proportional item for increased spindle holding force	Set the speed loop gain proportional item for when the disturbance observer is valid.	0 to 5000 (1/s)	63
3369 (PR)	SP169	VGUI	Speed loop gain integral item for increased spindle holding force	Set the speed loop gain integral item for when the disturbance observer is valid.	0 to 5000 (0.1 1/s)	60

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3370
(PR)</td><td>SP170</td><td>VGUD</td><td>Speed loop gain delay advance item for increased spindle holding force</td><td>Set the speed loop gain delay advance item for when the disturbance observer is valid.</td><td>0 to 5000
(0.1 1/s)</td><td>15</td></tr>
<tr><td>3371
to
3376</td><td>SP171
to
SP176</td><td></td><td></td><td>Not used. Set to "0".</td><td>0</td><td>0</td></tr>
<tr><td>3377
(PR)</td><td>SP177</td><td>SPECS</td><td>Spindle synchronous specifica-tions</td><td>Set the spindle synchronous specifications in bit units.
<table>
<tr><th>F</th><th>E</th><th>D</th><th>C</th><th>B</th><th>A</th><th>9</th><th>8</th></tr>
<tr><td></td><td></td><td>Odx8</td><td></td><td></td><td></td><td></td><td>phos</td></tr>
</table>
<table>
<tr><th>7</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th>0</th></tr>
<tr><td></td><td></td><td>fdir</td><td></td><td>pyfx</td><td>rtrn</td><td>adin</td><td>fclx</td></tr>
</table>
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>fclx</td><td>Closed loop</td><td>Semi-closed loop</td></tr>
<tr><td>1</td><td>adin</td><td>Interpolation A/D compensation invalid</td><td>Interpolation A/D compensation valid</td></tr>
<tr><td>2</td><td>rtrn</td><td>Position monitor during ready OFF invalid</td><td>Position monitor during ready OFF valid</td></tr>
<tr><td>3</td><td>pyfx</td><td>Normal excitation</td><td>Position loop excitation fixed (strong)</td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td>fdir</td><td>Position detector direc-tion (positive direction)</td><td>Position detector direc-tion (negative direction)</td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td></td><td></td><td></td></tr>
<tr><td>9</td><td></td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td>odx8</td><td>Magnification of excessive error width × 8 times invalid</td><td>Magnification of excessive error width × 8 times valid</td></tr>
<tr><td>E</td><td></td><td></td><td></td></tr>
<tr><td>F</td><td></td><td colspan="2">(Used with SPJ)</td></tr>
</table>
</td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
<tr><td>3378
(PR)</td><td>SP178</td><td>VGSP</td><td>Spindle synchronous speed loop gain propor-tional term</td><td>Set the speed loop proportional gain in spindle synchronous mode.</td><td>0 to 1000
(1/s)</td><td>63</td></tr>
<tr><td>3379
(PR)</td><td>SP179</td><td>VGSI</td><td>Spindle synchronous speed loop gain integral term</td><td>Set the speed loop integral gain in spindle synchronous mode.</td><td>0 to 1000
(0.1 1/s)</td><td>60</td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
3380 (PR)	SP180	VGSD	Spindle synchronous speed loop gain delay advance term	Set the speed loop delay advance gain in spindle synchronous mode. When this parameter is set to "0", PI control is applied.	0 to 1000 (0.1 1/s)	15
3381 (PR)	SP181	VCGS	Spindle synchronous Target value of variable speed loop proportional gain	Set the magnification of speed loop proportional gain with respect to SP178 (VGSP) at the maximum speed defined in SP017 (TSP) in spindle synchronous mode.	0 to 100 (%)	100
3382 (PR)	SP182	VCSS	Spindle synchronous Change starting speed of variable speed loop proportional gain	Set the speed when the speed loop proportional gain change starts in the spindle synchronous mode.  	0 to 32767 (r/min)	0
3383	SP183	SYNV	Spindle synchronous Sync matching speed	For changeover from the speed loop to the position loop in the spindle synchronous mode, set a speed command error range for output of the synchronous speed matching signal.	0 to 1000 (r/min)	20
3384 (PR)	SP184	FFCS	Spindle synchronous Acceleration rate feed forward gain	Set the acceleration rate feed forward gain in the spindle synchronous mode. This parameter is used only with the SPJ2.	0 to 1000 (%)	0
3385	SP185	SINP	Spindle synchronous In-position width	Set the position error range for output of the in-position signal in the spindle synchronous mode.	1 to 2880 (1/16°)	16
3386 (PR)	SP186	SODR	Spindle synchronous Excessive error width	Set the excessive error width in the spindle synchronous mode.	1 to 32767 (pulse) (1 pulse =0.088°)	32767
3387 (PR)	SP187	IQGS	Spindle synchronous Current loop gain magnification1	Set the magnification of current loop gain (torque component) in the spindle synchronous mode.	1 to 1000 (%)	100

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3388 (PR)</td><td>SP188</td><td>IDGS</td><td>Spindle synchronous Current loop gain magnification 2</td><td>Set the magnification of current loop gain (excitation component) in the spindle synchronous mode.</td><td>1 to 1000 (%)</td><td>100</td></tr>
<tr><td>3389</td><td>SP189</td><td>PG2S</td><td>Spindle synchronous Position loop gain 2</td><td>Set the second position loop gain when high-gain control is carried out in the spindle synchronous mode.
When this parameter function is not used, set to "0".</td><td>0 to 999 (1/s)</td><td>0</td></tr>
<tr><td>3390</td><td>SP190</td><td>PG3S</td><td>Spindle synchronous Position loop gain 3</td><td>Set the third position loop gain when high-gain control is carried out in the spindle synchronous mode.
When this parameter function is not used, set to "0".</td><td>0 to 999 (1/s)</td><td>0</td></tr>
<tr><td>3391</td><td>SP191</td><td></td><td></td><td>Use not possible.</td><td>0</td><td>0</td></tr>
<tr><td>3392</td><td>SP192</td><td></td><td></td><td>Not used. Set to "0".</td><td></td><td></td></tr>
<tr><td>3393 (PR)</td><td>SP193</td><td>SPECT</td><td>Synchronized tapping specifications</td><td>Set the synchronized tapping specifications in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td>zrtn</td><td>ptyp</td><td>od8x</td><td></td><td></td><td></td><td></td><td>phos</td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td></td><td>fdir</td><td>cdir</td><td>pyfx</td><td></td><td>adin</td><td>fclx</td></tr>
</table>
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>fclx</td><td>Closed loop</td><td>Semi-closed loop (Gear 1 : 1 only)</td></tr>
<tr><td>1</td><td>adin</td><td>Interpolation A/D compensation invalid</td><td>Interpolation A/D compensation valid</td></tr>
<tr><td>2</td><td>rtrn</td><td>Position monitor during ready OFF invalid</td><td>Position monitor during ready OFF valid</td></tr>
<tr><td>3</td><td>pyfx</td><td>Normal excitation</td><td>Position loop excitation fixed (strong)</td></tr>
<tr><td>4</td><td>cdir</td><td>Command polarity (+)</td><td>Command polarity (–)</td></tr>
<tr><td>5</td><td>fdir</td><td>Position detector polarity (+)</td><td>Position detector polarity (–)</td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td>phos</td><td>Normal (no compensation)</td><td>Synchronized tapping position compensation valid</td></tr>
<tr><td>9</td><td></td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td>od8x</td><td>Magnification of excessive error width × 8 times invalid</td><td>Magnification of excessive error width × 8 times valid</td></tr>
<tr><td>E</td><td>ptyp</td><td>Position control switch type: After zero point return</td><td>Position control switch type: After deceleration stop</td></tr>
<tr><td>F</td><td>zrtn</td><td>Zero point return direction: CCW</td><td>Zero point return direction: CW</td></tr>
</table></td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
3394 (PR)	SP194	VGTP	Synchronized tapping speed loop gain proportional term	Set the speed loop proportional gain in synchronized tapping mode.	0 to 1000 (1/s)	63
3395 (PR)	SP195	VGTI	Synchronized tapping speed loop gain integral term	Set the speed loop integral gain in synchronized tapping mode.	0 to1000 (0.1 1/s)	60
3396 (PR)	SP196	VGTD	Synchronized tapping speed loop gain delay advance term	Set the speed loop delay advance gain in synchronized tapping mode. When this parameter is set to "0", PI control is applied.	0 to 1000 (0.1 1/s)	15
3397	SP197			This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
3398 (PR)	SP198	VCGT	Synchronized tapping target value of variable speed loop proportional gain	Set the magnification of speed loop proportional gain with respect to SP194 (VGTP) at the maximum motor speed defined in SP017 (TSP) in synchronized tapping mode.	0 to 100 (%)	100
3399 (PR)	SP199	VCST	Synchronized tapping change starting speed of variable speed loop proportional gain	Set the speed where the speed loop proportional gain change starts during synchronized tapping.  	0 to 32767 (r/min)	0
3400 (PR)	SP200	FFC1	Synchronized tapping acceleration feed forward gain (gear 1)	Set the acceleration feed forward gain for selection of gear 000 during synchronized tapping. This parameter should be used when an error of relative position to Z-axis servo is large.	0 to 1000 (%)	0
3401 (PR)	SP201	FFC2	Synchronized tapping acceleration feed forward gain (gear 2)	Set the acceleration feed forward gain for selection of gear 001 during synchronized tapping.	0 to 1000 (%)	0
3402 (PR)	SP202	FFC3	Synchronized tapping acceleration feed forward gain (gear 3)	Set the acceleration feed forward gain for selection of gear 010 during synchronized tapping.	0 to 1000 (%)	0

No.	Items			Details	Setting range	Standard setting
3403 (PR)	SP203	FFC4	Synchronized tapping acceleration feed forward gain (gear 4)	Set the acceleration feed forward gain for selection of gear 011 during synchronized tapping.	0 to 1000 (%)	0
3404 to 3413	SP204 to SP213			Not used. Set to "0".	0	0
3414	SP214	TZRN	Synchronized tapping zero point return speed	This parameter is valid when SP193 (SPECT) bitE is set to "0". Set the zero point return speed used when the speed loop changes to the position loop.	0 to 500 (r/min)	50
3415	SP215	TPDT	Synchronized tapping zero point return deceleration rate	This parameter is valid when SP193 (SPECT) bitE is set to "0". Set the deceleration rate where the machine starts to decelerate when it returns to the target stop point during synchronized tapping zero point return. When the machine tends to overshoot at the stop point set a smaller value.	0 to 10000 (pulse)	1
3416	SP216	TPST	Synchronized tapping zero point return shift amount	This parameter is valid when SP193 (SPECT) bitE is set to "0". Set the synchronized tapping zero point position.	0 to 4095	0
3417	SP217	TINP	Synchronized tapping in-position width	Set the position error range for output of the in-position during synchronized tapping.	1 to 2880 (1/16°)	16
3418 (PR)	SP218	TODR	Synchronized tapping excessive error width	Set the excessive error width during synchronized tapping.	1 to 32767 (pulse) (1 pulse =0.088°)	32767
3419 (PR)	SP219	IQGT	Synchronized tapping current loop gain magnifi-cation 1	Set the magnification of current loop gain (torque component) during synchronized tapping.	1 to 1000 (%)	100
3420 (PR)	SP220	IDGT	Synchronized tapping current loop gain magnifi-cation 2	Set the magnification of current loop gain (excitation component) during synchronized tapping.	1 to 1000 (%)	100

No.	Items			Details	Setting range	Standard setting
3421	SP221	PG2T	Synchronized tapping position loop gain 2	Set the second position loop gain when high-gain control is applied during synchronized tapping. When this parameter is not used, set to "0".	0 to 999 (1/s)	0
3422	SP222	PG3T	Synchronized tapping position loop gain 3	Set the third position loop gain when high-gain control is applied during synchronized tapping. When this parameter is not used, set to "0".	0 to 999 (1/s)	0
3423	SP223	SPDV	Speed monitor speed	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.	0 to 800 (r/min)	0
3424	SP224	SPDF	Speed monitor time	Set the time (continuous) to detect alarms. (Detected instantly when 0 is set.)	0 to 2813 (3.5ms)	0
3425	SP225	OXKPH	Position loop gain magni-fication after orientation gain changeover (H coil)	If gain changeover is valid (SP097: SPEC0-bitC=1) during orientation, set the magnification of each gain changed to after in-position.	0 to 2560 (1/256-fold)	0
3426	SP226	OXKPL	Position loop gain magni-fication after orientation gain changeover (L coil)		0 to 2560 (1/256-fold)	0
3427	SP227	OXVKP	Speed loop proportional gain magnifi-cation after orientation gain changeover		0 to 2560 (1/256-fold)	0
3428	SP228	OXVKI	Speed loop cumulative gain magnifi-cation after orientation gain changeover	If gain changeover is valid (SP097: SPEC0-bitC=1) during orientation, set the magnification of each gain changed to after in-position.	0 to 2560 (1/256-fold)	0
3429	SP229	OXSFT	Orientation virtual target shift amount	Set the amount to shift the target position when orientation virtual target position is valid (SP097: SPEC0-bitD=1).	0 to 2048 (360°/4096)	0
3430 to 3432	SP230 to SP232			Use not possible.		

No.	Items			Details	Setting range	Standard setting
3433 (PR)	SP233	JL	Disturbance observer general inertia scale	Set the ratio of the motor inertia + load inertia and motor inertia. $\text{Setting value} = \frac{\text{Motor inertia + load inertia}}{\text{Motor inertia}} \times 100$ (Normally, set "100" or more. When less than "50" is set, the setting will be invalid.)	0 to 5000 (%)	0
3434 (PR)	SP234	OBS1	Disturbance observer low path filter frequency	Set the frequency of the low path filter for when the disturbance observer is valid. Setting (1/s) = $2\pi f$ f: Approx. 1.5 times the disturbance frequency	0 to 1000 (1/s)	0
3435 (PR)	SP235	OBS2	Disturbance observer gain	Set the gain for the disturbance observer.	0 to 500 (%)	0
3436	SP236	OBS3		This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
3437	SP237			Not used. Set to "0".	0	0
3438 to 3441	SP238 to SP241			Use not possible.	0	0
3442	SP242	Vavx		This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
3443	SP243	UTTM			0	0
3444	SP244	OPLP			0	0
3445	SP245	PGHS			0	0
3446	SP246	TEST			0	0
3447 to 3448	SP247 to SP248			Use not possible.	0	0
3449	SP249	SM0	Speed meter speed	Set the motor rotation speed when the speed meter 10V is output. When set to "0", this parameter becomes the same as SP017 (TSP).	0 to 32767 (r/min)	0
3450	SP250	LM0	Load meter voltage	Set the voltage when the load meter 120% is output. When set to "0", this becomes 10V.	0 to 10 (V)	0
3451 to 3452	SP251 to SP252			Use not possible.	0	0

No.	Items			Details	Setting range	Standard setting
3453	SP253	DA1NO	D/A output channel 1 data number	Set the output data number for channel 1 of the D/A output function. When set to "0", the output is speedometer. Refer to "9.4 (1) For D/A output functions".	–32768 to 32767	0
3454	SP254	DA2NO	D/A output channel 2 data number	Set the output data number for channel 2 of the D/A output function. When set to "0", the output is load meter. Refer to "9.4 (1) For D/A output functions".	–32768 to 32767	0
3455	SP255	DA1MPY	DA output channel 1 magnifica-tion	Set the data magnification for channel 1 of the D/A output function. The output magnification is the setting value divided by 256. When set to "0", the output magnification becomes 1-fold, in the same manner as when "256" is set. Refer to "9.4 (1) For D/A output functions".	–32768 to 32767 (1/256-fold)	0
3456	SP256	DA2MPY	DA output channel 2 magnifica-tion	Set the data magnification for channel 2 of the D/A output function. The output magnification is the setting value divided by 256. When set to "0", the output magnification becomes 1-fold, in the same manner as when "256" is set. Refer to "9.4 (1) For D/A output functions".	–32768 to 32767 (1/256-fold)	0

No.	Items			Details	Setting range	Standard setting
3457 (PR) to 3520 (PR)	SP257 to SP320	RPM BSD	Motor constant (H coil)	This parameter is valid only in the following two conditional cases: (a) In case that SP034 (SFNC2) bit0=1 and SP034 (SFNC2) bit2=0 Set the motor constants when using a special motor, not described in the SP040 (MTYP) explanation and when not using the coil changeover motor. (b) In case that SP034 (SFNC2) bit0=1 and SP034 (SFNC2) bit2=1 Set the motor constant of the H coil of the coil changeover motor. **(Note)** It is not allowed for the user to change the setting.	0000 to FFFF HEX setting	0000
3521 (PR) to 3584 (PR)	SP321 to SP384	RPML BSDL	Motor constant (L coil)	This parameter is valid only in the following conditional case: (a) In case that SP034 (SFNC2) bit0=1 and SP034 (SFNC2) bit2=1 Set the motor constant of the L coil of the coil changeover motor. **(Note)** It is not allowed for the user to change the setting.	0000 to FFFF HEX setting	0000

8.4 MDS-C1-SPM

The spindle parameter setting and display method will differ according to the NC being used, so refer to Instruction Manual for each NC and the following spindles.

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For parameters marked with a (PR) in the tables, turn the NC power OFF after setting. The parameters will be valid after the power is turned ON again.
The "fixed control constants" and "fixed control bits" in this section are set by Mitsubishi.

⚠ **CAUTION**

⚠ Do not make remarkable adjustments or changes of the parameters as the operation may become unstable.

⚠ In the explanation on bits, set all bits not used, including blank bits, to "0".

No.	Items			Details	Setting range	Standard setting
3201	SP001	PGM	Magnetic sensor and motor built-in encoder orientation position loop gain	As the set value is larger, the orientation time becomes shorter and servo rigidity is increased. However, vibration is increased and the machine becomes likely to overshoot.	0 to 2000 (0.1 1/s)	100
3202	SP002	PGE	Encoder orientation position loop gain	As the set value is larger, the orientation time becomes shorter and servo rigidity is increased. However, vibration is increased and the machine becomes likely to overshoot.	0 to 2000 (0.1 1/s)	100
3203	SP003	PGC0	C-axis non-cutting position loop gain	Set the position loop gain in C-axis non-cutting mode. During non-cutting (rapid traverse, etc.) with the C axis control, this position loop gain setting is valid.	1 to 200 (1/s)	15
3204	SP004	OINP	Orientation in-position width	Set the position error range in which an orientation completion signal is output.	1 to 2880 (1/16 °)	16
3205 (PR)	SP005	OSP	Orientation mode changing speed limit value	Set the motor speed limit value to be used when the speed loop is changed to the position loop in orientation mode. When this parameter is set to "0", SP017 (TSP) becomes the limit value.	0 to 32767 (r/min)	0
3206	SP006	CSP	Orientation mode deceleration rate	As the set value is larger, the orientation time becomes shorter. However, the machine becomes likely to overshoot.	1 to 1000	20
3207	SP007	OPST	In-position shift amount for orientation	Set the stop position for orientation. (i) Motor built-in encoder, encoder: Set the value by dividing 360° by 4096. (ii) Magnetic sensor: Divide –5° to +5° by 1024 and put 0° for 0.	(i) 0 to 4095 (ii) –512 to 512	0
3208	SP008			Not used. Set to "0".	0	0

No.	Items			Details	Setting range	Standard setting
3209	SP009	PGT	Synchronized tapping Position loop gain	Set the spindle position loop gain in synchronized tapping mode.	1 to 200 (1/s)	15
3210	SP010	PGS	Spindle synchronous position loop gain	Set the spindle position loop gain in spindle synchronization mode.	1 to 200 (1/s)	15
3211 to 3216	SP011 to SP016			Use not possible.	0	0
3217 (PR)	SP017	TSP	Maximum motor speed	Set the maximum motor speed of the spindle.	1 to 32767 (r/min)	6000
3218 (PR)	SP018	ZSP	Motor zero speed	Set the motor speed for which zero-speed output is performed.	1 to 1000 (r/min)	50
3219 (PR)	SP019	CSN1	Speed cushion 1	Set the time constant for a speed command from "0" to the maximum speed. (This parameter is invalid in position loop mode.)	1 to 32767 (10ms)	30
3220 (PR)	SP020	SDTS	Speed detection set value	Set the motor speed so for which speed detection output is performed. Usually, the setting value is 10% of SP017 (TSP).	0 to 32767 (r/min)	600
3221	SP021	TLM1	Torque limit 1	Set the torque limit rate for torque limit signal 001.	0 to 120 (%)	10
3222 (PR)	SP022	VGNP1	Speed loop gain proportional term under speed control	Set the speed loop proportional gain in speed control mode. When the gain is increased, response is improved but vibration and sound become larger.	0 to 1000 (1/s)	63
3223 (PR)	SP023	VGNI1	Speed loop gain integral term under speed control	Set the speed loop integral gain in speed control mode. Usually, set a value in proportion to SP022 (VGNP1).	0 to 1000 (0.1 1/s)	60
3224	SP024			Use not possible.	0	0
3225 (PR)	SP025	GRA1	Spindle gear teeth count 1	Set the number of gear teeth of the spindle corresponding to gear 000.	1 to 32767	1
3226 (PR)	SP026	GRA2	Spindle gear teeth count 2	Set the number of gear teeth of the spindle corresponding to gear 001.	1 to 32767	1
3227 (PR)	SP027	GRA3	Spindle gear teeth count 3	Set the number of gear teeth of the spindle corresponding to gear 010.	1 to 32767	1
3228 (PR)	SP028	GRA4	Spindle gear teeth count 4	Set the number of gear teeth of the spindle corresponding to gear 011.	1 to 32767	1
3229 (PR)	SP029	GRB1	Motor shaft gear teeth count 1	Set the number of gear teeth of the motor shaft corresponding to gear 000.	1 to 32767	1

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3230
(PR)</td><td>SP030</td><td>GRB2</td><td>Motor shaft gear teeth count 2</td><td>Set the number of gear teeth of the motor shaft corresponding to gear 001.</td><td>1 to 32767</td><td>1</td></tr>
<tr><td>3231
(PR)</td><td>SP031</td><td>GRB3</td><td>Motor shaft gear teeth count 3</td><td>Set the number of gear teeth of the motor shaft corresponding to gear 010.</td><td>1 to 32767</td><td>1</td></tr>
<tr><td>3232
(PR)</td><td>SP032</td><td>GRB4</td><td>Motor shaft gear teeth count 4</td><td>Set the number of gear teeth of the motor shaft corresponding to gear 011.</td><td>1 to 32767</td><td>1</td></tr>
<tr><td>3233
(PR)</td><td>SP033</td><td>SFNC1</td><td>Spindle function 1</td><td>Set the spindle function 1 in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td>poff</td><td></td><td></td><td>ront</td><td></td><td></td><td>pycal</td><td>pychg</td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>pyst</td><td>pyoff</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td></td><td></td><td></td></tr>
<tr><td>1</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td></td><td></td><td></td></tr>
<tr><td>3</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td></td><td></td><td></td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td></td><td></td><td></td></tr>
<tr><td>9</td><td></td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td colspan="2">This is used by Mitsubishi.
Set to "0" unless particularly designated.</td></tr>
<tr><td>C</td><td>ront</td><td>Normal ready ON</td><td>High-speed ready ON</td></tr>
<tr><td>D</td><td></td><td colspan="2">This is used by Mitsubishi.
Set to "0" unless particularly designated.</td></tr>
<tr><td>E</td><td></td><td></td><td></td></tr>
<tr><td>F</td><td>poff</td><td>Contactor hold at NC power OFF invalid</td><td>Contactor hold at NC power OFF valid</td></tr>
</table>
</td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr>
<td>3234
(PR)</td>
<td>SP034</td>
<td>SFNC2</td>
<td>Spindle function 2</td>
<td>Set the spindle function 2 in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td></td><td></td><td></td><td>mkc2</td><td>mkch</td><td>Mk3c</td><td>mts1</td></tr>
</table>
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>mts1</td><td>Special motor constant invalid</td><td>Special motor constant setting valid</td></tr>
<tr><td>1</td><td>Mk3c</td><td>3-step coil changeover function invalid</td><td>3-step coil changeover function valid</td></tr>
<tr><td>2</td><td>mkch</td><td>Coil switch function invalid</td><td>Coil switch function valid</td></tr>
<tr><td>3</td><td>mkc2</td><td>Coil switch specification 2 invalid</td><td>Coil switch specification 2 valid (Note1) (Note2)</td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td></td><td></td><td></td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td></td><td></td><td></td></tr>
<tr><td>9</td><td></td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td></td><td></td><td></td></tr>
<tr><td>E</td><td></td><td></td><td></td></tr>
<tr><td>F</td><td></td><td></td><td></td></tr>
</table>
(Note1) To validate bit3(mkc2), NC side needs to prepare.
(Note2) Always turn the bit2 at the same time to use bit3.</td>
<td>0000 to FFFF HEX setting</td>
<td>000C</td>
</tr>
</table>

No.	Items			Details	Setting range	Standard setting
3235 (PR)	SP035	SFNC3	Spindle function 3	Set the spindle function 3 in bit units.	0000 to FFFF HEX setting	0000

F	E	D	C	B	A	9	8

7	6	5	4	3	2	1	0
					mwid	lwid	hwid

(Note) Always set "0" for the empty bits.

bit	Name	Meaning when set to 0	Meaning when set to 1
0	hwid	H coil output characteristics change invalid	H coil output characteristics change valid
1	lwid	L coil output characteristics change invalid	L coil output characteristics change valid
2	mwid	M coil output characteristics change invalid	M coil output characteristics change valid
3			
4			
5			
6			
7			
8		(Used with SPJ.)	
9			
A			
B			
C			
D			
E			
F			

No.	Items			Details	Setting range	Standard setting
3236	SP036			Not used. Set to "0".		
3237 (PR)	SP037	SFNC5	Spindle function 5	Set the spindle function 5 in bit units. (See bit layout and table below.)	0000 to FFFF HEX setting	0000

Set the spindle function 5 in bit units.

F	E	D	C	B	A	9	8
						nsno	nosg

7	6	5	4	3	2	1	0
					plgo		enco

(Note) Always set "0" for the empty bits.

bit	Name	Meaning when set to 0	Meaning when set to 1
0	enco	Encoder orientation invalid	Encoder orientation valid
1			
2	plgo	PLG orientation invalid	PLG orientation valid
3			
4			
5			
6			
7			
8	nosg	No-signal detection type (Always monitoring)	Monitoring only in position loop or orientation-mode
9	nsno	No-signal detection valid	No-signal detection invalid
A			
B			
C			
D			
E			
F			

(Note) For bit0 to 2, do not set two bits or more to "1" at the same time.

No.	Items			Details	Setting range	Standard setting
3238 (PR)	SP038	SFNC6	Spindle function 6	Set the spindle function 6 in bit units.	0000 to FFFF HEX setting	0000

F	E	D	C	B	A	9	8
			XFzs			pl80	sdt2

7	6	5	4	3	2	1	0
hzrn	orm		tdn	plg2	pftm		alty

(Note) Always set "0" for the empty bits.

bit	Name	Meaning when set to 0	Meaning when set to 1
0	alty	Deceleration stop during special alarm invalid	Deceleration stop during special alarm valid
1			
2	pftm	Encoder feedback serial communication invalid	Encoder feedback serial communication valid
3	plg2	Semi-closed pulse output signal ×2 invalid	Semi-closed pulse output signal ×2 valid
4	tdn	Fixed control bit	
5			
6	orm	Orientation start memo invalid	Orientation start memo valid
7	hzrn	Fixed control bit	
8	sdt2		
9	pl80		
A			
B			
C	XFzs	Fixed control bit	
D			
E			
F			

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3239
(PR)</td><td>SP039</td><td>ATYP</td><td>Amplifier type</td><td>Set the amplifier type.
Set each amplifier type or "0"
<table>
<tr><th>Parameter setting</th><th>Amplifier type</th></tr>
<tr><td>0000</td><td>—</td></tr>
<tr><td>0001</td><td>—</td></tr>
<tr><td>0002</td><td>—</td></tr>
<tr><td>0003</td><td>—</td></tr>
<tr><td>0004</td><td>—</td></tr>
<tr><td>0005</td><td>—</td></tr>
<tr><td>0006</td><td>—</td></tr>
<tr><td>0007</td><td>SPM-110</td></tr>
<tr><td>0008</td><td>SPM-150</td></tr>
<tr><td>0009</td><td>SPM-185</td></tr>
<tr><td>000A</td><td>SPM-220</td></tr>
<tr><td>000B</td><td>SPM-260</td></tr>
<tr><td>000C</td><td>SPM-300</td></tr>
<tr><td>000D</td><td>(SPM-370)</td></tr>
<tr><td>000E</td><td>(SPM-450)</td></tr>
<tr><td>000F</td><td>—</td></tr>
<tr><td>0010</td><td>—</td></tr>
</table>
(Note) (SPM-370) and (SPM-450) are used with MDS-B-SPM.</td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
<tr><td>3240
(PR)</td><td>SP040</td><td>MTYP</td><td>Motor type</td><td>
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td></td><td></td><td colspan="5">motr</td></tr>
</table>
<table>
<tr><th>bit</th><th>Name</th><th>Details</th></tr>
<tr><td>0</td><td rowspan="5">motr</td><td rowspan="5">Set the motor type.
Set "0" when using a special motor.</td></tr>
<tr><td>1</td></tr>
<tr><td>2</td></tr>
<tr><td>3</td></tr>
<tr><td>4</td></tr>
<tr><td>5</td><td></td><td></td></tr>
<tr><td>6</td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td></tr>
<tr><td>8</td><td></td><td></td></tr>
<tr><td>9</td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td></tr>
<tr><td>D</td><td></td><td></td></tr>
<tr><td>E</td><td></td><td></td></tr>
<tr><td>F</td><td></td><td></td></tr>
</table>
</td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
3241 (PR)	SP041	PTYP	Power supply type	Power supply type (bit layout and explanation below)	0000 to FFFF HEX setting	0000
3242 (PR)	SP042	CRNG	C-axis detector range	This parameter is used to set the C-axis detector range. Set "0" for this parameter. "2" is used by Mitsubishi for testing.	0 to 7	0

Power supply type

F	E	D	C	B	A	9	8
amp				rtyp			

7	6	5	4	3	2	1	0
ptyp							

bit		Explanation
0 to 7	ptyp	When the CN4 connector of the drive unit and the power supply are connected, setting below is necessary. To validate the external emergency stop function, add 40h.
8 to B	rtyp	Set the regenerative resistor type when MDS-A-CR is used.
C to F	amp	Always set to "0".

ptyp:

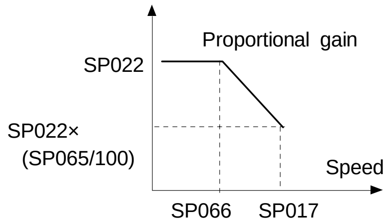
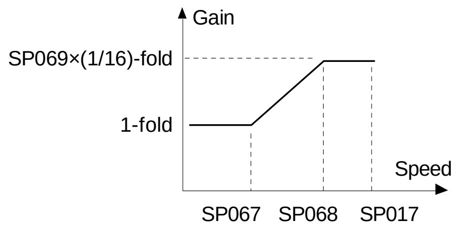
Setting	0x	1x	2x	3x	4x	5x	6x	7x	8x
x0	Not used			CV-300					
x1		CV-110							CR-10
x2			CV-220						CR-15
x3									CR-22
x4	CV-37								CR-37
x5		CV-150			CV-450	CV-550			
x6	CV-55		CV-260						CR-55
x7				CV-370					
x8	CV-75								CR-75
x9		CV-185							CR-90

rtyp:

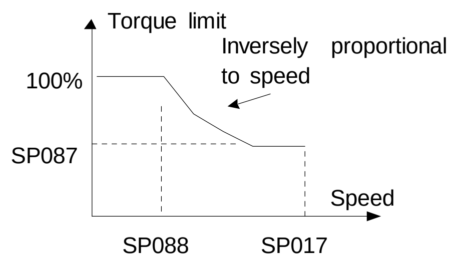
Setting	Regenerative resistor model name	Resistance value	Capacity
0	MDS-C1-CV (Setting when using power supply regeneration)		
1	GZG200W260HMJ	26Ω	80W
2	GZG300W130HMJ×2	26Ω	150W
3	MR-RB30	13Ω	300W
4	MR-RB50	13Ω	500W
5	GZG200W200HMJ×3	6.7Ω	350W
6	GZG300W200HMJ×3	6.7Ω	500W
7	R-UNIT-1	30Ω	700W
8	R-UNIT-2	15Ω	700W
9	R-UNIT-3	15Ω	2100W
A to D	No setting		
E	Large capacity + ready ON high-speed sequence		
F	Ready ON high-speed sequence		

No.	Items			Details	Setting range	Standard setting
3243 (PR)	SP043	TRNG	Synchronous tapping, spindle synchronous detector range	This parameter is used to set the synchronous tapping or spindle synchronous detector range. Set "0" for this parameter.	0 to 7	0
3244 (PR)	SP044	TRANS	NC communication frequency	Set a frequency of data communication with NC.	0 to 32767	Standard: 0 Special: 1028
3245	SP045	CSNT	Dual cushion timer	Set the cycle to add the increment values in the dual cushion process. When this setting value is increased, the dual cushion will increase, and the changes in the speed during acceleration/deceleration will become gradual.	0 to 1000 (ms)	0
3246 (PR)	SP046	CSN2	Speed command dual cushion	For an acceleration/deceleration time constant defined in SP019 (CSN1) , this parameter is used to provide smooth movement only at the start of acceleration/deceleration. As the value of this parameter is smaller, it moves smoother but the acceleration/deceleration time becomes longer. To make this parameter invalid, set "0".	0 to 1000	0
3247 (PR)	SP047	SDTR	Speed detection reset value	Set the reset hysteresis width for a speed detection set value defined in SP020 (SDTS).	0 to 1000 (r/min)	30
3248 (PR)	SP048	SUT	Speed reach range	Set the speed deviation rate with respect to the commanded speed for output of the speed reach signal.	0 to 100 (%)	15
3249	SP049	TLM2	Torque limit 2	Set the torque limit rate for the torque limit signal 010.	1 to 120 (%)	20
3250	SP050	TLM3	Torque limit 3	Set the torque limit rate for the torque limit signal 011.	1 to 120 (%)	30
3251	SP051	TLM4	Torque limit 4	Set the torque limit rate for the torque limit signal 100.	1 to 120 (%)	40
3252	SP052	TLM5	Torque limit 5	Set the torque limit rate for the torque limit signal 101.	1 to 120 (%)	50
3253	SP053	TLM6	Torque limit 6	Set the torque limit rate for the torque limit signal 110.	1 to 120 (%)	60
3254	SP054	TLM7	Torque limit 7	Set the torque limit rate for the torque limit signal 111.	1 to 120 (%)	70
3255 (PR)	SP055	SETM	Excessive speed deviation timer	Set the timer value until the excessive speed deviation alarm is output. The value of this parameter should be longer than the acceleration/deceleration time.	0 to 60 (s)	12

No.	Items			Details	Setting range	Standard setting
3256	SP056			Use not possible.	0	0
3257 (PR)	SP057	STOD	Constant → excessive judgment value	Set the value for judging when changing from a constant to excessive speed command.	0 to 50 (r/min)	0
3258 (PR)	SP058	SDT2	2nd speed detection speed	Set the speed for turning the 2nd speed detection ON. (This is valid only when SP038: SFNC6-bit8 is set to "1".) If the speed drops below this set speed, the 2nd speed detection will turn ON. When the speed reaches this set speed +15r/min or more, the 2nd speed detection will turn OFF. If SP034: SFNC2-bit1 is set to "1", this will be the medium-speed and high-speed coil changeover speed. The speed detection reset width follows the SP047 (speed detection reset width) setting.	0 to 32767 (r/min)	0
3259 (PR)	SP059	MKT	Winding changeover base shut-off timer	Set the base shut-off time for contactor switching at winding changeover. Note that the contactor may be damaged with burning if the value of this parameter is too small.	50 to 10000 (ms)	150
3260 (PR)	SP060	MKT2	Current limit timer after winding changeover	Set the current limit time to be taken after completion of contactor switching at winding changeover.	0 to 10000 (ms)	500
3261 (PR)	SP061	MKIL	Current limit value after winding changeover	Set the current limit value during a period defined in SP060 (MKT2) after completion of contactor switching at winding changeover.	0 to 120 (%)	75
3262	SP062			Not used. Set to "0".	0	0
3263 (PR)	SP063	OLT	Overload alarm detection time	Set the time constant for detection of the motor overload alarm.	0 to 1000 (s)	60
3264 (PR)	SP064	OLL	Overload alarm detection level	Set the detection level of the motor overload alarm.	0 to 180 (%)	110
3265 (PR)	SP065	VCGN1	Target value of variable speed loop proportional gain	Set the magnification of speed loop proportional gain with respect to SP022 (VGNP1) at the maximum motor speed defined in SP017 (TSP).	0 to 100 (%)	100

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3266
(PR)</td><td>SP066</td><td>VCSN1</td><td>Change starting speed of variable speed loop proportional gain</td><td>Set the speed when the speed loop proportional gain change starts.

</td><td>0 to 32767
(r/min)</td><td>0</td></tr>
<tr><td>3267
(PR)</td><td>SP067</td><td>VIGWA</td><td>Change starting speed of variable current loop gain</td><td>Set the speed where the current loop gain change starts.</td><td>0 to 32767
(r/min)</td><td>0</td></tr>
<tr><td>3268
(PR)</td><td>SP068</td><td>VIGWB</td><td>Change ending speed of variable current loop gain</td><td>Set the speed where the current loop gain change ends.</td><td>0 to 32767
(r/min)</td><td>0</td></tr>
<tr><td>3269
(PR)</td><td>SP069</td><td>VIGN</td><td>Target value of variable current loop gain</td><td>Set the magnification of current loop gain (torque component and excitation component) for a change ending speed defined in SP068 (VIGWB).
When this parameter is set to "0", the magnification is 1.

<table>
<tr><th>SP017 (TSP)
Maximum
motor speed</th><th>SP067
(VIGWA)</th><th>SP068
(VIGWB)</th><th>SP069
(VIGN)</th></tr>
<tr><td>0 to 6000</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>6001 to 8000</td><td>5000</td><td>8000</td><td>45</td></tr>
<tr><td>8001 or more</td><td>5000</td><td>10000</td><td>64</td></tr>
</table></td><td>0 to 32767

(1/16-fold)</td><td>0</td></tr>
<tr><td>3270</td><td>SP070</td><td>FHz</td><td>Machine resonance suppression filter frequency</td><td>When machine vibration occurs in speed and position control, set the frequency of the required vibration suppression.
Note that a value of 100Hz or more is set.
Set to "0" when not used.</td><td>0 to 3000
(Hz)</td><td>0</td></tr>
<tr><td>3271
to
3275</td><td>SP071
to
SP075</td><td></td><td></td><td>Use not possible.</td><td>0</td><td>0</td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
3276	SP076	FONS	Machine resonance suppression filter operation speed	When the vibration increases in motor stop (ex. in orientation stop) when the machine vibration suppression filter is operated by SP070, operate the machine vibration suppression filter at a speed of this parameter or more. When set to "0", this is validated for all speeds.	0 to 32767 (r/min)	0
3277 (PR)	SP077	TDSL	Fixed control constant	Set by Mitsubishi. Set "14" unless designated in particular.		14
3278 (PR)	SP078	FPWM	Fixed control constant	Set by Mitsubishi. Set "1" unless designated in particular.	1	1
3279	SP079			Use not possible.	0	0
3280	SP080	SWTD	Fixed control constant	Set by Mitsubishi. Set "0" unless designated in particular.	0	0
3281 to 3286	SP081 to SP086			Use not possible.	0	0
3287 (PR)	SP087	DIQM	Target value of variable torque limit magnifica-tion at deceleration	Set the minimum value of variable torque limit at deceleration.	0 to 150 (%)	75
3288 (PR)	SP088	DIQN	Speed for starting change of variable torque limit magnifica-tion at deceleration	Set the speed where the torque limit value at deceleration starts to change.  	0 to 32767 (r/min)	3000
3289 to 3292	SP089 to SP092			Use not possible.	0	0
3293 (PR)	SP093	ORE	Tolerable pulse check error	Set this when detecting the pulse detector's pulse mistakes. (Valid only for full close control.)	0 to 32767	0
3294 (PR)	SP094	LMAV	Load meter output filter	Set the filter time constant of load meter output. When "0" is set, a filter time constant is set to 100ms.	0 to 32767 (2ms)	0
3295 (PR)	SP095	VFAV	Fixed control constant	Set by Mitsubishi. Set "0" unless designated in particular.	0	0

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3296
(PR)</td><td>SP096</td><td>EGAR</td><td>Encoder gear ratio</td><td>Set the gear ratio between the spindle end and the encoder end (except for the motor-built-in encoder) as indicated below.
<table>
<tr><th>Setting value</th><th>Gear ratio (deceleration)</th></tr>
<tr><td>0</td><td>1 : 1</td></tr>
<tr><td>1</td><td>1 : 2</td></tr>
<tr><td>2</td><td>1 : 4</td></tr>
<tr><td>3</td><td>1 : 8</td></tr>
<tr><td>4</td><td>1 : 16</td></tr>
</table>
(Note) Use a combination so that the encoder end is slower than the spindle end.</td><td>0 to 4</td><td>0</td></tr>
<tr><td>3297
(PR)</td><td>SP097</td><td>SPECO</td><td>Orientation specifica-tion</td><td>Set the orientation specifications in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td>ostp</td><td>orze</td><td>ksft</td><td>gchg</td><td></td><td>ips2</td><td></td><td></td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>vg8x</td><td></td><td>fdir</td><td>osc1</td><td></td><td>dmin</td><td>odi2</td><td>odi1</td></tr>
</table>
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>odi1</td><td colspan="2" rowspan="2">Orientation rotation direction
00: Previous (the direction in which the motor has so far rotated under speed control)
01: Forward rotation
10: Backward rotation
11: Prohibited (Same as setting value = 10)</td></tr>
<tr><td>1</td><td>odi2</td></tr>
<tr><td>2</td><td>dmin</td><td>Orientation in-position advance invalid</td><td>Orientation in-position advance valid</td></tr>
<tr><td>3</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td>osc1</td><td>Indexing speed clamp invalid</td><td>Indexing speed clamp valid</td></tr>
<tr><td>5</td><td>fdir</td><td>Encoder detector polarity: +</td><td>Encoder detector polarity: –</td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td>vg8x</td><td>Speed gain *1/8 during torque limit valid</td><td>Speed gain *1/8 during torque limit invalid</td></tr>
<tr><td>8</td><td></td><td></td><td></td></tr>
<tr><td>9</td><td></td><td colspan="2"></td></tr>
<tr><td>A</td><td>ips2</td><td>2nd in-position invalid</td><td>2nd in-position valid</td></tr>
<tr><td>B</td><td></td><td colspan="2"></td></tr>
<tr><td>C</td><td>gchg</td><td>Gain changeover during orientation invalid</td><td>Gain changeover during orientation valid</td></tr>
<tr><td>D</td><td>ksft</td><td>Orientation virtual target shift invalid</td><td>Orientation virtual target shift valid</td></tr>
<tr><td>E</td><td>orze</td><td colspan="2" rowspan="2">This is used by Mitsubishi.
Set to "0" unless particularly designated.</td></tr>
<tr><td>F</td><td>ostp</td></tr>
</table>
<table>
<tr><td></td><td></td><td colspan="2">In-position advance (bit 2)</td></tr>
<tr><td></td><td></td><td>0 (invalid)</td><td>1 (valid)</td></tr>
<tr><td rowspan="2">Second in-position</td><td>0
(Invalid)</td><td rowspan="2">In-position signal in OINP width=1
Control output 4/ bit 4=1
Second in-position signal=0
Control output 4/ bit F=1</td><td>In-position signal in OINP width=1
Control output 4/ bit 4=1
Second in-position signal=0
Control output 4/ bit F=0</td></tr>
<tr><td>1
(Valid)</td><td>In-position signal in DINP width=1
Control output 4/ bit 4=1
Second in-position signal in OINP width = 0
Control output 4/ bit F=1</td></tr>
</table></td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
3298 (PR)	SP098	VGOP	Speed loop gain proportional term in orientation mode	Set the speed loop proportional gain in orientation mode. When the gain is increased, rigidity is improved in the orientation stop but vibration and sound become larger.	0 to 2000 (1/s)	63
3299 (PR)	SP099	VGOI	Orientation mode speed loop gain integral term	Set the speed loop integral gain in orientation mode.	0 to 2000 (0.1 1/s)	60
3300 (PR)	SP100	VGOD	Orientation mode speed loop gain delay advance term	Set a loop gain delay advance gain in orientation mode. When this parameter is set to "0", PI control is applied.	0 to 1000 (0.1 1/s)	15
3301 (PR)	SP101	DINP	Orientation advance in-position width	When using the orientation in-position advance function, set the in-position width that is larger than the normal in-position width defined in SP004 (OINP).	1 to 2880 (1/16°)	16
3302 (PR)	SP102	OODR	Excessive error value in orientation mode	Set the excessive error width in orientation mode.	0 to 32767 (1/4 pulse) (1 pulse= 0.088°)	32767
3303 (PR)	SP103	FTM	Index positioning completion OFF time timer	Set the time for forcedly turn OFF the index positioning completion signal (different from the orientation completion signal) after the leading edge of the indexing start signal.	0 to 10000 (ms)	200
3304 (PR)	SP104	TLOR	Torque limit value for orientation servo locking	Set the torque limit value for orientation in-position output. If the external torque limit signal is input, the torque limit value set by this parameter is made invalid.	0 to 120 (%)	100
3305 (PR)	SP105	IQG0	Current loop gain magnification 1 in orientation mode	Set the magnification for current loop gain (torque component) at orientation completion.	1 to 1000 (%)	100
3306 (PR)	SP106	IDG0	Current loop gain magnification 2 in orientation mode	Set the magnification for current loop gain (excitation component) at orientation completion.	1 to 1000 (%)	100
3307	SP107	CSP2	Deceleration rate 2 in orientation mode	Set the deceleration rate in orientation mode corresponding to the gear 001. When this parameter is set to "0", same as SP006 (CSP).	0 to 1000	0
3308	SP108	CSP3	Deceleration rate 3 in orientation mode	Set the deceleration rate in orientation mode corresponding to the gear 010. When this parameter is set to "0", same as SP006 (CSP).	0 to 1000	0

No.	Items			Details	Setting range	Standard setting
3309	SP109	CSP4	Deceleration rate 4 in orientation mode	Set the deceleration rate in orientation mode corresponding to the gear 011. When this parameter is set to "0", same as SP006 (CSP).	0 to 1000	0
3310 to 3313	SP110 to SP003			Use not possible.		0
3314	SP114	OPER	Orientation pulse miss check value	An alarm "5C" will occur if the pulse miss value at the orientation stop exceeds this setting value. (Note that this is invalid when set to "0".) In this parameter, set the value to fulfill the following conditions. SP114 setting value > 1.5 × SP004 (orientation in-position width)	0 to 32767 (360°/4096)	0
3315	SP115	OSP2	Orientation motor speed clamp value 2	When the orientation clamp speed is changed by the control input, this parameter setting will be used instead of SP005: OSP. Indexing speed clamp valid This parameter is used when (SP097: SPEC0-bit4 = 1).	0 to 32767 (r/min)	0
3316	SP116			Use not possible.	0	0
3317	SP117	ORUT		Set by Mitsubishi. Set "0" unless designated in particular.	0	0
3318	SP118	ORCT	Number of orientation retry times	Set the number of times to retry when an orientation or feedback error occurs. The warning (A9) is issued while retrying orientation, and an alarm (5C) is issued when the set number of times is exceeded.	0 to 100 (time)	0
3319	SP119	MPGH	Orientation position gain H winding compensation magnification	Set the compensation magnification of the orientation position loop gain for the H winding. H winding orientation position loop gain = SP001 (or SP002) × SP119/256 When set to "0", will become the same as SP001 or SP002.	0 to 2560 (1/256-fold)	0
3320	SP120	MPGL	Orientation position gain L winding compensation magnification	Set the compensation magnification of the orientation position loop gain for the L winding. L winding orientation position loop gain = SP001 (or SP002) × SP120/256 When set to "0", will become the same as SP001 or SP002.	0 to 2560 (1/256-fold)	0

No.	Items			Details	Setting range	Standard setting
3321	SP121	MPCSH	Orientation deceleration rate H winding compensation magnification	Set the compensation magnification of the orientation deceleration rate for the H winding. Orientation deceleration rate for the H winding = SP006 × SP121/256 When set to "0", will become the same as SP006.	0 to 2560 (1/256-fold)	0
3322	SP122	MPCSL	Orientation deceleration rate L winding compensation magnification	Set the compensation magnification of the orientation deceleration rate for the L winding. Orientation deceleration rate for the L winding = SP006 × SP122/256 When set to "0", will become the same as SP006.	0 to 2560 (1/256-fold)	0
3323 to 3325	SP123 to SP125			Use not possible.	0	0
3326	SP126	MPGH	Orientation position gain M coil compensation	Set this to set the orientation position loop gain for the coil changeover motor to the M coil's unique value.	0 to 2560 (1/256-fold)	0
3327	SP127	MPCSM	Orientation deceleration rate M coil compensation	Set this to set the orientation deceleration rate for the coil motor to the M coil's unique value.	0 to 2560 (1/256-fold)	0
3328	SP128	OXKPM	Position loop gain magnification after orientation gain changeover (M coil)	Set the M coil gain magnification to be used after in-position when gain changeover is valid (SP097: SPEC0-bitC=1) during orientation.	0 to 2560 (1/256-fold)	0

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3329
(PR)</td><td>SP129</td><td>SPECC</td><td>C-axis specifications</td><td>Set the C-axis specifications in bit units.

<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td>zrtn</td><td>ptyp</td><td>fb9x</td><td>zrtd</td><td>zrn2</td><td></td><td>zdir</td><td>ztyp</td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>vg8x</td><td></td><td>fdir</td><td></td><td>phos</td><td>rtrn</td><td></td><td>fclx</td></tr>
</table>
(Note) Always set "0" for the empty bits.

<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>fclx</td><td>Closed loop</td><td>Semi-closed loop (Gear 1 : 1 only)</td></tr>
<tr><td>1</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>rtrn</td><td>Position monitor during ready OFF invalid</td><td>Position monitor during ready OFF valid</td></tr>
<tr><td>3</td><td>phos</td><td>Normal (no compensation)</td><td>Vx4 synchronization compensation valid</td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td>fdir</td><td>Position detector polarity (+)</td><td>Position detector polarity (–)</td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td>vg8x</td><td>Speed gain × 1/8 during torque limit valid</td><td>Speed gain × 1/8 during torque limit invalid</td></tr>
<tr><td>8</td><td>ztyp</td><td>Z-phase type: Normal start up</td><td>Z-phase type: Start up only</td></tr>
<tr><td>9</td><td>zdir</td><td>Z-phase rising polarity (+)</td><td>Z-phase rising polarity (–)</td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td>zrn2</td><td colspan="2" rowspan="2">This is used by Mitsubishi.
Set to "0" unless particularly designated.</td></tr>
<tr><td>C</td><td>zrtd</td></tr>
<tr><td>D</td><td>fb9x</td><td>Speed feedback Standard (PLG)</td><td>Speed feedback 90,000 pulse detector</td></tr>
<tr><td>E</td><td>ptyp</td><td>Position control switch type: After zero point return</td><td>Position control switch type: After deceleration stop</td></tr>
<tr><td>F</td><td>zrtn</td><td>Zero point return direction: CCW</td><td>Zero point return direction: CW</td></tr>
</table>
</td><td></td><td>0000</td></tr>
<tr><td>3330</td><td>SP130</td><td>PGC1</td><td>First position loop gain for cutting on C-axis</td><td>Set the position loop gain when the first gain is selected for C axis cutting.</td><td>1 to 200
(1/s)</td><td>15</td></tr>
</table>

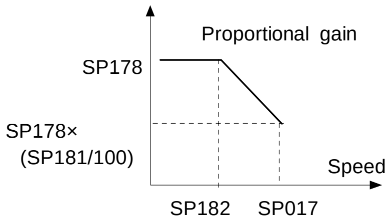
No.	Items			Details	Setting range	Standard setting
3331	SP131	PGC2	Second position loop gain for cutting on C-axis	Set the position loop gain when the second gain is selected for C axis cutting.	1 to 200 (1/s)	15
3332	SP132	PGC3	Third position loop gain for cutting on C-axis	Set the position loop gain when the third gain is selected for C-axis cutting.	1 to 200 (1/s)	15
3333	SP133	PGC4	Stop position loop gain for cutting on C-axis	Set the position loop gain for stopping when carrying out C-axis cutting.	1 to 200 (1/s)	15
3334 (PR)	SP134	VGCP0*	C-axis non-cutting speed loop gain proportional item	Set the speed loop proportional gain in C-axis non-cutting mode.	0 to 5000 (1/s)	63
3335 (PR)	SP135	VGCI0	C-axis non-cutting speed loop gain integral item	Set the speed loop integral gain in C-axis non-cutting mode.	0 to 5000 (0.1 1/s)	60
3336 (PR)	SP136	VGCD0	C-axis non-cutting speed loop gain delay advance item	Set the speed loop delay advance gain in C-axis non-cutting mode. When this parameter is set to "0", PI control is exercised.	0 to 5000 (0.1 1/s)	15
3337 (PR)	SP137	VGCP1	First speed loop gain proportional item for C-axis cutting	Set the speed loop proportional gain when the first gain is selected for C-axis cutting.	0 to 5000 (1/s)	63
3338 (PR)	SP138	VGCI1	First speed loop gain integral item for cutting on C-axis	Set the speed loop integral gain when the first gain is selected for C-axis cutting.	0 to 5000 (0.1 1/s)	60
3339 (PR)	SP139	VGCD1	First speed loop gain delay advance item for cutting on C-axis	Set the speed loop delay advance gain when the first gain is selected for curing on the C-axis. When this parameter is set to "0", PI control is applied.	0 to 5000 (0.1 1/s)	15
3340 (PR)	SP140	VGCP2	Second speed loop gain proportional item for cutting on C-axis	Set the speed loop proportional gain when the second gain is selected for C-axis cutting.	0 to 5000 (1/s)	63
3341 (PR)	SP141	VGCI2	Second speed loop gain integral item for cutting on C-axis	Set the speed loop integral gain when the second gain is selected for C-axis cutting.	0 to 5000 (0.1 1/s)	60
3342 (PR)	SP142	VGCD2	Second speed loop gain delay advance item for cutting on C-axis	Set the speed loop delay advance gain when the second gain is selected for C-axis cutting. When this parameter is set to "0", PI control is applied.	0 to 5000 (0.1 1/s)	15

No.	Items			Details	Setting range	Standard setting
3343 (PR)	SP143	VGCP3	Third speed loop gain proportional item for cutting on C-axis	Set the speed loop proportional gain when the third gain is selected for C-axis cutting.	0 to 5000 (1/s)	63
3344 (PR)	SP144	VGCI3	Third speed loop gain integral item for cutting on C-axis	Set the speed loop integral gain when the third gain is selected for C-axis cutting.	0 to 5000 (0.1 1/s)	60
3345 (PR)	SP145	VGCD3	Third speed loop gain delay advance item for cutting on C-axis	Set the speed loop delay advance gain when the third gain is selected for C-axis cutting. When this parameter is set to "0", PI control is applied.	0 to 5000 (0.1 1/s)	15
3346 (PR)	SP146	VGCP4	Speed loop gain propor- tional item for stop of cutting on C-axis	Set the speed loop proportional gain when C-axis cutting is stopped.	0 to 5000 (1/s)	63
3347 (PR)	SP147	VGCI4	Speed loop gain integral item for stop of cutting on C-axis	Set the speed loop integral gain when C-axis cutting is stopped.	0 to 5000 (0.1 1/s)	60
3348 (PR)	SP148	VGCD4	Speed loop gain delay advance item for stop of cutting on C-axis	Set the speed loop delay advance gain when C-axis cutting is stopped. When this parameter is set to "0", PI control is applied.	0 to 5000 (0.1 1/s)	15
3349	SP149	CZRN	C-axis zero point return speed	This parameter is valid when SP129 (SPECC) bitE is set to "0". Set the zero point return speed used when the speed loop changes to the position loop.	1 to 500 (r/min)	50
3350	SP150	CPDT	C-axis zero point return deceleration point	This parameter is valid when SP129 (SPECC) bitE is set to "0". Set the deceleration rate where the machine starts to decelerate when it returns to the target stop point during C-axis zero point return. When the machine tends to overshoot at the stop point, set the smaller value.	1 to 10000	1
3351	SP151	CPSTL	C-axis zero point return shift amount (low byte)	This parameter is valid when SPECC (SP129) bitE is set to "0". Set the C-axis zero point position.	HEX setting 00000000 to FFFFFFFF (1/1000°)	H: 0000 L: 0000
3352	SP152	CPSTH	C-axis zero point return shift amount (high byte)			

No.	Items			Details	Setting range	Standard setting
3353	SP153	CINP	C-axis in-position width	Set the position error range in which the in-position signal is output on the C-axis.	0000 to FFFF (1/1000°) HEX setting	03E8
3354 (PR)	SP154	CODRL	Excessive error width on C-axis (low byte)	Set the excessive error width on the C-axis.	HEX setting 00000000 to FFFFFFFF (1/1000°)	H: 0001 L: D4C0
3355 (PR)	SP155	CODRH	Excessive error width on C-axis (high byte)			
3356	SP156	OVSH	C-axis overshoot compensa-tion	Set this to prevent overshooting when shifting from movement to stopping with C-axis control. (Set this referring to the load meter display when overshooting occurred.)	0 to 1000 (0.1%)	0
3357	SP157			Not used. Set to "0".	0	0
3358	SP158			Not used. Set to "0".	0	0
3359	SP159			Use not possible.	0	0
3360	SP160			Use not possible.	0	0
3361 (PR)	SP161	IQGC0	Current loop gain magnifi-cation 1 for non-cutting on C-axis	Set the magnification of current loop gain (torque component) for C-axis non-cutting.	1 to 1000 (%)	100
3362 (PR)	SP162	IDGC0	Current loop gain magnifi-cation 2 for non-cutting on C-axis	Set the magnification of current loop gain (excitation component) for C-axis non-cutting.	1 to 1000 (%)	100
3363 (PR)	SP163	IQGC1	Current loop gain magnifi-cation 1 for cutting on C-axis	Set the magnification of current loop gain (torque component) for C-axis cutting.	1 to 1000 (%)	100
3364 (PR)	SP164	IDGC1	Current loop gain magnifi-cation 2 for cutting on C-axis	Set the magnification of current loop gain (excitation component) for C-axis cutting.	1 to 1000 (%)	100
3365	SP165	PG2C	C-axis position loop gain 2	Set the second position loop gain when high-gain control is carried out for control of the C-axis. This parameter is applied to all the operation modes of C-axis control. When this function is not used, assign "0".	0 to 999 (1/s)	0

No.	Items			Details	Setting range	Standard setting
3366	SP166	PG3C	C-axis position loop gain 3	Set the third position loop gain when high-gain control is carried out for control of the C-axis. This parameter is applied to all the operation modes of C-axis control. When this function is not used, assign "0".	0 to 999 (1/s)	0
3367 (PR)	SP167	PGU	Position loop gain for increased spindle holding force	Set the position loop gain for when the disturbance observer is valid.	0 to 100 (1/s)	15
3368 (PR)	SP168	VGUP	Speed loop gain proportional item for increased spindle holding force	Set the speed loop gain proportional item for when the disturbance observer is valid.	0 to 5000 (1/s)	63
3369 (PR)	SP169	VGUI	Speed loop gain integral item for increased spindle holding force	Set the speed loop gain integral item for when the disturbance observer is valid.	0 to 5000 (0.1 1/s)	60
3370 (PR)	SP170	VGUD	Speed loop gain delay advance item for increased spindle holding force	Set the speed loop gain delay advance item for when the disturbance observer is valid.	0 to 5000 (0.1 1/s)	15
3371 to 3376	SP171 to SP176			Not used. Set to "0".	0	0

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3377
(PR)</td><td>SP177</td><td>SPECS</td><td>Spindle synchronous specifica-tions</td><td>Set the spindle synchronous specifications in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td></td><td></td><td>odx8</td><td></td><td></td><td></td><td></td><td>phos</td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td></td><td>fdir</td><td></td><td>mach</td><td></td><td></td><td>fclx</td></tr>
</table>
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>fclx</td><td>Closed loop</td><td>Semi-closed loop</td></tr>
<tr><td>1</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td></td><td></td><td></td></tr>
<tr><td>3</td><td>mach</td><td>Automatic coil change-over during spindle synchronization invalid</td><td>Automatic coil change-over during spindle synchronization valid</td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td>fdir</td><td>Position detector direc-tion (positive direction)</td><td>Position detector direc-tion (negative direction)</td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td></td><td></td><td></td></tr>
<tr><td>9</td><td></td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td>odx8</td><td>Magnification of excessive error width × 8 times invalid</td><td>Magnification of excessive error width × 8 times valid</td></tr>
<tr><td>E</td><td></td><td></td><td></td></tr>
<tr><td>F</td><td></td><td colspan="2">(Used with SPJ)</td></tr>
</table></td><td>0000 to FFFF
HEX setting</td><td>0000</td></tr>
<tr><td>3378
(PR)</td><td>SP178</td><td>VGSP</td><td>Spindle synchronous speed loop gain propor-tional term</td><td>Set the speed loop proportional gain in spindle synchronous mode.</td><td>0 to 2000
(1/s)</td><td>63</td></tr>
<tr><td>3379
(PR)</td><td>SP179</td><td>VGSI</td><td>Spindle synchronous speed loop gain integral term</td><td>Set the speed loop integral gain in spindle synchronous mode.</td><td>0 to 2000
(0.1 1/s)</td><td>60</td></tr>
<tr><td>3380
(PR)</td><td>SP180</td><td>VGSD</td><td>Spindle synchronous speed loop gain delay advance term</td><td>Set the speed loop delay advance gain in spindle synchronous mode.
When this parameter is set to "0", PI control is applied.</td><td>0 to 1000
(0.1 1/s)</td><td>15</td></tr>
<tr><td>3381
(PR)</td><td>SP181</td><td>VCGS</td><td>Spindle synchronous Target value of variable speed loop proportional gain</td><td>Set the magnification of speed loop proportional gain with respect to SP178 (VGSP) at the maximum speed defined in SP017 (TSP) in spindle synchronous mode.</td><td>0 to 100
(%)</td><td>100</td></tr>
</table>

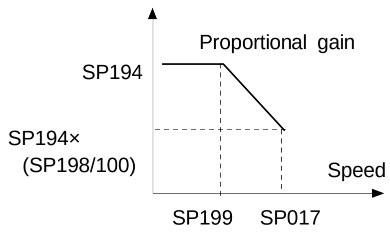
No.	Items			Details	Setting range	Standard setting
3382 (PR)	SP182	VCSS	Spindle synchronous Change starting speed of variable speed loop proportional gain	Set the speed when the speed loop proportional gain change starts in the spindle synchronous mode. 	0 to 32767 (r/min)	0
3383	SP183	SYNV	Spindle synchronous Sync matching speed	For changeover from the speed loop to the position loop in the spindle synchronous mode, set a speed command error range for output of the synchronous speed matching signal.	0 to 1000 (r/min)	20
3384 (PR)	SP184	FFCS	Spindle synchronous Acceleration rate feed forward gain	Set the acceleration rate feed forward gain in the spindle synchronous mode. This parameter is used only with the SPJ2.	0 to 1000 (%)	0
3385	SP185	SINP	Spindle synchronous In-position width	Set the position error range for output of the in-position signal in the spindle synchronous mode.	1 to 2880 (1/16°)	16
3386 (PR)	SP186	SODR	Spindle synchronous Excessive error width	Set the excessive error width in the spindle synchronous mode.	1 to 32767 (pulse) (1 pulse =0.088°)	32767
3387 (PR)	SP187	IQGS	Spindle synchronous Current loop gain magnification1	Set the magnification of current loop gain (torque component) in the spindle synchronous mode.	1 to 1000 (%)	100
3388 (PR)	SP188	IDGS	Spindle synchronous Current loop gain magnification 2	Set the magnification of current loop gain (excitation component) in the spindle synchronous mode.	1 to 1000 (%)	100
3389	SP189	PG2S	Spindle synchronous Position loop gain 2	Set the second position loop gain when high-gain control is carried out in the spindle synchronous mode. When this parameter function is not used, set to "0".	0 to 999 (1/s)	0

No.	Items			Details	Setting range	Standard setting
3390	SP190	PG3S	Spindle synchronous Position loop gain 3	Set the third position loop gain when high-gain control is carried out in the spindle synchronous mode. When this parameter function is not used, set to "0".	0 to 999 (1/s)	0
3391	SP191			Use not possible.	0	0
3392	SP192			Not used. Set to "0".		
3393 (PR)	SP193	SPECT	Synchronized tapping specifications	Set the synchronized tapping specifications in bit units.	0000 to FFFF HEX setting	0000

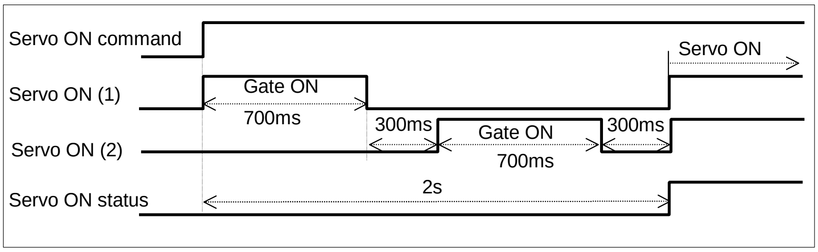
F	E	D	C	B	A	9	8
zrtn	ptyp	od8x					phos

7	6	5	4	3	2	1	0
		fdir	cdir	pyfx	rtrn		fclx

bit	Name	Meaning when set to 0	Meaning when set to 1
0	fclx	Closed loop	Semi-closed loop (Gear 1 : 1 only)
1			
2	rtrn	Position monitor during ready OFF invalid	Position monitor during ready OFF valid
3			
4	cdir	Command polarity (+)	Command polarity (–)
5	fdir	Position detector polarity (+)	Position detector polarity (–)
6			
7			
8	phos	Normal (no compensation)	Synchronized tapping position command compensation (for synchronization with high-gain servo)
9			
A			
B			
C			
D	od8x	Magnification of excessive error width × 8 times invalid	Magnification of excessive error width × 8 times valid
E	ptyp	Position control switch type: After zero point return	Position control switch type: After deceleration stop
F	zrtn	Zero point return direction: CCW	Zero point return direction: CW

No.	Items			Details	Setting range	Standard setting
3394 (PR)	SP194	VGTP	Synchronized tapping speed loop gain proportional term	Set the speed loop proportional gain in synchronized tapping mode.	0 to 2000 (1/s)	63
3395 (PR)	SP195	VGTI	Synchronized tapping speed loop gain integral term	Set the speed loop integral gain in synchronized tapping mode.	0 to2000 (0.1 1/s)	60
3396 (PR)	SP196	VGTD	Synchronized tapping speed loop gain delay advance term	Set the speed loop delay advance gain in synchronized tapping mode. When this parameter is set to "0", PI control is applied.	0 to 1000 (0.1 1/s)	15
3397	SP197			Use not possible.	0	0
3398 (PR)	SP198	VCGT	Synchronized tapping target value of variable speed loop proportional gain	Set the magnification of speed loop proportional gain with respect to SP194 (VGTP) at the maximum motor speed defined in SP017 (TSP) in synchronized tapping mode.	0 to 100 (%)	100
3399 (PR)	SP199	VCST	Synchronized tapping change starting speed of variable speed loop proportional gain	Set the speed where the speed loop proportional gain change starts during synchronized tapping. 	0 to 32767 (r/min)	0

No.	Items			Details	Setting range	Standard setting
3400 (PR)	SP200	FFC1	Synchronized tapping acceleration feed forward gain (gear 1)	Set the acceleration feed forward gain for selection of gear 000 during synchronized tapping. This parameter should be used when an error of relative position to Z-axis servo is large.	0 to 1000 (%)	0
3401 (PR)	SP201	FFC2	Synchronized tapping acceleration feed forward gain (gear 2)	Set the acceleration feed forward gain for selection of gear 001 during synchronized tapping.	0 to 1000 (%)	0
3402 (PR)	SP202	FFC3	Synchronized tapping acceleration feed forward gain (gear 3)	Set the acceleration feed forward gain for selection of gear 010 during synchronized tapping.	0 to 1000 (%)	0
3403 (PR)	SP203	FFC4	Synchronized tapping acceleration feed forward gain (gear 4)	Set the acceleration feed forward gain for selection of gear 011 during synchronized tapping.	0 to 1000 (%)	0
3404	SP204		Fixed control constant	This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
3405	SP205					
3406	SP206	GCK	Reverse run detection error detection width	When the motor moves (including movement with external force), the motor overrun alarm (3E) will be detected even if the speed command is 0 (including position control stop command) during servo ON (gate ON). Set the movement amount to be detected as an alarm. 0: Detect with 10° motor movement amount (Recommended setting) 1: Detect with 20° motor movement amount 2: Detect with 40° motor movement amount	0/1/2	0

No.	Items			Details	Setting range	Standard setting
3407	SP207	GDL	Sequential mode startup timing	To carry out spindle synchronization or C-axis control in the both-chuck state with no movement immediately after the power is turned ON, set this parameter so that the reverse run detection function will function correctly. Set so that servo ON timing for the opposing spindle has the combination of (1) and (2) shown in the drawing below. 0: Servo turns ON simultaneously with servo ON command, and servo ON status is returned immediately. 1: Gate turns ON at pattern (1) shown below, and servo ON status is returned two seconds later. 2: Gate turns ON at pattern (2) shown below, and servo ON status is returned two seconds later. 	0/1/2	0
3408	SP208	W2		This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
3409 to 3413	SP209 to SP213			Not used. Set to "0".	0	0
3414	SP214	TZRN	Synchronized tapping zero point return speed	This parameter is valid when SP193 (SPECT) bitE is set to "0". Set the zero point return speed used when the speed loop changes to the position loop.		
3415	SP215	TPDT	Synchronized tapping zero point return deceleration rate	This parameter is valid when SP193 (SPECT) bitE is set to "0". Set the deceleration rate where the machine starts to decelerate when it returns to the target stop point during synchronized tapping zero point return. When the machine tends to overshoot at the stop point set a smaller value.	0 to 10000 (pulse)	1
3416	SP216	TPST	Synchronized tapping zero point return shift amount	This parameter is valid when SP193 (SPECT) bitE is set to "0". Set the synchronized tapping zero point position.	0 to 4095	0

No.	Items			Details	Setting range	Standard setting
3417	SP217	TINP	Synchronized tapping in-position width	Set the position error range for output of the in-position during synchronized tapping.	1 to 2880 (1/16°)	16
3418 (PR)	SP218	TODR	Synchronized tapping excessive error width	Set the excessive error width during synchronized tapping.	1 to 32767 (pulse) (1 pulse =0.088°)	32767
3419 (PR)	SP219	IQGT	Synchronized tapping current loop gain magnifi-cation 1	Set the magnification of current loop gain (torque component) during synchronized tapping.	1 to 1000 (%)	100
3420 (PR)	SP220	IDGT	Synchronized tapping current loop gain magnifi-cation 2	Set the magnification of current loop gain (excitation component) during synchronized tapping.	1 to 1000 (%)	100
3421	SP221	PG2T	Synchronized tapping position loop gain 2	Set the second position loop gain when high-gain control is applied during synchronized tapping. When this parameter is not used, set to "0".	0 to 999 (1/s)	0
3422	SP222	PG3T	Synchronized tapping position loop gain 3	Set the third position loop gain when high-gain control is applied during synchronized tapping. When this parameter is not used, set to "0".	0 to 999 (1/s)	0
3423	SP223	SPDV	Speed monitor speed	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.	0 to 800 (r/min)	0
3424	SP224	SPDF	Speed monitor time	Set the time (continuous) to detect alarms. (Detected instantly when 0 is set.)	0 to 2813 (3.5ms)	0

No.	Items			Details	Setting range	Standard setting
3425	SP225	OXKPH	Position loop gain magni-fication after orientation gain changeover (H coil)	If gain changeover is valid (SP097: SPEC0-bitC=1) during orientation, set the magnification of each gain changed to after in-position.	0 to 2560 (1/256-fold)	0
3426	SP226	OXKPL	Position loop gain magni-fication after orientation gain changeover (L coil)		0 to 2560 (1/256-fold)	0
3427	SP227	OXVKP	Speed loop proportional gain magnifi-cation after orientation gain changeover		0 to 2560 (1/256-fold)	0
3428	SP228	OXVKI	Speed loop cumulative gain magnifi-cation after orientation gain changeover	If gain changeover is valid (SP097: SPEC0-bitC=1) during orientation, set the magnification of each gain changed to after in-position.	0 to 2560 (1/256-fold)	0
3429	SP229	OXSFT	Orientation virtual target shift amount	Set the amount to shift the target position when orientation virtual target position is valid (SP097: SPEC0-bitD=1).	0 to 2048 (360°/4096)	0
3430 to 3432	SP230 to SP232			Use not possible.		
3433 (PR)	SP233	JL	Disturbance observer general inertia scale	Set the ratio of the motor inertia + load inertia and motor inertia. $\text{Setting value} = \dfrac{\text{Motor inertia + load inertia}}{\text{Motor inertia}} \times 100$ (Normally, set "100" or more. When less than "50" is set, the setting will be invalid.) To calculate speed loop gain with general inertia scale: The effective proportional gain and effective cumulative gain during the speed control are changed at the set scale.	0 to 5000 (%)	0
3434 (PR)	SP234	OBS1	Disturbance observer low path filter frequency	Set the frequency of the low path filter for when the disturbance observer is valid. Setting (1/s) = $2\pi f$ f: Approx. 1.5 times the disturbance frequency	0 to 1000 (1/s)	0

No.	Items			Details	Setting range	Standard setting
3435 (PR)	SP235	OBS2	Disturbance observer gain	Set the gain for the disturbance observer.	0 to 500 (%)	0
3436	SP236	OBS3	Fixed control constant	This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
3437	SP237	KSCP	Fixed control constant	This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
3438	SP238	SEZR				
3439	SP239	SEZT				
3440	SP240			Use not possible.	0	0
3441	SP241			Use not possible.	0	0
3442	SP242	Vavx		This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
3443	SP243	UTTM			0	0
3444	SP244	OPLP		Use not possible.	0	0
3445	SP245	PGHS		This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
3446	SP246	TEST			0	0
3447 to 3448	SP247 to SP248			Use not possible.	0	0
3449	SP249	SM0	Speed meter speed	Set the motor rotation speed when the speed meter 10V is output. When set to "0", this parameter becomes the same as SP017 (TSP).	0 to 32767 (r/min)	0
3450	SP250	LM0	Load meter voltage	Set the voltage when the load meter 120% is output. When set to "0", this becomes 10V.	0 to 10 (V)	0
3451 to 3452	SP251 to SP252			Use not possible.	0	0

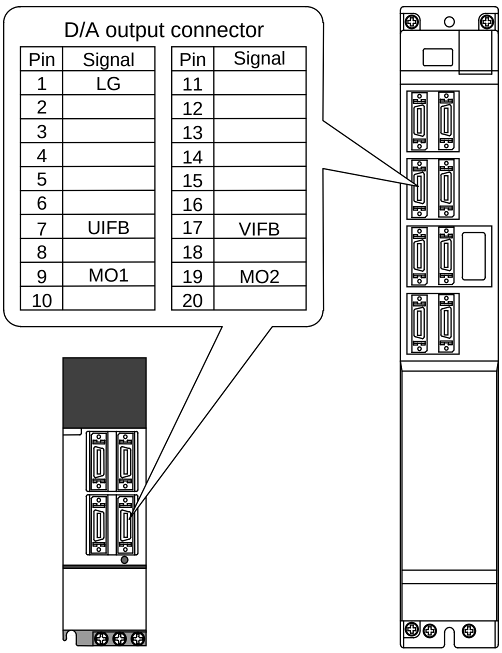
No.	Items			Details	Setting range	Standard setting
3453	SP253	DA1NO	D/A output channel 1 data number	Set the output data number for channel 1 of the D/A output function. When set to "0", the output is speedometer. Refer to "9.4 (1) For D/A output functions".	–32768 to 32767	0
3454	SP254	DA2NO	D/A output channel 2 data number	Set the output data number for channel 2 of the D/A output function. When set to "0", the output is load meter. Refer to "9.4 (1) For D/A output functions".	–32768 to 32767	0
3455	SP255	DA1MPY	DA output channel 1 magnifica-tion	Set the data magnification for channel 1 of the D/A output function. The output magnification is the setting value divided by 256. When set to "0", the output magnification becomes 1-fold, in the same manner as when "256" is set. Refer to "9.4 (1) For D/A output functions".	–32768 to 32767 (1/256-fold)	0
3456	SP256	DA2MPY	DA output channel 2 magnifica-tion	Set the data magnification for channel 2 of the D/A output function. The output magnification is the setting value divided by 256. When set to "0", the output magnification becomes 1-fold, in the same manner as when "256" is set. Refer to "9.4 (1) For D/A output functions".	–32768 to 32767 (1/256-fold)	0
3457 (PR) to 3520 (PR)	SP257 to SP320	RPM BSD	Motor constant (H coil)	This parameter is valid only in the following two conditional cases: (a) In case that SP034 (SFNC2) bit0=1 and SP034 (SFNC2) bit2=0 Set the motor constants when using a special motor, not described in the SP040 (MTYP) explanation and when not using the coil changeover motor. (b) In case that SP034 (SFNC2) bit0=1 and SP034 (SFNC2) bit2=1 Set the motor constant of the H coil of the coil changeover motor. **(Note)** It is not allowed for the user to change the setting.	0000 to FFFF HEX setting	0000
3521 (PR) to 3584 (PR)	SP321 to SP384	RPML BSDL	Motor constant (L coil)	This parameter is valid only in the following conditional case: (a) In case that SP034 (SFNC2) bit0=1 and SP034 (SFNC2) bit2=1 Set the motor constant of the L coil of the coil changeover motor. **(Note)** It is not allowed for the user to change the setting.	0000 to FFFF HEX setting	0000

8.5 Supplement

8.5.1 D/A Output Specifications

(1) D/A output specifications

Item	Explanation
No. of channels	2ch
Output cycle	444µs (min. value)
Output precision	8bit
Output voltage range	0V to +5V (zero) to +10V, 0V to +10V during meter output
Output scale setting	1/256 to ±128 tiems
Output pins	CN9 connector MO1 = 9 pin MO2 = 19 pin GND = 11pin
Function	Phase current feedback output function U–phase current FB : 7 pin



MDS–B–SPJ2 MDS–C1–SP

(2) Setting the output data

Input the No. of the data to be output to each D/A output channel.

#	No.	Abbrev	Parameter name
3453	SP253	DA1NO	D/A output channel 1 data No.
3454	SP254	DA2NO	D/A output channel 2 data No.

No.	Output data	Original data unit	Standard setting value for output scale (Setting values in SP255, SP256)	Standard output unit	Output cycle
0	ch1: Speed meter output	10V=max. speed (0=0V)	0	Depends on the max. speed	3.55ms
	ch2: Load meter output	10V=120% load (0=0V)	0	Rated 12%/V	3.55ms
1	–				
2	Current command	Rated 100% = 4096	8	Rated 20%/V	3.55ms
3	Current feedback	Rated 100% = 4096	8	Rated 20%/V	3.55ms
4	Speed feedback	r/min	13	500rpm/V	3.55ms
5	–				
6	Position droop	1° = (64000/65536)	671	10°/V	888µs
7	–				
8	Feedrate (FΔT)	1° = (64000/65536)	629 (When communicating by 3.5ms)	500rpm/V	888µs
9	–				
10	Position command	1° = (64000/65536)	19 (18.64)	360°/V	888µs
11	–				
12	Position feedback	1° = (64000/65536)	19 (18.64)	360°/V	888µs
13	–				
80	Control input 1	HEX	Bit correspondence		3.55ms
81	Control input 2				
82	Control input 3				
83	Control input 4				
84	Control output 1	HEX	Bit correspondence		3.55ms
85	Control output 2				
86	Control output 3				
87	Control output 4				
125	Saw-tooth wave test output		0 (256)	Cycle 227.5ms	444µs
126	Rectangular wave test output		0 (256)	Cycle 1.7ms	444µs
127	2.5V(data0) test output		0 (256)	–	444µs

(3) Setting the output scale

#	No.	Abbrev	Parameter name
3455	SP255	DA1MPY	D/A output channel 1 magnification
3456	SP256	DA2MPY	D/A output channel 2 magnification

Usually, the standard setting value is set for the output scale (SV063, SV 064). When “0” is set, the output will be made as well as when “256” is set.

$$\text{DATA} \times \frac{\text{SP255}}{256} \times \frac{10\ [\text{V}]}{256\ (\text{8bit})} + 5\ [\text{V}]\ (\text{offset}) = \text{Output voltage [V]}$$

(Example) When outputting the position droop with 10°/V.

$$\frac{640000}{65536} \times \frac{671}{256} \times \frac{10}{256} + 5 = 5.999\ [\text{V}]$$

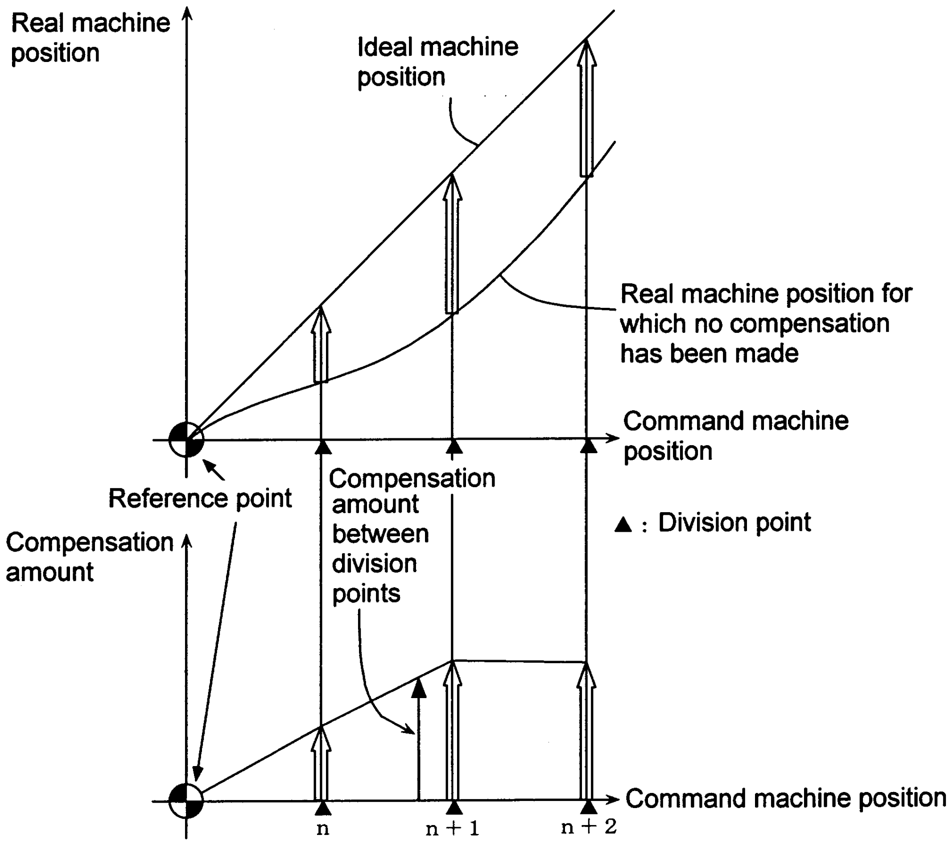
9. Machine Error Compensation

9.1 Function Outline

Machine error compensation includes two independent functions: memorized pitch error compensation and memorized relative position compensation.

(1) Memorized pitch error compensation

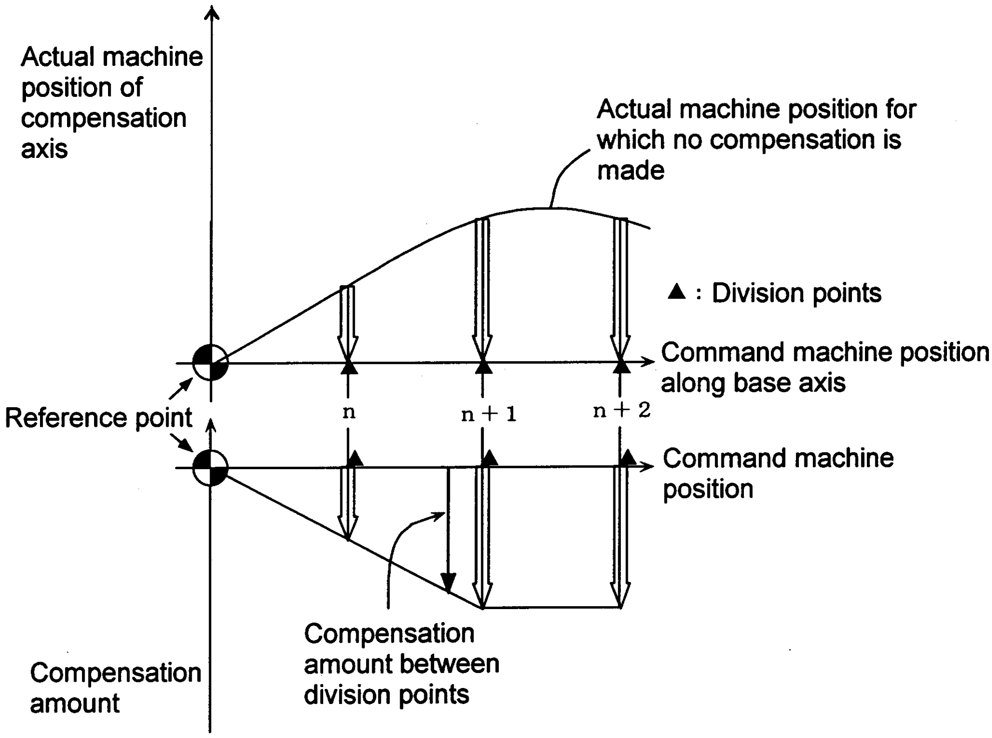
According to the specified parameters, this method compensates an axis feed error caused by a ball screw pitch error, etc.
With the reference point defined as the base, as shown in the following figure, set the compensation amount in the division points obtained by equally dividing the machine coordinates. The compensation amount can be set by either the absolute or incremental system.
Select the desired method with the "#4000 Pinc". Machine position is compensated between division points n and n+1 as much as compensation amount between them by linear approximation.



Relationship between the compensation amount and machine position

(2) Memorized relative position compensation

This method, according to the parameters specified in advance, compensates the relative position error between two orthogonal axes caused by deflection of the moving stand.
For this, as shown in the following figure, specify the compensation amount in the compensation axis direction in the division points obtained by equally dividing the machine coordinates of the base axis.
The base axis is one of the two orthogonal axes to which relative position compensation applies. This axis is used as the criterion for relative-error measurement. The compensation axis is the coordinate axis that is orthogonal to the base axis. The compensation is actually made for this coordinate axis.
The section between division points n and n+1 is compensated smoothly by linear approximation.



Relationship between the compensation amount and machine position

#	Item		Details	Setting range
4000 (PR)	Pinc	Machine error offset increment method	Specify whether the incremental volume method or absolute volume method is to be used to set machine error offset data.	0: Absolute volume method 1: Incremental volume method

<1st axis>

#	Item		Details	Setting range
4001	cmpax	Basic axis	Specify the basic axis address for machine error compensation. 1) For pitch error compensation, set the name of the axis to be compensated. 2) For relative position compensation, set the name of the axis to be the base axis.	X, Y, Z, U, V, W, A, B, or C axis address
4002	drcax	Compensation axis	Set the compensation axis address for machine error compensation. 1) For pitch error compensation, set the same axis name as "#4001 cmpax". 2) For relative position compensation, set the name of the axis to be actually compensated.	X, Y, Z, U, V, W, A, B, or C axis address
4003	rdvno	Division point number at reference point position	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.	4101 to 5124
4004	mdvno	Division point number at the most negative side	Set the compensation data No. that is on the farthest negative side.	4101 to 5124
4005	pdvno	Division point number at the most positive side	Set the compensation data No. that is on the farthest positive side.	4101 to 5124
4006	sc	Compensation scale factor	Set the compensation amount's scale. When the compensation scale is set to "1", the compensation amount unit will be the same as the output unit. Compensation amount unit = unit of output × compensation scale	0 to 99
4007	spcdv	Division interval	Set the interval to divide the basic axis. Each compensation data will be the compensation amount for each of these intervals.	1 to 9999999(μm)

2nd axis	3rd axis	4th axis	5th axis	6th axis	7th axis	8th axis	9th axis	10th axis	
4011 4012 4013 4014 4015 4016 4017	4021 4022 4023 4024 4025 4026 4027	4031 4032 4033 4034 4035 4036 4037	4041 4042 4043 4044 4045 4046 4047	4051 4052 4053 4054 4055 4056 4057	4061 4062 4063 4064 4065 4066 4067	4071 4072 4073 4074 4075 4076 4077	4081 4082 4083 4084 4085 4086 4087	4091 4092 4093 4094 4095 4096 4097	Set the parameters corresponding to the 1st axis' parameters 4001 to 4007 for each axis. A maximum of 6 axes can be controlled, but as the relative position is compensated, settings for 10 axes can be made.

#	Item		Details	Setting range
4101 • • • 5124			Set the compensation amount for each axis.	–128 to 127 The actual compensation amount will be the value obtained by multiplying the setting value with the compensation scale.

9.2 Setting Compensation Data

Compensation data can be set according to either absolute or incremental system.
"#4000:Pinc" 0: Absolute system
1: Incremental system

(1) Absolute system

Feed from the reference point to each division point is executed as shown in the following figure. The following is obtained at this time. Set it as the compensation amount.

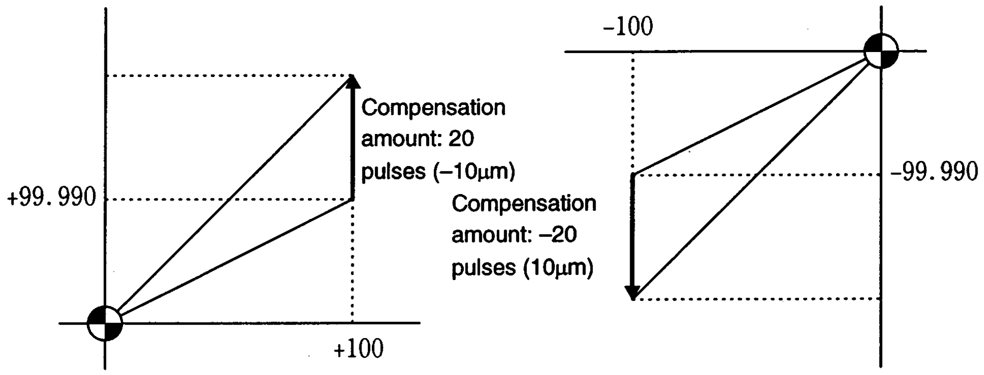
(Specified position – Real machine position) × 2 (Unit of output)

For example, assume that the feed from the reference point to the +100mm position is executed. Also, assume that the real machine position is 99.990mm. In this case, the following value is defined as the compensation amount used at the +100mm position:

(100000 – 99990) × 2 = 20 pulses

The resultant value is defined as the compensation amount. Assume that the real machine position resulting when feed to the –100mm position is executed, is –99.990mm. In this case, the following value is defined as the compensation amount used at the –100mm position:

(–100000 – (–99990)) × 2 = –20 pulses



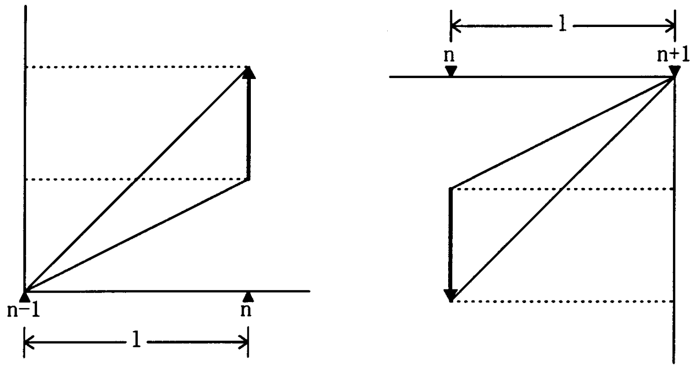
(2) Incremental system

The following figure (left) contains a machine position that is placed in the positive direction with respect to the reference point. Assume that feed from division n–1 to n (division interval) is executed. In this case, the following value is defined as the compensation amount:

(Division interval – Actual movement distance) × 2 (Unit of output)

The following figure (right) contains a machine position that is placed in the negative direction with respect to the reference point. Assume that feed from division point n+1 to n by the division interval is executed. In this case, the following value is defined as the compensation amount:

(Division interval + Actual movement distance) × 2 (Unit of output)



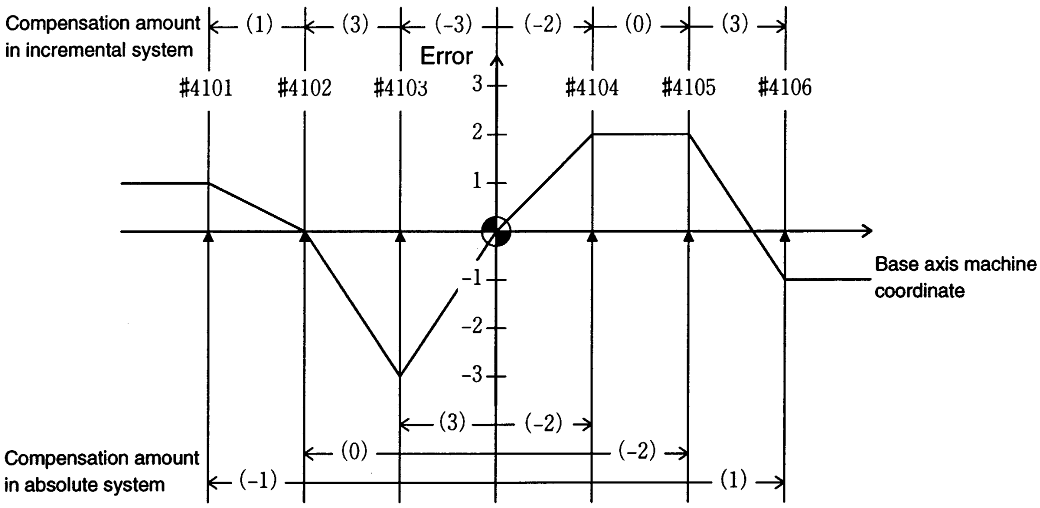
n: Division point compensation number
1: Division interval

Unit : Unit of output
Range : –128 to 127

(Note) The unit of output is used as the unit of setting. The actual unit of compensation pulses depends on the compensation scale factor.

9.3 Example in Using a Linear Axis as the Base Axis

(1) When "mdvno" or "pdvno" exists at both ends of "rdvno":

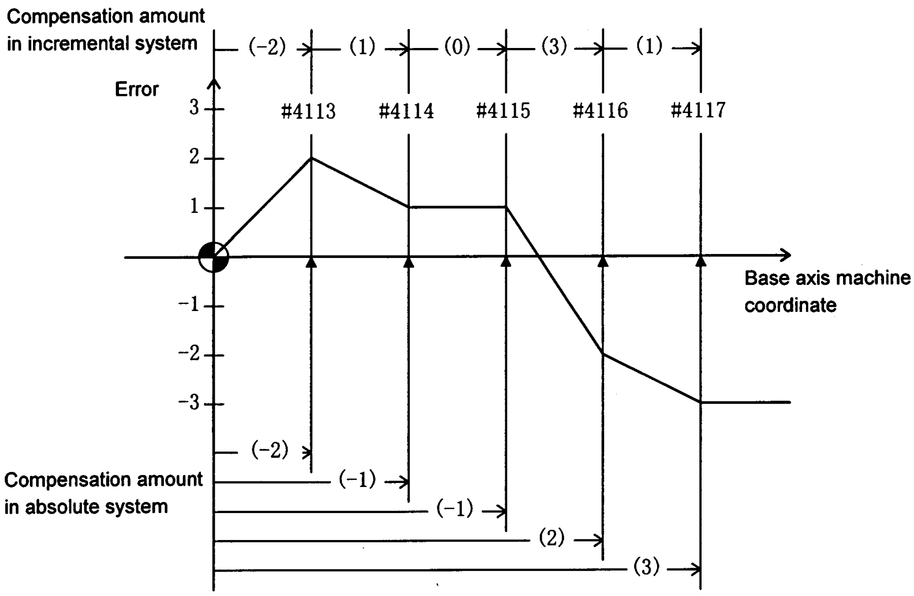


Division point number		#4101	#4102	#4103	#4104	#4105	#4106
Specified machine position		–300.000	–200.000	–100.000	100.000	200.000	300.000
Real machine position		–299.999	–200.000	–100.003	100.002	200.002	299.999
Compensation amount	Incremental	2	6	–6	–4	0	6
	Absolute	–2	0	6	–4	–4	2

rdvno	4103
mdvno	4101
pdvno	4106
sc	1
spcdv	100000

If the setting range (mdvno to "pdvno") is exceeded, the compensation will be based on compensation amount at mdvno or "pdvno".

(2) When the range compensated is only the positive range:

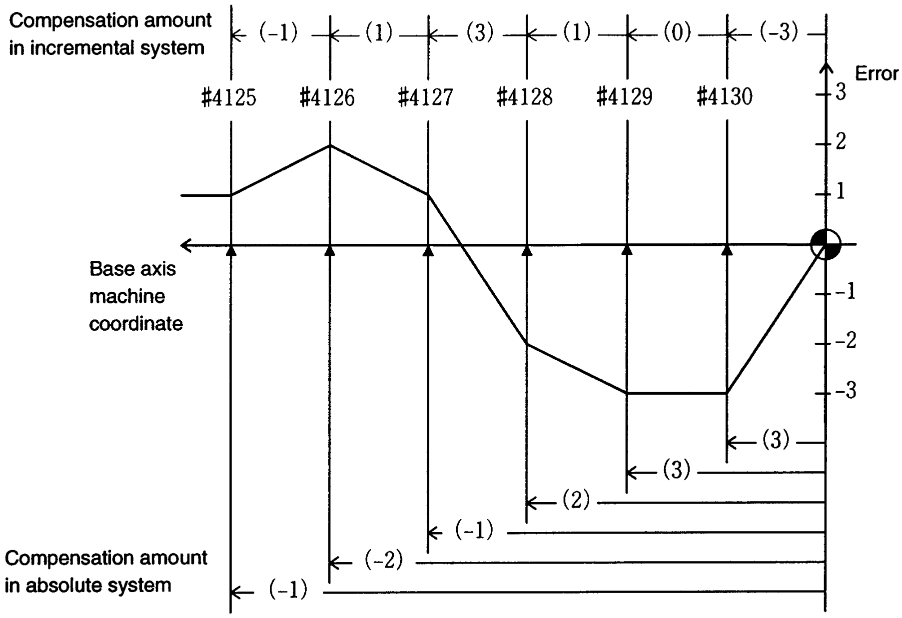


Division point number		#4113	#4114	#4115	#4116	#4117
Compensation amount	Incremental	–4	2	0	6	2
	Absolute	–4	–2	–2	4	6

rdvno	4112
mdvno	4113
pdvno	4117

If the machine position exceeds "pdvno", the compensation will be based on the compensation amount at "pdvno". If the machine position is negative in this case, no compensation will be executed.

(3) When the range compensated is only the negative range:

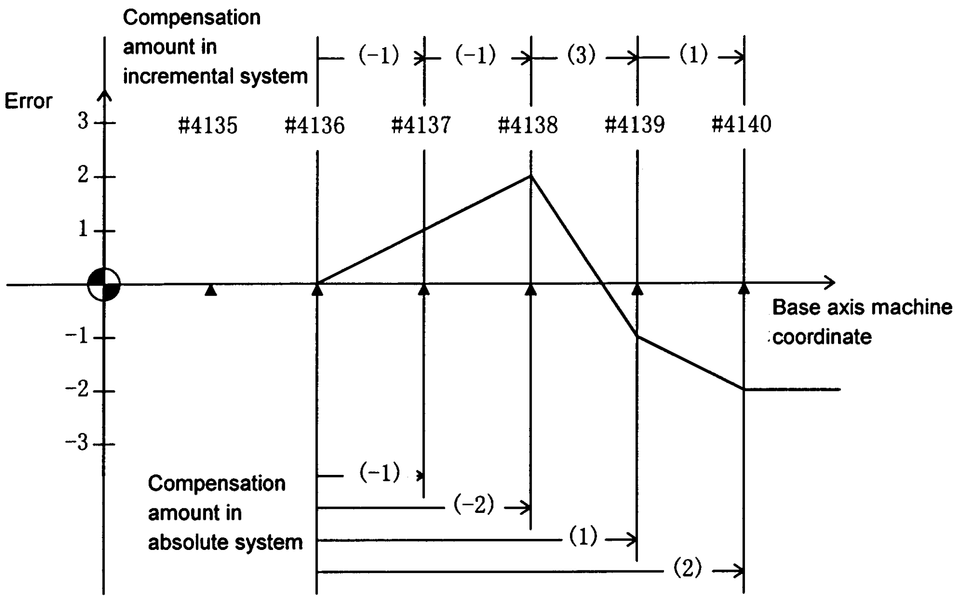


Division point number		#4125	#4126	#4127	#4128	#4129	#4130
Compensation amount	Incremental	–2	2	6	2	0	–6
	Absolute	–2	–4	–2	4	6	6

rdvno	4130
mdvno	4125
pdvno	4130

If the machine position exceeds "mdvno", the compensation will be based on compensation amount at "mdvno".

(4) When compensation is executed in a range that contains no reference point:

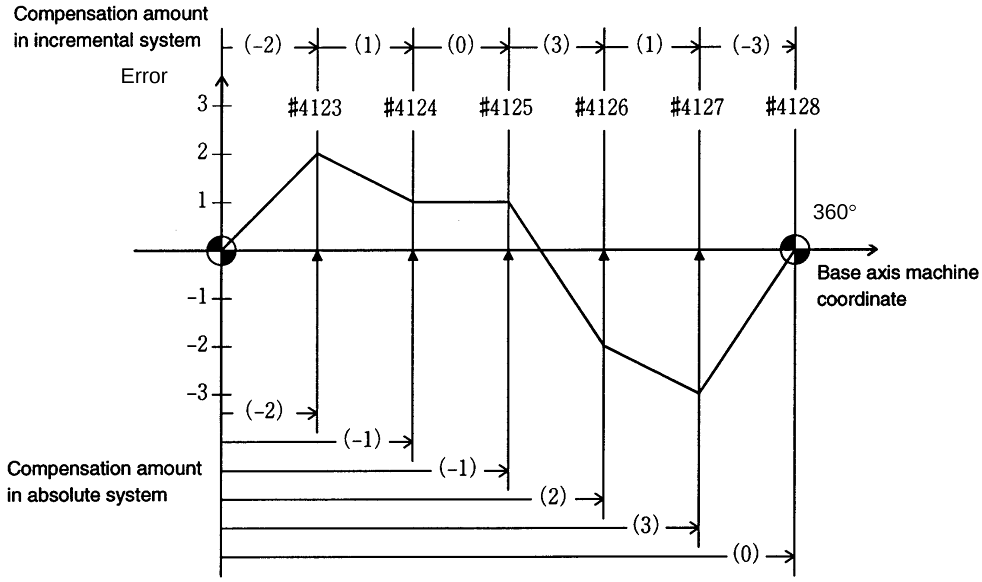


Division point number		#4135	#4136	#4137	#4138	#4139	#4140
Compensation amount	Incremental			–2	–2	6	2
	Absolute			–2	–4	2	4

rdvno	4134
mdvno	4136
pdvno	4140

In this case, the compensation is executed in the range from "mdvno" to "pdvno". This setting rule applies also when the compensation is executed in a range which contains negative machine positions and no reference point.

9.4 Example in Using a Rotation Axis as the Base Axis



Division point number		#4123	#4124	#4125	#4126	#4127	#4128
Compensation amount	Incremental	−4	2	0	6	2	−6
	Absolute	−4	−2	−2	4	6	0

rdvno	4122
mdvno	4123
pdvno	4128

In this case, the sum of the compensation amounts set according to the incremental system is always 0. For the absolute system, the compensation amount at the terminal point (360 degrees) is always 0.

10. PLC Constants

10.1 PLC Timer

(SETUP PARAM 6. 1/6) to (SETUP PARAM 6. 2/6)

#	PLC device	Item	Details	Setting range
6000 ⋮ 6015	T000 ⋮ T015	10ms adding timer <10ms>	Set the time for the timer used in the PLC program (ladder). **(Note)** This setting value is valid when parameter "#6449 bit0" in the following "[BIT SELECT]" is set to "0".	0 to 32767 (×10ms)
6016 ⋮ 6095	T016 ⋮ T095	100ms adding timer <10ms>	Set the time for the timer used in the PLC program (ladder). **(Note)** This setting value is valid when parameter "#6449 bit0" in the following "[BIT SELECT]" is set to "0".	0 to 32767 (×100ms)
6096 ⋮ 6103	T096 ⋮ T103	100ms cumulative timer <100ms INC>	Set the time for the timer used in the PLC program (ladder). **(Note)** This setting value is valid when parameter "#6449 bit0" in the following "[BIT SELECT]" is set to "0".	0 to 32767 (×100ms)

10.2 PLC Counter

(SETUP PARAM 6. 3/6)

#	PLC device	Item	Details	Setting range
6200 ⋮ 6223	C000 ⋮ C023	Counter	Set the time for the counter used in the PLC program (ladder). **(Note)** This setting value is valid when parameter "#6449 bit1" in the following "[BIT SELECT]" is set to "0".	0 to 32767

10.3 PLC Constants

(SETUP PARAM 6. 4/6)

#	PLC device	Item	Details	Setting range
6301 ⋮ 6348	R4500,4501 ⋮ R4594,4595	PLC constant	Set the value to be set in the data type R register used in the PLC program (ladder). Even if the data is set in the R register that corresponds to the PLC side when this parameter is displayed, the screen will not change. Enter a different screen once, and then select this screen again. Note that some parameters have limited uses.	–99999999 to 99999999
6325	—	Check timer of input signal for safety	Reserved for the system. Used for only C64T.	0 to 32767(X100ms) Standard: 2 Set "0" for C6/C64.
6326	—	Check timer of output signal for safety		

10.4 PLC Bit Selection

(SETUP PARAM 6. 5/6) to (SETUP PARAM 6. 6/6)

#	PLC device	Item	Details	Setting range
6401 6402 ⋮ 6495 6496	R4600-Low R4600-High ⋮ R4647-Low R4647-High	Bit selection	This is the bit type parameter used in the PLC program (ladder). Even if the data is set in the R register that corresponds to the PLC side when this parameter is displayed, the screen will not change. Enter a different screen once, and then select this screen again. Note that some parameters have limited uses.	0: OFF 1: ON
6413	—	bit0 Dual monitoring interruption	Reserved for the system. Used for only C64T.	0/1 Standard: 0
6449	—	bit6 Communication terminal overheat detected	Designate whether to detect the communication terminal overheat alarm or not. 0: Detects the overheat alarm. 1: Does not detect the overheat alarm.	0: Detect 1: Not detect
		bit7 Control unit overheat detected	Designate whether to detect the control unit overheat alarm or not. 0: Detects the overheat alarm. 1: Does not detect the overheat alarm.	0: Detect 1: Not detect
6454	—	bit0 Macro interface for respective part systems	Designate whether to use the macro interface for respective part systems or not. 0: Conventional macro interface common to part systems. 1: Available to respective part systems.	0/1
6457	—	bit0,1 High-speed input specification	bit0: High-speed input from R54. bit1: High-speed input from R55. Note that this is used for only C64T.	bit0: 0/1 bit1: 0/1
6458	—	bit0,1 High-speed output specification	bit0: High-speed output to R56 bit1: High-speed output to R57 Note that this is used for only C64T.	bit0: 0/1 bit1: 0/1

⚠ CAUTION

❗ When setting the parameter (#6449/bit6,7) not to check the overheat, the control unit and the communication terminal may not be controlled because of overheat.
In such case, axis runaway may cause a machine breakage, an accident resulting in injury or death, or device breakage.
To prevent the serious results, ordinarily set the parameters so that the overheat check is valid.

Table: "Contents of bit selection parameters #6449 to #6496"

	Symbol name	7	6	5	4	3	2	1	0
0	#6449 R2924 L	NC card Controller thermal alarm disable	Setting display unit thermal alarm disable	-		Counter C retention	Integrating timer T retention	PLC counter program on	PLC timer program on
1	#6450 R2924 H			Alarm/ operator change	Full screen display of message	-	Operator message on	1: R system / 0: F system	Alarm message on
2	#6451 R2925 L	-	-	-	-		-	-	1: F0 screen / 0: APLC release
3	#6452 R2925 H	-		-		Counter (fixed) retention	Integrating timer (fixed) retention		-
4	#6453 R2926 L	-	-	-	-	-		Message language change code	
5	#6454 R2926 H								Macro I/F for respective part system
6	#6455 R2927 L	-	-	-	-	-	-	-	-
7	#6456 R2927 H	-	-	-	-	-	-	-	-
8	#6457 R2928 L	High-speed input specification 1 (Note4)							
9	#6458 R2928 H	High-speed input specification 2							
A	#6459 R2929 L	High-speed input specification 3 (Spare)							
B	#6460 R2929 H	High-speed input specification 4 (Spare)							
C	#6461 R2930 L	High-speed output specification 1 (Note4)							
D	#6462 R2930 H	High-speed output specification 2							
E	#6463 R2931 L	High-speed output specification 3 (Spare)							
F	#6464 R2931 H	High-speed output specification 4 (Spare)							

(Note 1) Be sure to set the bits indicated - and blanks to 0.

(Note 2) Parameters #6481 to #6496 are reserved for debugging by Mitsubishi.

(Note 3) High-speed input specification is valid for only the devices allocated to remote I/O. As for the devices allocated to the input signals from network such as HR863 Q-bus bridge or H865 CC-Link, high-speed input specification is not applied to.

(Note 4) When using C64T system, these parameters are used as follows;

#6457	bit0	High-speed input specification from R54.
	bit1	High-speed input specification from R55.
#6458	bit0	High-speed output specification to R56.
	bit1	High-speed output specification to R57.

	Symbol name	7	6	5	4	3	2	1	0
0	#6465 R2932 L	-	-	-	-	-	-	-	-
1	#6466 R2932 H	-	-	-	-	-	-	-	-
2	#6467 R2933 L	-	-	-	-	-	-	-	-
3	#6468 R2933 H								
4	#6469 R2934 L			Standard PLC parameter				-	NC alarm output disable
5	#6470 R2934 H								
6	#6471 R2935 L	-	-	-	-	-	-	-	-
7	#6472 R2935 H	-	-	-	-	-	-	-	-
8	#6473 R2936 L	-							-
9	#6474 R2936 H								
A	#6475 R2937 L								
B	#6476 R2937 H								
C	#6477 R2938 L								
D	#6478 R2938 H								
E	#6479 R2939 L								
F	#6480 R2939 H								

(Note 1) Be sure to set the bits indicated - and blanks to 0.

(Note 2) Parameters #6481 to #6496 are reserved for debugging by Mitsubishi.

11. Macro List

<table>
<tr><th>#</th><th>Item</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td>7001
to
7091</td><td rowspan="3">M [01]
to
M [10]</td><td><Code>
Set the M code used for calling out the macro with the M command.
This is valid when "#1195 Mmac" is set to 1.</td><td>1 to 9999</td></tr>
<tr><td>7002
to
7092</td><td><Type>
Set the macro call out type.<table><tr><td>0</td><td>M98 P△△△△; and equivalent value call</td></tr><tr><td>1</td><td>G65 P△△△△; and equivalent value call</td></tr><tr><td>2</td><td>G66 P△△△△; and equivalent value call</td></tr><tr><td>3</td><td>G66.1 P△△△△; and equivalent value call</td></tr><tr><td>others</td><td>M98 P△△△△; and equivalent value call</td></tr></table></td><td>0 to 3</td></tr>
<tr><td>7003
to
7093</td><td><Program No.>
Set the No. of the program to be called out.</td><td>1 to 99999999</td></tr>
<tr><td></td><td rowspan="3">M2mac</td><td colspan="2">Set the type and program No. for when calling out the macro with the 2nd miscellaneous command. The macro will be called out with the "#1170 M2name" address command when "#1198 M2mac" is set to 1.</td></tr>
<tr><td>7102</td><td><Type>
Same as the M call macro.</td><td>0 to 3</td></tr>
<tr><td>7103</td><td><Program No.>
Same as the M call macro.</td><td>0 to 99999999</td></tr>
<tr><td>7201
to
7291</td><td rowspan="3">G [01]
to
G [10]</td><td><Code>
Set the G code to be used when calling the macro with a G command. Do not set a G code used in the system.</td><td>1 to 255</td></tr>
<tr><td>7202
to
7292</td><td><Type>
Same as the M call macro.</td><td>0 to 3</td></tr>
<tr><td>7203
to
7293</td><td><Program No.>
Same as the M call macro.</td><td>1 to 99999999</td></tr>
<tr><td></td><td rowspan="3">Smac</td><td colspan="2">Set the type and program No. for when calling the macro with an S command.
This is valid when "#1196 Smac" is set to 1.</td></tr>
<tr><td>7302</td><td><Type>
Same as the M call macro.</td><td>0 to 3</td></tr>
<tr><td>7303</td><td><Program No.>
Same as the M call macro.</td><td>1 to 99999999</td></tr>
<tr><td></td><td rowspan="3">Tmac</td><td colspan="2">Set the type and program No. for when calling the macro with a T command.
This is valid when "#1197 Tmac" is set to 1.</td></tr>
<tr><td>7312</td><td><Type>
Same as the M call macro.</td><td>0 to 3</td></tr>
<tr><td>7313</td><td><Program No.>
Same as the M call macro.</td><td>0 to 99999999</td></tr>
<tr><td>27000</td><td>Nmac</td><td>Not used.</td><td>0</td></tr>
<tr><td>27001
to
27071</td><td rowspan="2">N [0]
to
N [08]</td><td><Code>
Not used.</td><td>0</td></tr>
<tr><td>27002
to
27072</td><td><Program No.>
Not used.</td><td>0</td></tr>
</table>

12. Position Switch

12.1 Outline of Function

The position switch (PSW) is used as an imaginary dog switch by assigning an axis name and coordinate values that indicate the imaginary dog position to be used instead of the dog switch on the machine axis. When the machine reaches the imaginary dog position, a signal is output to the PLC interface. This imaginary dog switch is called the position switch (PSW).

No.	Item		Details	Setting range (unit)
7500	Pcheck	High-speed switching of position switch	Specify whether to perform position switch area checking at high speeds. 0: Does not perform position switch area checking at high speed (do it the same as before). 1: Performs position switch area checking at high speed.	0/1
75∗1	<axis>	Axis name	Specify the name of the axis for which a position switch is provided.	X, Y, Z, U, V, W, A, B, or C axis address
75∗2	<dog1>	Imaginary dog position 1	When the machine enters the range between imaginary dog positions 1 and 2, a signal is output to the PLC.	–99999.999 to 99999.999 (0.001mm)
75∗3	<dog2>	Imaginary dog position 2	Part system 1 device X 660 Part system 2 device Y 6E0	
75∗4	<check>	Selection of area check method	When position switch area checking at high speed is selected, specify the mode of area checking, i.e., whether to use the command type machine position or detector feedback position, for each position switch point. 0: Use the command type machine position as the machine position for position switch area checking. 1: Use the detector feedback position as the machine position for position switch area checking. **(Note)** This parameter is valid only when 1 set in "#7500 Pcheck."	0/1

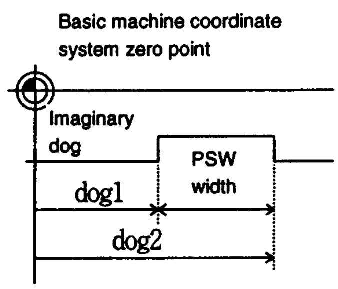
Position switch numbers of PSW1 to PSW16 and signal devices

	<axis>	<dog1>	<dog2>	1st part system	2nd part system	3rd part system	4th part system	5th part system	6th part system	7th part system
PSW1	7501	7502	7503	X660	X6E0	X760	X7E0	X860	X8E0	X960
PSW2	7511	7512	7513	X661	X6E1	X761	X7E1	X861	X8E1	X961
PSW3	7521	7522	7523	X662	X6E2	X762	X7E2	X862	X8E2	X962
PSW4	7531	7532	7533	X663	X6E3	X763	X7E3	X863	X8E3	X963
PSW5	7541	7542	7543	X664	X6E4	X764	X7E4	X864	X8E4	X964
PSW6	7551	7552	7553	X665	X6E5	X765	X7E5	X865	X8E5	X965
PSW7	7561	7562	7563	X666	X6E6	X766	X7E6	X866	X8E6	X966
PSW8	7571	7572	7573	X667	X6E7	X767	X7E7	X867	X8E7	X967
PSW9	7581	7582	7583	X670	X6F0	X770	X7F0	X870	X8F0	X970
PSW10	7591	7592	7593	X671	X6F1	X771	X7F1	X871	X8F1	X971
PSW11	7601	7602	7603	X672	X6F2	X772	X7F2	X872	X8F2	X972
PSW12	7611	7612	7613	X673	X6F3	X773	X7F3	X873	X8F3	X973
PSW13	7621	7622	7623	X674	X6F4	X774	X7F4	X874	X8F4	X974
PSW14	7631	7632	7633	X675	X6F5	X775	X7F5	X875	X8F5	X975
PSW15	7641	7642	7643	X676	X6F6	X776	X7F6	X876	X8F6	X976
PSW16	7651	7652	7653	X677	X6F7	X777	X7F7	X877	X8F7	X977

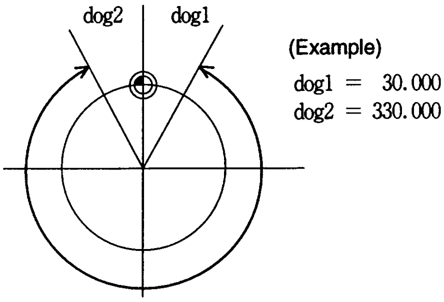
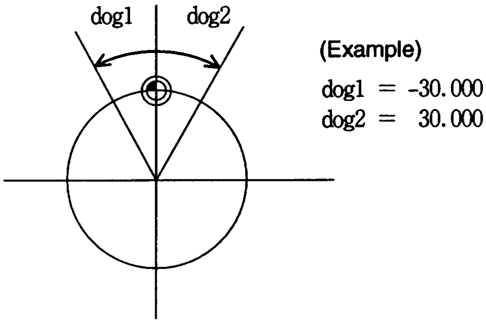
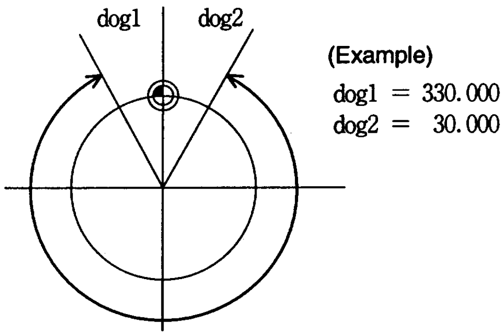
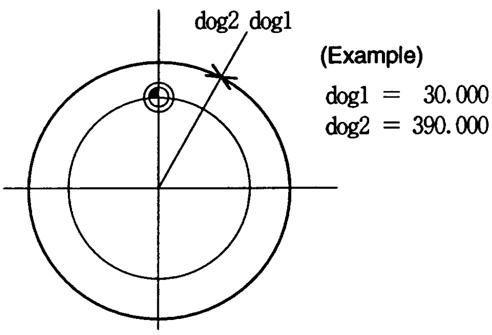
Instead of the dog switch provided on the machine axis, the coordinate values indicating imaginary dog positions (dog1 and dog2) on the coordinate axis of the axis name preset with axis are set with the position switches (PSW1 – PSW16). When the machine reaches the position, the signal is output to the device corresponding to the PLC interface.

Example of settings of dog1 and dog2 and operation

Setting of dog1 and dog2	Operation	Description
dog1 < dog2	dog1 dog2	A signal is output between dog1 and dog2.
dog1 > dog2	dog2 dog1	A signal is output between dog1 and dog2.
dog1 = dog2	dog1 = dog2	If dog1 equals dog2, the dog1 position triggers a signal.



Rotary axis

<table>
<tr><th>Setting of dog1 and dog2</th><th>Operation</th><th>Description</th></tr>
<tr><td rowspan="2">dog1 < dog2</td><td></td><td>A signal is output between dog1 and dog2.</td></tr>
<tr><td></td><td>A signal is also output when dog1 is negative.</td></tr>
<tr><td>dog1 > dog2</td><td></td><td>A signal is output between dog2 and dog1.</td></tr>
<tr><td>|dog1 – dog2| ≥ 360</td><td></td><td>A signal is kept output when the difference between dog1 and dog2 exceeds 360 degrees.</td></tr>
</table>

12.2 Canceling the Position Switch

To cancel the position switch, enter the number (#75∗1) of the position switch to be canceled in # ( ) of the setting area, enter a slash "/" in DATA ( ), then press the INPUT key. This deletes the axis name for the specified position switch, thus invalidating the position switch.
The data specified for <dog1> and <dog2> are still stored in memory. To validate the position switch again, therefore, it is enough to specify the axis name only.

13. Indexing Axis Parameters

(Note) These parameters are used only with the G64T.

<table>
<tr><th>#</th><th colspan="2">Item</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td>26251</td><td colspan="2">METHOD</td><td>Select the index command method.
0: Matrix command
1: Single command
2: BCD command (without parity)
3: BCD command (with parity)</td><td>0/1/2/3</td></tr>
<tr><td rowspan="5">26252</td><td rowspan="5">AUX</td><td>bit0</td><td>Select the rotary axis' control method.
0: Non-endless method
Positioning is carried out without extending over 0.000°. Thus, the rotation direction is automatically determined according to the command.
1: Endless method
Positioning is carried out with the designated rotation direction or a short cut.</td><td rowspan="5">0 to F
Set as a HEX value.</td></tr>
<tr><td>bit1</td><td>Validates addition/subtraction with the index position command input.
0: Addition/subtraction invalid
1: Addition/subtraction valid</td></tr>
<tr><td>bit2</td><td>Select the valid width of external data input/output function's IN data.
0: 16 bits (IN0 to IN15)
1: 24 bits (IN0 to IN23)</td></tr>
<tr><td>bit3</td><td>When the "request fixed" signal is ON, the parity of the IN data equivalent to the valid width set in #26252 bit2 is checked.
0: Does not check parity
1: Checks parity</td></tr>
<tr><td>bit4</td><td>Select the external positioning stop mode.
0: Retraction stop mode
After decelerating to a stop, the axis is retracted to the position where the signal was input (point where deceleration started). Then the index position compensation amount is calculated and set.
1: Deceleration stop mode
After decelerating to a stop, the index position compensation amount is calculated and set at that point.</td></tr>
<tr><td>26253</td><td colspan="2">JOG CLAMP SPEED 1</td><td>Set JOG speed 1 or indexing speed clamp 1.</td><td rowspan="3">1 to 1000000
(mm/min, °/min)</td></tr>
<tr><td>26254</td><td colspan="2">JOG CLAMP SPEED 2</td><td>Set JOG speed 2 or indexing speed clamp 2.</td></tr>
<tr><td>26255</td><td colspan="2">JOG CLAMP SPEED 3</td><td>Set JOG speed 3 or indexing speed clamp 3.</td></tr>
</table>

#	Item	Details	Setting range (unit)
26256	CURRENT LIMIT	Set current limit value when current limit value command signal is ON.	0 to 100 (%)
26257	OFFSET	Set the indexing position compensation amount.	-999.999 to 999.999 (mm)
26258	OFFSET LIMIT	If the indexing position compensation amount exceeds this value, the "index position offset MAX reached" signal (M:Y18E, L:Y100) will be output.	0 to 999.999 (mm)
26259	DETECTION WIDTH	Set the tolerable width for outputting the in-position signal when indexing is completed.	0 to 999.999 (mm)
26260	CURRENT LIMIT 2	Set current limit value when current limit value command 2 signal is ON.	0 to 100 (%)
26261	CURRENT LIMIT 3	Set current limit value when current limit value command 3 signal is ON.	0 to 100 (%)

14. Indexing Axis Position Switch

14.1 Outline of Function

(Note) These parameters are used only with the G64T.
The position switch (PSW) is used as an imaginary dog switch by assigning an axis name and coordinate values that indicate the imaginary dog position to be used instead of the dog switch on the machine axis. When the machine reaches the imaginary dog position, a signal is output to the PLC interface. This imaginary dog switch is called the position switch (PSW).
The position switch for the indexing axis is set on this screen.

No.	Item		Details	Setting range (unit)
27701	<dog1>	Imaginary dog position 1	The PLC position output signal turns ON when the machine reaches the range between the imaginary dog position 1 and imaginary dog position 2.	–99999.999 to 99999.999 (0.001mm)
27702	<dog2>	Imaginary dog position 2		
:		:		
27731	<dog1>	Imaginary dog position 1		
27732	<dog2>	Imaginary dog position 2		

Position switch numbers of PSW1 to PSW16 and signal devices

	<dog1>	<dog2>	1st axis device	2nd axis device	3rd axis device	4th axis device
PSW1	27701	27702	R3561/bit0	R3566/bit0	R3571/bit0	R3576/bit0
PSW2	27703	27704	R3561/bit1	R3566/bit1	R3571/bit1	R3576/bit1
PSW3	27705	27706	R3561/bit2	R3566/bit2	R3571/bit2	R3576/bit2
PSW4	27707	27708	R3561/bit3	R3566/bit3	R3571/bit3	R3576/bit3
PSW5	27709	27710	R3561/bit4	R3566/bit4	R3571/bit4	R3576/bit4
PSW6	27711	27712	R3561/bit5	R3566/bit5	R3571/bit5	R3576/bit5
PSW7	27713	27714	R3561/bit6	R3566/bit6	R3571/bit6	R3576/bit6
PSW8	27715	27716	R3561/bit7	R3566/bit7	R3571/bit7	R3576/bit7
PSW9	27717	27718	R3561/bit8	R3566/bit8	R3571/bit8	R3576/bit8
PSW10	27719	27720	R3561/bit9	R3566/bit9	R3571/bit9	R3576/bit9
PSW11	27721	27722	R3561/bitA	R3566/bitA	R3571/bitA	R3576/bitA
PSW12	27723	27724	R3561/bitB	R3566/bitB	R3571/bitB	R3576/bitB
PSW13	27725	27726	R3561/bitC	R3566/bitC	R3571/bitC	R3576/bitC
PSW14	27727	27728	R3561/bitD	R3566/bitD	R3571/bitD	R3576/bitD
PSW15	27729	27730	R3561/bitE	R3566/bitE	R3571/bitE	R3576/bitE
PSW16	27731	27732	R3561/bitF	R3566/bitF	R3571/bitF	R3576/bitF

(Note) If the imaginary dog positions 1 and 2 are both set to “0”, the signal will not be output to the PLC interface.

15. Indexing Axis Commands

(Note) These parameters are used only with the G64T.

Item	Details	Setting range (unit)
POSITION	Command the indexing position.	–99999.999 to 99999.999 (0.001mm/0.001°, 0.0001mm/0.0001°)
SPEED	Set the indexing speed.	0 to 999999 (mm/min, °/min)
INPOS	Set the in-position width, which indicates the output range of the in-position signal output when positioning is completed.	0 to 99999.999 (0.001mm/0.001°, 0.0001mm/0.0001°)
FLAG	0: Normal indexing position command 1: Position command valid for external positioning 2: Indexing command compensation valid	0/1/2

100 sets can be set for each axis.
When changing the axis, set the axis No. after "X" in the first setting area, such as # (X2), and then press INPUT. Axis No. "1" corresponds to the 1st peripheral axis.

(Example 1) To change to 2nd peripheral axis # (X2) INPUT

(Example 2) To change to 4th peripheral axis # (X4) INPUT

16. Auxiliary Axis Parameters

Turn the NC power OFF after setting parameters indicated with a (PR) in the table. The setting will be validated after the power is turned ON again.

<table>
<tr><th>No.</th><th colspan="2">Name</th><th>Details</th><th>Setting range</th><th>Default value</th></tr>
<tr><td>1
(PR)</td><td>MSR</td><td>Motor series</td><td>Set the motor series. This is automatically judged by the system when the default value (0000) is set.</td><td>0000 to FFFF
(hexadecimal)</td><td>0000</td></tr>
<tr><td>2
(PR)</td><td>RTY</td><td>Regeneration option type</td><td colspan="3">Set the regenerative resistor type. Do not set values without a description.

0 0 0 0 (Default value)
<table><tr><th>Setting value</th><th>Details</th></tr><tr><td>0</td><td>Amplifier standard built-in resistor (10CT has no built-in resistor)</td></tr><tr><td>1</td><td>Setting prohibited</td></tr><tr><td>2</td><td>MR-RB032 (30W)</td></tr><tr><td>3</td><td>MR-RB12 (100W)</td></tr><tr><td>4</td><td>MR-RB32 (300W)</td></tr><tr><td>5</td><td>MR-RB30 (300W)</td></tr><tr><td>6</td><td>MR-RB50 (500W)</td></tr><tr><td>7~F</td><td></td></tr></table></td></tr>
<tr><td>3
(PR)</td><td>PC1</td><td>Motor side gear ratio (machine rotation ratio)</td><td rowspan="2">Set the No. of gear teeth on the motor side and the No. of gear teeth on the machine side as an integer reduced to its lowest terms.
Set the total gear ratio if there are multiple gear levels.
For rotation axes, set the No. of motor rotation speed per machine rotation.</td><td>1 to 32767</td><td>1</td></tr>
<tr><td>4
(PR)</td><td>PC2</td><td>Machine side gear ratio (motor rotation ratio)</td><td>1 to 32767</td><td>1</td></tr>
<tr><td>5
(PR)</td><td>PIT</td><td>Feed pitch</td><td>Set 360 (default value) for rotation axes.
Set the feed lead for linear axes.</td><td>1 to 32767
(° or mm)</td><td>360</td></tr>
<tr><td>6</td><td>INP</td><td>In-position detection width</td><td>In-position is detected when the position droop becomes this setting value or less.</td><td>1 to 32767
(1/1000° or μm)</td><td>50</td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Name</th><th>Details</th><th>Setting range</th><th>Default value</th></tr>
<tr><td>7</td><td>ATU</td><td>Auto-tuning</td><td colspan="3">Set the adjustment of the auto-tuning. Do not set values without a description.

0 1 0 2 (Default setting value)
<table>
<tr><th>Setting value</th><th>Details</th></tr>
<tr><td>1</td><td>Low response (low-rigidity loads, loads which easily vibrate)</td></tr>
<tr><td>2</td><td>Standard setting value</td></tr>
<tr><td>3</td><td>Standard setting value</td></tr>
<tr><td>4</td><td>Standard setting value</td></tr>
<tr><td>5</td><td>High response (high-rigidity loads, loads which do not easily vibrate)</td></tr>
</table>
<table>
<tr><th>Setting value</th><th>Details</th></tr>
<tr><td>0</td><td>Standard</td></tr>
<tr><td>2</td><td>Large friction amount (set the position loop gain slightly lower)</td></tr>
</table>
<table>
<tr><th>Setting value</th><th>Details</th></tr>
<tr><td>0</td><td>Only auto-tuning PG2, VG2, VIC, and GD2.</td></tr>
<tr><td>1</td><td>Auto-tuning PG1, PG2, VG1, VG2, VIC, and GD2 (total gain).
(Standard setting)</td></tr>
<tr><td>2</td><td>No auto-tuning.</td></tr>
</table>
</td></tr>
<tr><td>8</td><td>PG1</td><td>Position loop gain 1</td><td>Set the position loop gain for the model loop.
Determine the tracking ability regarding the position commands.</td><td>4 to 1000 (1/s)</td><td>70</td></tr>
<tr><td>9</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>10</td><td>EMGt</td><td>Deceleration control time constant</td><td>Set the deceleration time from the clamp speed (Aspeed1). For normal rapid traverse, set the same value as the acceleration/deceleration time constant.</td><td>0 to 32768 (ms)</td><td>500</td></tr>
<tr><td>11</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>12</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>13</td><td>MBR</td><td>Vertical axis drop prevention time</td><td>Input the time the servo OFF is delayed during servo OFF command. Increase the setting by 100ms at a time and set the minimum value where the axis does not drop.</td><td>0 to 1000 (ms)</td><td>100</td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Name</th><th>Details</th><th>Setting range</th><th>Default value</th></tr>
<tr><td>14</td><td>NCH</td><td>Notch filter No.</td><td colspan="3">Set the frequency of the machine resonance suppression filter.
Do not set values without a description.
<table><tr><td>Setting value</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr><tr><td>Frequency (Hz)</td><td>No start</td><td>1125</td><td>563</td><td>375</td><td>282</td><td>225</td><td>188</td><td>161</td></tr></table></td></tr>
<tr><td>15</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>16</td><td>JIT</td><td>Jitter compensation</td><td colspan="3">Set the No. of ignored jitter compensation pulses. Do not set values without a description.
<table><tr><td>Setting value</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>Number of ignore pulses</td><td>No start</td><td>1</td><td>2</td><td>3</td></tr></table></td></tr>
<tr><td>17</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>18</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>19</td><td>PG2</td><td>Position loop gain 2</td><td>Set the position loop gain of the actual loop.
Determine the position responsiveness for external disturbance.</td><td>1 to 500 (1/s)</td><td>25</td></tr>
<tr><td>20</td><td>VG1</td><td>Speed loop gain 1</td><td>Set the speed loop gain of the model loop.
Determine the tracking ability regarding the speed commands.</td><td>20 to 5000 (1/s)</td><td>1200</td></tr>
<tr><td>21</td><td>VG2</td><td>Speed loop gain 2</td><td>Set the speed loop gain of the actual loop.
Determine the speed responsiveness for external disturbance.</td><td>20 to 8000 (1/s)</td><td>600</td></tr>
<tr><td>22</td><td>VIC</td><td>Speed integral compensation</td><td>Determine the characteristics of the speed low-frequency region.</td><td>1 to 1000 (ms)</td><td>20</td></tr>
<tr><td>23</td><td>VDC</td><td>Speed differential compensation</td><td>PI control normally results from a default value of 1000.
Adjust the overshoot amount by lowering in increments of 20.</td><td>0 to 1000</td><td>1000</td></tr>
<tr><td>24</td><td>DG2</td><td>Load inertia ratio</td><td>Set the load inertia ratio for the motor inertia.</td><td>0.0 to 50.0 (fold)</td><td>2.0</td></tr>
<tr><td>25</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>30 (PR)</td><td>MTY</td><td>Motor type</td><td>Set the motor type. This is automatically judged by the system when the default value (0000) is set.</td><td>0000 to FFFF (hexadecimal)</td><td>0000</td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Name</th><th>Details</th><th>Setting range</th><th>Default value</th></tr>
<tr><td>50</td><td>MD1</td><td>D/A output channel 1 data No.</td><td colspan="3">Set the Nos. of the data to be output on D/A output channel 1.
0 0 0 0 (Default setting value)
<table>
<tr><th>Setting value</th><th>Details</th><th>Magnification</th></tr>
<tr><td>0</td><td>Speed feedback (with sign)</td><td>Maximum rotation speed = 8V</td></tr>
<tr><td>1</td><td>Current feedback (with sign)</td><td>Maximum current (torque) = 8V</td></tr>
<tr><td>2</td><td>Speed feedback (without sign)</td><td>Maximum rotation speed = 8V</td></tr>
<tr><td>3</td><td>Current feedback (without sign)</td><td>Maximum current (torque) = 8V</td></tr>
<tr><td>4</td><td>Current command</td><td>Maximum current (torque) = 8V</td></tr>
<tr><td>5</td><td>Command FΔT</td><td>100000 [degrees/min] = 10V</td></tr>
<tr><td>6</td><td>Position droop 1 (1/1)</td><td>2048 [pulse] = 10V</td></tr>
<tr><td>7</td><td>Position droop 2 (1/4)</td><td>8192 [pulse] = 10V</td></tr>
<tr><td>8</td><td>Position droop 3 (1/16)</td><td>32768 [pulse] = 10V</td></tr>
<tr><td>9</td><td>Position droop 4 (1/32)</td><td>65536 [pulse] = 10V</td></tr>
<tr><td>A</td><td>Position droop 5 (1/64)</td><td>131072 [pulse] = 10V</td></tr>
</table></td></tr>
<tr><td>51</td><td>MO1</td><td>D/A output channel 1 output offset</td><td>Set this value when the zero level of D/A output channel 1 is not suitable.</td><td>–999 to 999 (mV)</td><td>0</td></tr>
<tr><td>52</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>53</td><td>MD2</td><td>D/A output channel 2 data No.</td><td>Set the Nos. of the data to be output on D/A output channel 2.
The descriptions are the same as "50 MD1".</td><td>0000 to FFFF (hexadecimal)</td><td>0000</td></tr>
<tr><td>54</td><td>MO2</td><td>D/A output channel 2 output offset</td><td>Set this value when the zero level of D/A output channel 2 is not suitable.</td><td>–999 to 999 (mV)</td><td>0</td></tr>
<tr><td>55</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>100 (PR)</td><td>station</td><td>No. of indexing stations</td><td>Set the No. of stations. For linear axes, this value is expressed by: No. of divisions = No. of stations – 1.</td><td>2 to 360</td><td>2</td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Name</th><th>Details</th><th>Setting range</th><th>Default value</th></tr>
<tr><td>101
(PR)</td><td>Cont1</td><td>Control parameter 1</td><td>This is a HEX setting parameter. Set bits without a description to their default values.

<table>
<tr><td>bit</td><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>Default value</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table>

<table>
<tr><th>bit</th><th>Meaning when "0" is set</th><th>Meaning when "1" is set</th></tr>
<tr><td>0</td><td></td><td></td></tr>
<tr><td>1</td><td>High-speed zero point return after establishment of zero point.</td><td>Dog-type return for each zero point return operation.</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></tr>
<tr><td>5</td><td></td><td></td></tr>
<tr><td>6</td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td></tr>
<tr><td>8</td><td>Reference point return direction (+)</td><td>Reference point return direction (–)</td></tr>
<tr><td>9</td><td>Rotation direction determined by operation control signal (DIR)</td><td>Rotation direction in the shortcut direction</td></tr>
<tr><td>A</td><td>Machine basic position becomes the origin point</td><td>Electrical zero point becomes the origin point</td></tr>
<tr><td>B</td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td></tr>
<tr><td>D</td><td>Coordinate zero point creation valid</td><td>Zero point established at power supply ON position</td></tr>
<tr><td>E</td><td>Rotation direction in operation control signal (DIR) or in the shortcut direction</td><td>Rotation direction in the random position command sign direction</td></tr>
<tr><td>F</td><td>Stopper direction is positioning direction</td><td>Stopper direction is in the sign direction of the stopper amount</td></tr>
</table>
</td><td></td><td></td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Name</th><th>Details</th><th>Setting range</th><th>Default value</th></tr>
<tr><td>102 (PR)</td><td>Cont2</td><td>Control parameter 2</td><td>This is a HEX setting parameter. Set bits without a description to their default values.

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

bit	Meaning when "0" is set	Meaning when "1" is set
0		
1	Error not corrected at servo OFF	Error corrected at servo OFF
2	Linear axis	Rotation axis
3	Station assignment direction CW	Station assignment direction CCW
4	Uniform index	Non-uniform index
5	DO channel standard assignment	DO channel reverse assignment
6	2-wire detector communication	4-wire detector communication
7	Incremental detection	Absolute position detection
8		
9		
A		
B		
C		
D		
E		
F		
</td><td></td><td></td></tr>
<tr><td>103 (PR)</td><td>EmgCont</td><td>Emergency stop control</td><td>This is a HEX setting parameter. Set bits without a description to their default values.

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

bit	Meaning when "0" is set	Meaning when "1" is set
0	External emergency stop valid	External emergency stop invalid (default value)
1	Dynamic brake stop at emergency stop	Deceleration control stop at emergency stop
2	NC bus emergency stop input valid	NC bus emergency stop input invalid
3	NC bus emergency stop output valid	NC bus emergency stop output invalid
4		
5		
6		
7		
8		
9		
A		
B		
C		
D		
E		
F		
</td><td></td><td></td></tr>
</table>

No.	Name		Details	Setting range	Default value
104 (PR)	tleng	Linear axis stroke length	Set the movement stroke length for linear axes. This is meaningless when setting non-uniform assignments or commanding random positions.	0.001 to 99999.999 (mm)	100.000
110	ZRNspeed	Reference point return speed	Set the clamp value of the feedrate when a reference point return is carried out. The feedrate becomes the manual operation speed of the parameter group selected at that time, but it is clamped by this parameter setting value.	1 to 100000 (°/min or mm/min)	1000
111	ZRNcreep	Reference point return creep speed	Set the approach speed to the reference point after dog detection during a reference point return.	1 to 65535 (°/min or mm/min)	200
112	grid mask	Grid mask	Set the amount that the dog is artificially extended. Set 1/2 the grid spacing as a standard.	0 to 65536 (1/1000° or μm)	0
113 (PR)	grspc	Grid spacing	Divide the grid spacing that is the conventional motor rotation movement amount into 2, 4, 8, or 16 divisions.	0 to 4 ($1/2^n$ division)	0
114	ZRNshift	Reference point shift amount	Set the shift amount in a dog-type reference point return from the electric zero point determined on the grid to the reference point.	0 to 65536 (1/1000° or μm)	0
115	ST. ofset	Station offset	Set the distance (offset) from the reference point to station 1.	–99999.999 to 99999.999 (° or mm)	0.000
116 (PR)	ABS base	Absolute position zero point	When movement of the machine coordinate zero point from the origin point is required during absolute position initializing, set that movement amount.	–99999.999 to 99999.999 (° or mm)	0.000
117	Limit (+)	Soft limit (+)	Commands in the plus direction that exceed this setting value are not possible. If the machine is in a position exceeding the setting value, commands in the minus direction are possible. The soft limit function will not operate if Limit (+) and Limit (–) are set to the same value.	–99999.999 to 99999.999 (mm)	1.000
118	Limit (–)	Soft limit (–)	Commands in the minus direction that exceed this value are not possible. If the machine is in a position exceeding the setting value, commands in the plus direction are possible.	–99999.999 to 99999.999 (mm)	1.000

<table>
<tr><th>No.</th><th colspan="2">Name</th><th>Details</th><th>Setting range</th><th>Default value</th></tr>
<tr><td>120</td><td>ABS Type</td><td>Absolute position detection parameter</td><td colspan="3">This parameter is set as a hexadecimal. Set the default value for bits that have no description.
<table>
<tr><td>bit</td><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>Default value</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td></tr>
</table>
<table>
<tr><th>bit</th><th>Meaning when "0" is set</th><th>Meaning when "1" is set</th></tr>
<tr><td>0</td><td></td><td></td></tr>
<tr><td>1</td><td>Dogless-type method initializing</td><td>Dog-type method initializing</td></tr>
<tr><td>2</td><td>Mechanical stopper method initializing</td><td>Origin point alignment method initializing</td></tr>
<tr><td>3</td><td>Electrical zero point direction (+)</td><td>Electrical zero point direction (–)</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></td><td></td></tr>
<tr><td>7</td><td></td><td></td></tr>
<tr><td>8</td><td></td><td></td></tr>
<tr><td>9</td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td></tr>
<tr><td>D</td><td></td><td></td></tr>
<tr><td>E</td><td></td><td></td></tr>
<tr><td>F</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>123</td><td>ABS check</td><td>Absolute position power OFF tolerable movement value</td><td>Set the value for the tolerable amount of movement for a machine that moved during power OFF in an absolute position detection system. The "Absolute position power OFF movement exceeded (ABS)" signal will turn ON if the machine moves more than this setting value during power OFF.
The movement amount is not checked when this parameter is set to 0.000.</td><td>0.000 to 99999.999 (° or mm)</td><td>0.000</td></tr>
<tr><td>130</td><td>backlash</td><td>Backlash compensa-tion amount</td><td>Set the backlash compensation amount.</td><td>0 to 9999 (1/1000° or μm)</td><td>0</td></tr>
<tr><td>132</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>133</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>134</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>135</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
</table>

< Operation parameter group 1 >

No.	Name		Details	Setting range	Default value
150	Aspeed1	Operation parameter group 1 Automatic operation speed	Set the feedrate during automatic operation when operation parameter group 1 is selected. This parameter is regarded as the clamp value for the automatic operation speeds and manual operation speeds of all operation groups. A speed exceeding Aspeed1 cannot be commanded, even if set in the parameters.	1 to 100000 (°/min or mm/min)	5000
151	Mspeed1	Operation parameter group 1 Manual operation speed	Set the feedrate during manual operation or JOG operation when operation parameter group 1 is selected.	1 to 100000 (°/min or mm/min)	2000
152	time1.1	Operation parameter group 1 Acceleration/ deceleration time constant 1	Set the linear acceleration/deceleration time for Aspeed 1(the operation parameter group 1 automatic operation speed (clamp speed)) when operation parameter group 1 is selected. When operating at speeds less than the clamp speed, the axis will linearly accelerate/decelerate at the inclination determined above. When this is set together with acceleration/deceleration time constant 2, S-shape acceleration/deceleration is carried out. In this case, set the acceleration/deceleration time of the linear part in this parameter.	1 to 9999 (ms)	100
153	time1.2	Operation parameter group 1 Acceleration/ deceleration time constant 2	Set this parameter when carrying out S-shape acceleration/deceleration. When S-shape acceleration/deceleration is carried out, set the total time of the non-linear parts. When "1" is set in this parameter, linear acceleration/deceleration is carried out. In the handle feed operation mode, this set value is regarded as the time constant for the linear acceleration/deceleration.	1 to 999 (ms)	1

No.	Name		Details	Setting range	Default value
154	TL1	Operation parameter group 1 Torque limit value	Set the motor output torque limit value when operation parameter group 1 is selected. At the default value, the torque is limited at the maximum torque of the motor specifications. Set the default value when torque limit is not especially required. In the stopper positioning operation mode, this becomes the torque limit value when positioning to the stopper starting coordinates.	1 to 500 (%)	500
155	OD1	Operation parameter group 1 Excessive error detection width	Set the excessive error detection width when operation parameter group 1 is selected. An alarm of excessive error (S03 0052) is detected when the position droop becomes larger than this setting value. In the stopper positioning operation mode, this becomes the excessive error detection width when positioning to the stopper starting coordinates.	0 to 32767 (° or mm)	100
156	just1	Operation parameter group 1 Set position output width	The signal indicating that the machine position is at any one of the stations is the set position reached (JST) signal. During automatic operation, the automatic set position reached (JSTA) signal is also output under the same conditions. Set the tolerable values at which these signals are output when operation parameter group 1 is selected. These signals turn OFF when the machine position is separated from the station by more than this value.	0.000 to 99999.999 (° or mm)	0.500
157	near1	Operation parameter group 1 Near set position output width	The signal indicating that the machine position is near any one of the station positions is the near set position (NEAR) signal. Set the tolerable value at which this signal is output when operation parameter group 1 is selected. This value is generally set wider than the set position output width. During operations, this is related to special commands when the station selection is "0".	0.000 to 99999.999 (° or mm)	1.000

< Operation parameter group 2 >

No.	Name		Details	Setting range	Default value
158	Aspeed2	Operation parameter group 2 Automatic operation speed	Set the feedrate during automatic operation when operation parameter group 2 is selected.	1 to 100000 (°/min or mm/min)	5000
159	Mspeed2	Operation parameter group 2 Manual operation speed	Set the feedrate during manual operation or JOG operation when operation parameter group 2 is selected.	1 to 100000 (°/min or mm/min)	2000
160	time2.1	Operation parameter group 2 Acceleration/ deceleration time constant 1	Set the linear acceleration/deceleration time for the operation parameter group 1 automatic operation speed (clamp speed) when operation parameter group 2 is selected. When operating at speeds less than the clamp speed, the axis will linearly accelerate/decelerate at the inclination determined above. When this is set together with acceleration/deceleration time constant 2, S-shape acceleration/deceleration is carried out. In this case, set the acceleration/deceleration time of the linear part in this parameter.	1 to 9999 (ms)	100
161	time2.2	Operation parameter group 2 Acceleration/ deceleration time constant 2	Set this parameter when carrying out S-shape acceleration/deceleration. When S-shape acceleration/deceleration is carried out, set the total time of the non-linear parts. When 1 is set in this parameter, linear acceleration/deceleration is carried out. In the handle feed operation mode, this set value is regarded as the time constant for the linear acceleration/deceleration.	1 to 9999 (ms)	1

No.	Name		Details	Setting range	Default value
162	TL2	Operation parameter group 2 Torque limit value	Set the motor output torque limit value when operation parameter group 2 is selected. At the default value, the torque is limited at the maximum torque of the motor specifications. Set the default value when torque limit is not especially required. In the stopper positioning operation mode, this becomes the torque limit value during stopper operation.	1 to 500 (%)	500
163	OD2	Operation parameter group 2 Excessive error detection width	Set the excessive error detection width when operation parameter group 2 is selected. An excessive error alarm (S03 0052) is detected when the position droop becomes larger than this setting value. In the stopper positioning operation mode, this becomes the excessive error detection width during stopper operation.	0 to 32767 (° or mm)	100
164	just2	Operation parameter group 2 Set position output width	The signal indicating that the machine position is at any one of the stations is the set position reached (JST) signal. During automatic operation, the automatic set position reached (JSTA) signal is also output under the same conditions. Set the tolerable values at which these signals are output when operation parameter group 2 is selected. These signals turn OFF when the machine position is separated from the station by more than this value.	0.000 to 99999.999 (° or mm)	0.500
165	near2	Operation parameter group 2 Near set position output width	The signal indicating that the machine position is near any one of the station positions is the near set position (NEAR) signal. Set the tolerable values at which these signals are output when operation parameter group 2 is selected. These values are generally set wider than the set position output width. During operations, this is related to special commands when the station selection is “0”.	0.000 to 99999.999 (° or mm)	1.000

< Operation parameter group 3 >

No.	Name		Details	Setting range	Default value
166	Aspeed3	Operation parameter group 3 Automatic operation speed	Set the feedrate during automatic operation when operation parameter group 3 is selected.	1 to 100000 (°/min or mm/min)	5000
167	Mspeed3	Operation parameter group 3 Manual operation speed	Set the feedrate during manual operation or JOG operation when operation parameter group 3 is selected.	1 to 100000 (°/min or mm/min)	2000
168	time3.1	Operation parameter group 3 Acceleration/ deceleration time constant 1	Set the linear acceleration/deceleration time for the operation parameter group 1 automatic operation speed (clamp speed) when operation parameter group 3 is selected. When operating at speeds less than the clamp speed, the axis will linearly accelerate/decelerate at the inclination determined above. When this is set together with acceleration/deceleration time constant 2, S-shape acceleration/deceleration is carried out. In this case, set the acceleration/deceleration time of the linear part in this parameter.	1 to 9999 (ms)	100
169	time3.2	Operation parameter group 3 Acceleration/ deceleration time constant 2	Set this parameter when carrying out S-shape acceleration/deceleration. When S-shape acceleration/deceleration is carried out, set the total time of the non-linear parts. When 1 is set in this parameter, linear acceleration/deceleration is carried out. In the handle feed operation mode, this set value is regarded as the time constant for the linear acceleration/deceleration	1 to 9999 (ms)	1

No.	Name		Details	Setting range	Default value
170	TL3	Operation parameter group 3 Torque limit value	Set the motor output torque limit value when operation parameter group 3 is selected. At the default value, the torque is limited at the maximum torque of the motor specifications. Set the default value when torque limit is not especially required. In the stopper positioning operation mode, this becomes the pressing torque limit value after completion of the positioning.	1 to 500 (%)	500
171	OD3	Operation parameter group 3 Excessive error detection width	Set the excessive error detection width when operation parameter group 3 is selected. An excessive error alarm (S03 0052) is detected when the position droop becomes larger than this setting value. In the stopper positioning operation mode, this becomes the excessive error detection width during pressing after completion of the positioning.	0 to 32767 (° or mm)	100
172	just3	Operation parameter group 3 Set position output width	The signal indicating that the machine position is at any one of the stations is the set position reached (JST) signal. During automatic operation, the automatic set position reached (JSTA) signal is also output under the same conditions. Set the tolerable values at which these signals are output when operation parameter group 3 is selected. These signals turn OFF when the machine position is separated from the station by more than this value.	0.000 to 99999.999 (° or mm)	0.500
173	near3	Operation parameter group 3 Near set position output width	The signal indicating that the machine position is near any one of the station positions is the near set position (NEAR) signal. Set the tolerable values at which these signals are output when operation parameter group 3 is selected. These values are generally set wider than the set position output width. During operations, this is related to special commands when the station selection is “0”.	0.000 to 99999.999 (° or mm)	1.000

< Operation parameter group 4 >

No.	Name		Details	Setting range	Default value
174	Aspeed4	Operation parameter group 4 Automatic operation speed	Set the feedrate during automatic operation when operation parameter group 4 is selected.	1 to 100000 (°/min or mm/min)	5000
175	Mspeed4	Operation parameter group 4 Manual operation speed	Set the feedrate during manual operation or JOG operation when operation parameter group 4 is selected.	1 to 100000 (°/min or mm/min)	2000
176	time4.1	Operation parameter group 4 Acceleration/ deceleration time constant 1	Set the linear acceleration/deceleration time for the operation parameter group 1 automatic operation speed (clamp speed) when operation parameter group 4 is selected. When operating at speeds less than the clamp speed, the axis will linearly accelerate/decelerate at the inclination determined above. When this is set together with acceleration/deceleration time constant 2, S-shape acceleration/deceleration is carried out. In this case, set the acceleration/deceleration time of the linear part in this parameter.	1 to 9999 (ms)	100
177	time4.2	Operation parameter group 4 Acceleration/ deceleration time constant 2	Set this parameter when carrying out S-shape acceleration/deceleration. When S-shape acceleration/deceleration is carried out, set the total time of the non-linear parts. When 1 is set in this parameter, linear acceleration/deceleration is carried out. In the handle feed operation mode, this set value is regarded as the time constant for the linear acceleration/deceleration.	1 to 9999 (ms)	1

No.	Name		Details	Setting range	Default value
178	TL4	Operation parameter group 4 Torque limit value	Set the motor output torque limit value when operation parameter group 4 is selected. At the default value, the torque is limited at the maximum torque of the motor specifications. Set the default value when torque limit is not especially required. In the stopper method initializing mode in absolute position detection systems, this becomes the torque limit value during stopper operation.	1 to 500 (%)	500
179	OD4	Operation parameter group 4 Excessive error detection width	Set the excessive error detection width when operation parameter group 4 is selected. An excessive error alarm (S03 0052) is detected when the position droop becomes larger than this setting value. In the stopper method initializing mode in absolute position detection systems, this becomes the excessive error detection width during stopper operation.	0 to 32767 (° or mm)	100
180	just4	Operation parameter group 4 Set position output width	The signal indicating that the machine position is at any one of the stations is the set position reached (JST) signal. During automatic operation, the automatic set position reached (JSTA) signal is also output under the same conditions. Set the tolerable values at which these signals are output when operation parameter group 4 is selected. These signals turn OFF when the machine position is separated from the station by more than this value.	0.000 to 99999.999 (° or mm)	0.500
181	near4	Operation parameter group 4 Near set position output width	The signal indicating that the machine position is near any one of the station positions is the near set position (NEAR) signal. Set the tolerable values at which these signals are output when operation parameter group 4 is selected. These values are generally set wider than the set position output width. During operations, this is related to special commands when the station selection is “0”.	0.000 to 99999.999 (° or mm)	1.000

No.	Name		Details	Setting range	Default value
190	stpos2	Station 2 coordinate value	Set the coordinate value of each station when non-uniform assignment is selected. The station 1 coordinate value is fixed at 0.000 (machine coordinate zero point).	–99999.999 to 99999.999 (° or mm)	0.000
191	stpos3	Station 3 coordinate value			
192	stpos4	Station 4 coordinate value			
193	stpos5	Station 5 coordinate value			
194	stpos6	Station 6 coordinate value			
195	stpos7	Station 7 coordinate value			
196	stpos8	Station 8 coordinate value			
197	stpos9	Station 9 coordinate value			
200	PSWcheck	PSW detection method	This is a HEX setting parameter. Set bits without a description to their default values.		

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

bit	Position switch	Meaning when "0" is set	Meaning when "1" is set
0	PSW1	The position switch output is judged by the machine position of the command system.	The position switch output is judged by the machine FB position (actual position).
1	PSW2		
2	PSW3		
3	PSW4		
4	PSW5		
5	PSW6		
6	PSW7		
7	PSW8		
8			
9			
A			
B			
C			
D			
E			
F			

No.	Name		Details	Setting range	Default value
201 202	PSW1dog1 PSW1dog2	PSW1 area setting 1 PSW1 area setting 2	When the machine position is in the region between region settings 1 and 2, the position switch of each No. will turn ON. Whether the value of setting 1 is larger than setting 2 (vice versa) does not affect the position switch operation. For rotation axes, the output turns ON at the region without including 0.000 degree.	-99999.999 to 99999.999 (° or mm)	0.000
203 204	PSW2dog1 PSW2dog2	PSW2 area setting 1 PSW2 area setting 2			
205 206	PSW3dog1 PSW3dog2	PSW3 area setting 1 PSW3 area setting 2			
207 208	PSW4dog1 PSW4dog2	PSW4 area setting 1 PSW4 area setting 2			
209 210	PSW5dog1 PSW5dog2	PSW5 area setting 1 PSW5 area setting 2			
211 212	PSW6dog1 PSW6dog2	PSW6 area setting 1 PSW6 area setting 2			
213 214	PSW7dog1 PSW7dog2	PSW7 area setting 1 PSW7 area setting 2			
215 216	PSW8dog1 PSW8dog2	PSW8 area setting 1 PSW8 area setting 2			
220	push	Stopper amount	Set the command stroke of the stopper operation during stopper positioning operations.	0.000 to 359.999 (° or mm)	0.000
221	pusht1	Stopper standby time	Set the standby time from the stopper starting coordinate positioning to the stopper operation start during stopper positioning operations.	0 to 9999 (ms)	0
222	pusht2	Stopper torque release time	Set the time from the completion of the stopper operation to the changeover of the stopper torque during stopper positioning operations.	0 to 9999 (ms)	0
223	pusht3	Set position signal output delay time	Set the time from the completion of the stopper operation to the output of the automatic set position reached (JSTA), set position reached (JST), and near set position (NEAR) signals during stopper positioning operations.	0 to 9999 (ms)	0

Revision History

<table>
<tr><th>Date of revision</th><th>Manual No.</th><th>Revision details</th></tr>
<tr><td>Dec. 2000</td><td>BNP-B2267*</td><td>First edition created.</td></tr>
<tr><td>Sep. 2003</td><td>BNP-B2267A</td><td>
• The cover (front, spine, back covers) design was changed.
• "Type", "Independent Product Code" and "Reference No." were added to the back cover.
• The following parameters were added.
(1) 5. Basic specification parameters
<table>
<tr><td>#1926</td><td>IP address</td></tr>
<tr><td>#1927</td><td>Subnet mask</td></tr>
<tr><td>#1928</td><td>Gateway address</td></tr>
<tr><td>#1929</td><td>Port number</td></tr>
</table>
<table>
<tr><td>#21025</td><td>SmpDelay</td></tr>
<tr><td>#21028</td><td>ed_mess</td></tr>
<tr><td>#21029</td><td>NCname</td></tr>
<tr><td>#21030</td><td>AlmHold</td></tr>
<tr><td>#21031</td><td>UnitMax</td></tr>
<tr><td>#21032</td><td>UnitNum</td></tr>
<tr><td>#21049</td><td>SPname</td></tr>
</table>
(2) 16. Indexing axis parameters (#26251 ~)
(3) 17. Indexing axis position switch (#27701 ~)
(4) 18 Indexing axis commands
• Mistakes, etc. were corrected.
</td></tr>
<tr><td>Mar.2004</td><td>BNP-B2267C</td><td>
• The contents revised following to the software Ver.C and Ver.D.
• Sections of servo parameters (section 7 to 9) were revised all over, and reconstructed to “7. Servo Parameters”.
• Sections of spindle parameters (section 10 and 11) were revised all over, and reconstructed to “8. Spindle Parameters”.
• “19 Auxiliary Axis Parameters” was revised all over and its section number became “16”.
• Mistakes, etc. were corrected.
</td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

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.

Duplication Prohibited

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