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CNC
MELDAS 600M Series

PARAMETER MANUAL

BNP-B2238G(ENG)

Introduction

This manual is a guide of the parameters used with the CNC MELDAS 600M Series software-fixed type of CNC (NC hereafter) systems which are designed to execute high-performance contour control. This information is mainly targeted for milling machines and machining centers.
This manual is written on the assumption that all machine parameters of the MELDAS 600M series 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 reference should be made 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 600M Series Instruction Manual.. BNP-B2237
- MELDAS AC Servo MDS-B-Vx Series Servo Parameter Manual...... BNP-B3759

⚠ 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 Instruction Manual issued by each machine maker for details on each machine tool.

⚠ 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 Instruction Manual issued by each machine maker for details on each machine tool.
- ⚠ Some screens and functions may differ or may not be usable depending on the NC system version.

CONTENTS

1. Control Parameters

1.1 Setting the Control Parameters

(1) Screen menus

Menu	Details	Reference
Param No.	When a number is set and the INPUT key is pressed, the cursor appears at the designated No. The ON or OFF status can be set. **(Note)**	–
ON	This turns ON the switch currently indicated by the cursor.	–
OFF	This turns OFF the switch currently indicated by the cursor.	–
Ctrl param 1	This changes the screen to the system common CONTROL PARAMETER screen.	1.2 Control parameter 1 details
Ctrl param 2	This changes the screen to the system independent CONTROL PARAMETER screen.	1.3 Control parameter 2 details

(Note) The page changeover keys and scroll keys can also be used to change the number.

(2) Setting method

Select the item and press the menu key ON or OFF.

1.2 Control Parameter 1 Details

The system common control parameters are displayed and set on this screen.
For parameters indicated with an "∗" in the table, turn the NC power OFF after setting. The setting is validated after the power is turned ON again.

#	Item	Setting	Details
310001	Initial inch ∗	ON	The inch command mode is the initial state when the power is turned ON. (The parameters, compensation amount, etc., all are inch settings.)
		OFF	The metric command mode is the initial state when the power is turned ON. (The input setting unit is also metric.)
310002	% rewind	ON	During tape search, the tape is rewound and stopped when the program is read to program end (%), and the designated block is not found.
		OFF	During tape search, the tape is not rewound when the program is read to program end (%), and the designated block is not found. Instead the program is stopped at the end.
310003	Edit lock B	ON	Editing of the label No. 8000 to 9999 machining program is locked.
		OFF	Editing of the label No. 8000 to 9999 machining program is enabled.
310004	Com-var RST clear	ON	After resetting, #100 to #149 are cleared to "blank" when there are 100 common variable sets, and #100 to #199 when there are 200 or 300 common variable sets.
		OFF	The common variables are held when reset.
310005	Com-var PWR-ON clear	ON	When the power is turned ON, #100 to #149 are cleared to "blank" when there are 100 common variable sets, and #100 to #199 when there are 200 or 300 common variable sets.
		OFF	The common variables are held when the power is turned ON or OFF.

1.3 Control Parameter 2 Details

The control parameters for each system are displayed and set on this screen.
For parameters indicated with an "∗" in the table, turn the NC power OFF after setting. The setting is validated after the power is turned ON again.

#	Item	Setting	Details
320001	G00 dry run	ON	The external manual feedrate is enabled in respect to rapid traverse (G0, G27, G28, G29, G30, G60).
		OFF	The "rapid traverse rate × rapid traverse override value" set in the machine parameters is applied.
320002	Macro single	ON	The macro block is handled as one block. The single block operation can be stopped at each macro block.
		OFF	The macro block is not handled as one block. The program is processed at a high speed.
320003	Middle point ignore	ON	During G28, G30 reference point return command, the middle point designated in the program is ignored, and the axis returns directly to the reference point.
		OFF	During G28, G30 command, the program designation is followed, and the axis returns to the reference point via the middle point.
320004	Machine lock rapid	ON	When carrying out automatic operation in the machine lock state, the feedrate becomes the machine lock speed. The machine lock speed is set with the machine parameter's base system parameter "120072 M_lock rapid feed".
		OFF	During machine lock, the feedrate is the commanded speed, and is the same process time as normal automatic operation.
320005	G04 time fixed	ON	The G04 command is a time designation in both the synchronous feed mode (G95) and asynchronous feed mode (G94).
		OFF	The G04 command is a time designation in the asynchronous feed mode (G94), and a rotation designation in the synchronous feed mode (G95).
320006	Rad compen intrf byp **(Note 1)**	ON	During the radius compensation interference check, the path is changed so that the workpiece is not cut into by the tool radius.
		OFF	During the radius compensation interference check, if the block is determined to cause cutting into the workpiece by the tool radius, an alarm is generated before execution, and the operation stops.
320007	Decimal point type 2	ON	1 of a position command data without a decimal point command is controlled as 1mm (1 inch).
		OFF	1 of a position command data without a decimal point command is controlled as the min. input command unit (0.01mm, 0.001mm or 0.0001mm) designated in the specifications.

(Note 1) If the control parameter "#320033 Tcomp interf chk OFF" is set to "OFF", the "#320006 Rad compen intrf byp " setting is invalid. Even if the workpiece is cut into, an alarm is not generated. Machining proceeds without changing the path.

#	Item	Setting	Details
320008	Macro interupt valid	ON	The user macro interrupt is validated.
		OFF	The user macro interrupt is invalidated.
320009	Sub-prog interrupt	ON	Subprogram type user macro interrupt is applied.
		OFF	Macro type user macro interrupt is applied.
320010	G0 interpolation OFF	ON	When positioning in the G00 mode, each axis independently moves at the respective rapid traverse rate. The path is not linear in respect to the end point.
		OFF	When positioning in the G00 mode, the axis moves at the shortest distance linearly in respect to the end point.
320011	Precision thrd cut E	ON	When cutting an inch thread, address E designates the precision lead.
		OFF	When cutting an inch thread, address E designates the number of threads per inch.
320012	Radius compen type B	ON	When radius compensation or executing start up or a cancel command during radius compensation, the intersecting point of the command block and next command block is operated.
		OFF	When radius compensation or executing start up or a cancel command during radius compensation, the start up or cancel command block are not targets for the intersecting point operation. The offset vector in the command right angle direction is applied.
320013	Ext deceleration OFF	ON	Even if the machine interface signal's external deceleration signal is input, it is ignored. (The machine's rapid traverse rate is not decelerated.)
		OFF	When the external deceleration signal is input, the machine's feedrate decelerates to the speed set with the machine parameters.
320014	Initial absolute val	ON	The absolute value command mode is the initial state when the power is turned ON.
		OFF	The incremental value command mode is the initial state when the power is turned ON.
320015	Initial synchr feed	ON	The synchronous feed mode is the initial state when the power is turned ON.
		OFF	The asynchronous feed mode is the initial state when the power is turned ON.
320016	Init cnst prphl spd	ON	Not used.
		OFF	Not used.
320017	Initial Z-X plane	ON	G18 (plane selection ZX mode) is the initial state when the power is turned ON.
		OFF	G17 (plane selection XY mode) or G19 (plane selection YZ mode) is the initial state when the power is turned ON.
320018	Initial Y-Z plane	ON	G19 (plane selection YZ mode) is the initial state when the power is turned ON.
		OFF	G17 (plane selection XY mode) or G18 (plane selection ZX mode) is the initial state when the power is turned ON.

#	Item	Setting	Details
320019	Initial G00	ON	G00 (positioning) mode is the initial state when the power is turned ON.
		OFF	G01 (linear interpolation) mode is the initial state when the power is turned ON.
320020	Auto restart valid	ON	The restart position is automatically moved to at the first start when the program is restarted.
		OFF	The program is restarted after moving to the restart position with manual operations.
320021	Drilling Z fixed	ON	The fixed cycle drilling axis is fixed to the Z axis.
		OFF	The fixed cycle drilling axis is an axes in a plane other than that designated with G17 to G19.
320022	Fixed cycle modal	ON	During the fixed cycle mode, movement to the drilling position follows the NC unit modal state (G0, G1).
		OFF	During the fixed cycle mode, the axis is positioned to the drilling position with G00.
320023	T leng offset Z fix	ON	The offset axis during tool length offset is fixed to the Z axis.
		OFF	The offset axis during tool length offset is designated with the program.
320024	Syncronized tapping	ON	The G74, G84 tap cycle is a floating tap chuckless tap cycle.
		OFF	The G74, G84 tap cycle is a tap cycle with floating tap chuck.
320025	T-life manage valid	ON	The tool life management is controlled.
		OFF	The tool life control data is ignored.
320026	Tool command mthd 2 (When tool life management is valid)	ON	The program tool command is handled as a tool No.
		OFF	The program tool command is handled as a group No.
320027	Tool select mthd 2 (When tool life management is valid)	ON	The tool with the maximum remaining life is selected from the tools used or not used within the same group.
		OFF	The tools are selected in registered No. order from the tools used in the same group.
320028	Initial high precis	ON	The G61.1 (high-precision control) mode is the initial state when the power is turned ON.
		OFF	The G64 (cutting) mode is the initial state when the power is turned ON.
320029	Playback G90	ON	The machining program created with playback is created with absolute values.
		OFF	The machining program created with playback is created with incremental values.
320030	Interrupt amt reset	ON	By pressing the reset button, the amount interrupted with manual or handle feed (when manual ABS is OFF) is cleared to zero. (The coordinates deviated by the interruption are returned to the original values.)
		OFF	Even if the reset button is pressed, the amount interrupted with manual or handle feed (when manual ABS is OFF) is held. (The coordinates deviated by the interruption are held.)
320031	Coord rot param invd	ON	Coordinate rotation by the parameters is invalid.
		OFF	Coordinate rotation by the parameters is valid.

#	Item	Setting	Details
320032	G04P decim pt valid	ON	The decimal point command of G04 address P is valid.
		OFF	The decimal point command of G04 address P is invalid.
320033	Tcomp interf chk OFF	ON	Interference check is not carried out during radius compensation. Turn this ON when carrying out radius compensation with a fine segment program. This is the performance condition for the high-speed machining mode IB.
		OFF	Interference check is carried out during radius compensation. When OFF, the performance is halved even in the high-speed machining mode IB.
320035	Dry run in thred cut	ON	Dry run is executed during thread cutting.
		OFF	Dry run is not executed during thread cutting. This parameter is normally set to OFF.
320036	Host link	ON	The on-line state with the host computer is established.
		OFF	The off-line state with the host computer is established.
320037	1-digit F feed valid	ON	F1-digit feed control becomes valid. When an F1 to F9 command is issued, the machine runs at the speed set in the machining parameters "F1" to "F9". When an "F10" or higher command is issued, the feedrate will be directly commanded. This parameter cannot be selected when F1-digit feed specifications are not supported.
		OFF	The feedrate is directly commanded in all cases without referring to the F1-digit feedrate parameter.
320039	OFS Diameter DESIGN	ON	The compensation amount for radius compensation is input as a diameter value.
		OFF	The compensation amount for radius compensation is input as a radius value.
320043	Prec ctrl dec chk2	ON	If the positioning command (G0) and cutting feed command (G1) movement directions do not change, the deceleration check is not carried out at the joints of the positioning command (G0) and cutting feed command (G1) blocks.
		OFF	Deceleration check is carried out at the joints of the positioning command (G0) and cutting feed command (G1) blocks.

2. User Parameters

When the menu key U-para select is pressed on the Parameter screen, the submenu appears, and each User Parameter screen can be selected. This section explains the user parameter details and setting range.

- **Submenus when U-para select is selected**

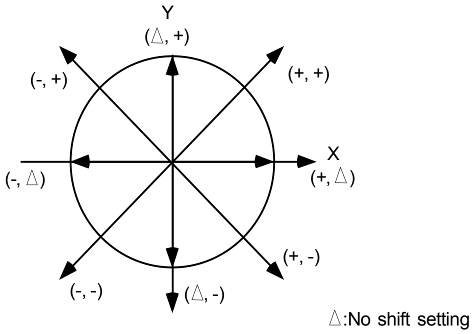
Menu	Details	Reference
Axis param	This changes the screen to the Axis param screen.	2.1 Axis Parameters
Process param	This changes the screen to the Process param screen.	2.2 Machining Parameters
Operate param	This changes the screen to the Operation param screen.	2.3 Operation Parameters
I/O param	This changes the screen to the I/O param screen.	2.5 Input/Output Parameters
Ethrnet param	This changes the screen to the Ethernet param screen.	2.6 Ethernet Parameters
Link param	This changes the screen to the Cmptr link param screen.	2.7 Computer Link Parameters

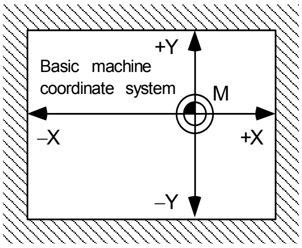
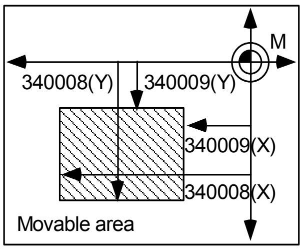
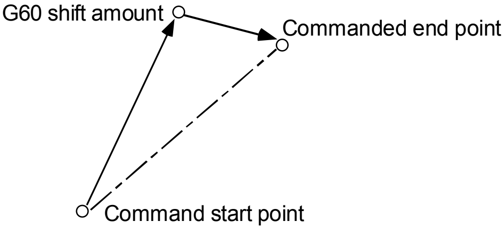
- **The anshin-net parameter 1 selects the Anshin param 1 menu on the Anshin-net screen.**

Menu	Details	Reference
Anshin param 1	This changes the screen to the Anshin param. 1 screen.	2.4 Anshin-net Parameter 1

2.1 Axis Parameters (Axis param screen)

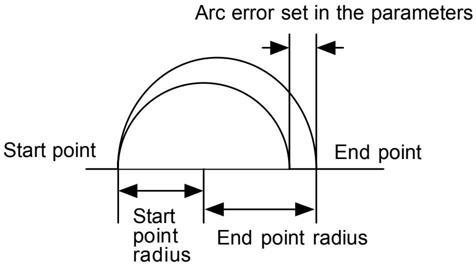
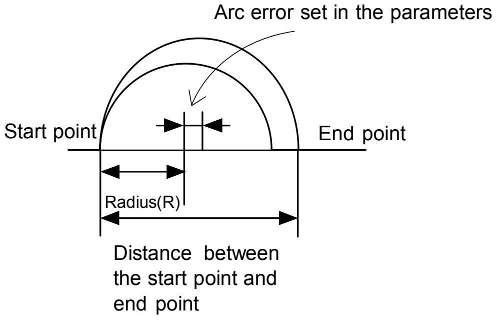
The necessary parameters are set for each axis.
For parameters indicated with an "∗" in the table, turn the NC power OFF after setting. The setting is validated after the power is turned ON again.

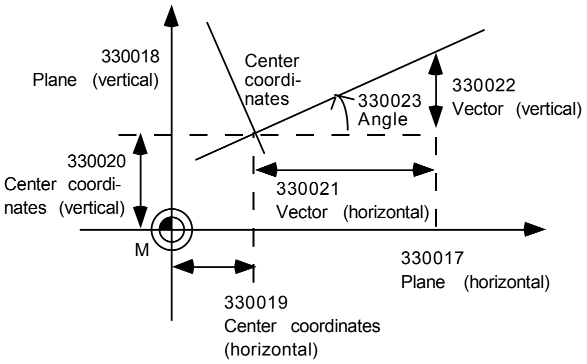
Number	Name	Details	Setting range (units)
34 0001	Mirror image	In memory and MDI operation, this reverses the sign for the next block movement data (incremental amount). **(Note)** During execution of a machining program, turn the mirror image parameter OFF at the same coordinate position where the parameter was turned ON. When the changeover position changes, always execute a reference point return and "G92 G53 X_ Y_ Z_ a_ ;".	0: Mirror image invalid 1: Mirror image valid
34 0002	Automatic dog type	The first reference point return is always dog-type, but this selects either dog-type or high-speed (memory type) for the second and subsequent reference point returns.	0: High-speed return 1: Dog-type return
34 0003	Manual dog type	This sets the manual reference point return method for the function above.	0: High-speed return 1: Dog-type return
34 0004	Axis removal	This excludes the control axis from the NC control targets. It is used for controlling other axes such as the additional axes (rotation table, etc.) separately from the machine.	0: Axis removal invalid 1: Axis removal valid
34 0005	No G76/87 shift	This is set when the axis direction is not shifted.	0: Shift 1: No shift
34 0006	G76/87 shift (–)	This designates the tool shift direction (–) for tool relief after spindle orientation in the fixed cycle G76 (fine boring) and G87 (back boring). 	0: Shift direction (+) 1: Shift direction (–)
34 0007	Soft limit invalid	This selects the stored stroke limit II function set in 340008 and 340009.	0: Valid 1: Invalid

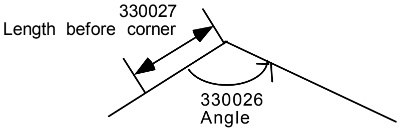
Number	Name	Details	Setting range (units)
34 0008	Soft limit (–)	This sets the coordinates of the (–) direction in the moveable range of the stored stroke limit II or the lower limit coordinates of the prohibited range of stored stroke limit IIB. When the stored stroke limit IIB function is selected, the prohibited range will be between two points even when 340008 and 340009 are set in reverse. When II is selected, the entire range will be prohibited. Soft limit outside (340011=0)  Soft limit inside (340011=1) 	–999999.999 to 999999.999 (mm) When the same value (other than 0) is set in 340008 and 340009, this function is invalidated. **(Ex.)** 340008 = 10. 340009 = 10.
34 0009	Soft limit (+)		
34 0010	G60 shift amount	When G60 (uni-direction positioning) is commanded, this sets the last positioning direction and distance for each axis. 	–999999.999 to 999999.999 (mm)
34 0011	Soft limit inside	This sets whether the stored stroke limit function set with 340008 and 340009 prohibits entry from outside the designated range or entry from inside the range.	0: Prohibited range is outside (Stored stroke limit II is selected.) 1: Prohibited range is inside (Stored stroke limit IIB is selected.)
34 0012	Rotation axis type∗	This designates the type of rotation axis.	0: Rotation axis 1: Linear type 2: Shortcut type

2.2 Machining Parameters (Process param screen)

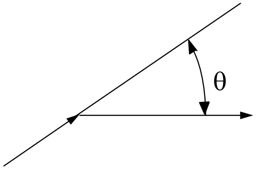
The machining parameters are set. Parameters with an "" mark added are validated after restarting.
If the parameter length exceeds 12 characters, the data will be echo-backed into the data setting area.

Number	Name	Details	Setting range (units)
33 0001	Base axis I	This sets the control axis address corresponding to G17, G18 and G19.	Axis name
33 0002	Base axis J		
33 0003	Base axis K		
33 0004	Parallel axis 1I		
33 0005	Parallel axis 1J		
33 0006	Parallel axis 1K		
33 0007	Parallel axis 2I		
33 0008	Parallel axis 2J		
33 0009	Parallel axis 2K		
33 0010	G73 return amount	This sets the return amount per G73/G83 (deep hole drilling) command.	0 to 999999.999 (mm)
33 0011	G83 return amount		
33 0012	Arc finish pt error	This sets the tolerable radius error amount of the arc command end point. **When the center coordinates of the arc are designated**  **When the arc radius (R) is designated** 	0 to 1.000 (mm) **(Note)** When "0" is set, it is processed as 0.100mm. Set a smaller value for more detailed control.

Number	Name	Details	Setting range (units)
33 0013	3-dimensional compen	A denominator variable by the three-dimensional tool radius compensation P value in Vx = i × r/p, Vy = j × r/p, Vz = k × r/p Vx, Vy, Vz: XYZ axis or vector of parallel axes i, j, k: Program command value r: Compensation amount When the setting value is "0": $P = \sqrt{i^2 + j^2 + k^2}$	0 to 999999.999 (mm)
33 0014	F cmnd mgf type /min	This multiplies the commanded F command value (per minute) using no decimal points.	0 : 1-fold 1 : 1/10-fold 2 : 1/100-fold
33 0015	Normal C axis turn R	This sets the length from the center of the C axis (spindle) to the tip of the tool. This is used in the turning speed calculation of the block seam during normal line control type II.	0 to 999999.999 (mm)
33 0016	Norm C insrt radius	During C axis normal line control, this sets the radius of the arc automatically inserted in the corner. This is only valid for normal line control type I.	0 to 999999.999 (mm)
33 0017	Coord rot plane (H)	This sets the plane, center coordinates, vector components and angle. Plane (horizontal axis): This sets the name of the 1st axis when measuring the rotation. When not set, the name will be the X axis. Plane (vertical axis): This sets the name of the 2nd axis when measuring the rotation. When not set, the name will be the Y axis.  **(Note)** The angle is automatically calculated and enumerated at vector component setting, but direct setting of the angle is possible. When directly setting the angle, "0" appears in both the horizontal axis and vertical axis of the vector components.	Axis name
33 0018	Coord rot plane (V)		Axis name
33 0019	Coord rot center (H)		–999999.999 to 999999.999 (mm)
33 0020	Coord rot center (V)		–999999.999 to 999999.999 (mm)
33 0021	Coord rot vector (H)		–999999.999 to 999999.999 (mm)
33 0022	Coord rot vector (V)		–999999.999 to 999999.999 (mm)
33 0023	Coord rotation angle		–180.000 to 180.000 (°)
33 0024	Scaling magnificat'n	This sets the reduction/enlargement magnification for the machining program designated in G50 and G51. It is validated when the magnification is not designated in the program.	0 to 999.99999

Number	Name	Details	Setting range (units)
33 0025	Auto corner override	This sets the judgment conditions of the automatic corner override valid designated in G62. The minimum value of the automatically calculated arc inside override is set. The override is invalidated when "0" is set. 	0 to 100 (%)
33 0026	A. crnr over max ang		0 to 180.000 (°)
33 0027	A. crnr over dcc zon		0 to 999999.999 (mm)
33 0028	A. crnr over ins arc		0 to 100 (%)
33 0029	Prog comand unit mgf	This designates the magnification of the actual movement value for the movement command input value (no decimal point) in the machining program. Note that, this is limited to when the command unit parameter is 0.001mm or 0.0001mm control.	1 : 1-fold 10 : 10-fold 100 : 100-fold
33 0030	Subpro search 1:dev	This designates the drive and directory name to be referred to during a subprogram search. Referred to in prioritized order from search destination 1 to 4. Search destination 1 ← Priority order: High ↓ Search destination 2 ↓ Search destination 3 ↓ Search destination 4 ← Priority order: Low	Drive name
33 0031	Subpro search 1:dir		Directory 20 characters
33 0032	Subpro search 2:dev		Drive name
33 0033	Subpro search 2:dir		Directory 20 characters
33 0034	Subpro search 3:dev		Drive name
33 0035	Subpro search 3:dir		Directory 20 characters
33 0036	Subpro search 4:dev		Drive name
33 0037	Subpro search 4:dir		Directory 20 characters
33 0038	Precision coefficien	This sets the compensation coefficient of the control error during the high-accuracy mode. The compensation coefficient is set when further reducing the control error of the roundness and arc radius reduction amount at the corner. The maximum control error is displayed in ( ). (Unit: mm) Theoretically, the accuracy error becomes smaller as the setting value becomes larger, but because the speed and arc clamp speed at the corner become lower, the cycle time becomes longer.	–1000 to 100 (%) (Standard value: 0)

<table>
<tr><th>Number</th><th>Name</th><th>Details</th><th>Setting range (units)</th></tr>
<tr><td>33 0039</td><td>Corner slow angle</td><td>In the high-accuracy mode, this automatically judges the corner, and realizes a smooth, curved line or a sharp corner.

In the high-accuracy control mode, when the angle (exterior angle) between blocks is larger than the setting value, it is judged as a corner. The machine will decelerate to make the edge. Consequently, set the minimum value to be recognized as an angle (exterior angle).

θ > setting value
→Optimum corner deceleration</td><td>0 to 90 (°)
0: Interpreted as 5°</td></tr>
<tr><td>33 0040</td><td>Arc speed ctrl valid</td><td>During high-accuracy control, this sets whether the speed control is valid or invalid at the arc entrance and exit.</td><td>0: Speed control invalid
1: Speed control valid</td></tr>
<tr><td>33 0041</td><td>Arc slowdown speed</td><td>During high-accuracy control, this sets the deceleration speed when the speed control is valid at the arc entrance and exit.</td><td>0 to 480000 (mm/min)</td></tr>
<tr><td>33 0042</td><td>F cmnd mgf type/rot</td><td>This multiples the commanded F command value (per rotation) using no decimal points.</td><td>0: 1-fold
1: 1/10-fold
2: 1/100-fold</td></tr>
<tr><td>33 0043</td><td>Subpro stor D0: dev</td><td rowspan="10">If D1 to D4 is designated when calling the subprogram, the subprogram to be called will be searched from the storage destination (device and directory) designated with this parameter.

(Example)
The following will be searched:
M98 P (program No.), D0
→ Device : "330043 Subpro stor D0:dev" device
Directory : "330044 Subpro stor D0:dir" directory

(Note 1) If the called subprogram is not found in the designated storage destination, a program error will occur.

(Note 2) If D0 to D4 is not designated when calling the subprogram, the subprogram will be searched for according to the setting of "330030 Subpro search 1: dev to 4: dir".
<table><tr><th>Device</th><th>Drive name</th></tr><tr><td>Memory</td><td>MO1</td></tr><tr><td>Data server</td><td>DS</td></tr><tr><td>IC card</td><td>IC</td></tr><tr><td>Floppy disk</td><td>FD1</td></tr><tr><td>Hard disk</td><td>HD</td></tr></table></td><td>Drive name</td></tr>
<tr><td>33 0044</td><td>Subpro stor D0: dir</td><td>Directory 20 characters</td></tr>
<tr><td>33 0045</td><td>Subpro stor D1: dev</td><td>Drive name</td></tr>
<tr><td>33 0046</td><td>Subpro stor D1: dir</td><td>Directory 20 characters</td></tr>
<tr><td>33 0047</td><td>Subpro stor D2: dev</td><td>Drive name</td></tr>
<tr><td>33 0048</td><td>Subpro stor D2: dir</td><td>Directory 20 characters</td></tr>
<tr><td>33 0049</td><td>Subpro stor D3: dev</td><td>Drive name</td></tr>
<tr><td>33 0050</td><td>Subpro stor D3: dir</td><td>Directory 20 characters</td></tr>
<tr><td>33 0051</td><td>Subpro stor D4: dev</td><td>Drive name</td></tr>
<tr><td>33 0052</td><td>Subpro stor D4: dir</td><td>Directory 20 characters</td></tr>
<tr><td>33 0053</td><td>Spline cancel angle</td><td>If the angle created by two continuing blocks exceeds this setting value, the high-accuracy spline function will be temporarily canceled. Set the angle for creating an edge.</td><td>0 to 90 (°)
(Standard value: 60)</td></tr>
</table>

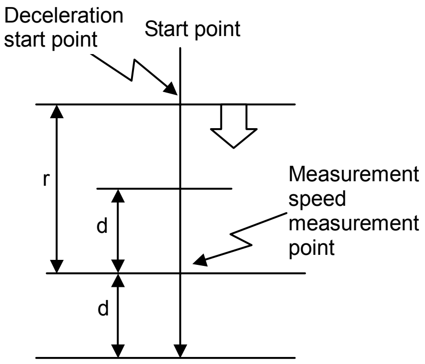
Number	Name	Details	Setting range (units)
33 0054	Minute line length	This is valid during the high-accuracy spline control. Curve interpolation will be carried out on linear blocks of which the length of one block is less than this setting value.	0 to 10 (mm) 0: 1 (mm) (Standard value: 0)
33 0055	Tolrnc (inflctn)	This corrects the curve shape so that the spline curve's helical difference is within this setting value for blocks containing an inflection point.	0 to 100 (mm) (Standard value: 0.01)
33 0056	Tolrnc (smooth)	This corrects the curve shape so that the spline curve's helical difference is within this setting value for blocks not containing an inflection point.	0 to 100 (mm) (Standard value: 0.01)
33 0057	Tolrnc (thin out)	This thins out blocks of which the block length does not satisfy this setting value.	0 to 10 (mm) (Standard value: 0.01)
33 0058	Tolrnc (fairing)	This corrects the path so that the path correction amount by faring with less than this setting value.	0 to 10 (mm) (Standard value: 0.1)
33 0059	Tolrnc (ACCS)	This corrects the curve shape so that the error separated from the original path caused by ACCS control is within the setting value.	0 to 10 (mm) (Standard value: 0.25)
33 0060	Tolrnc (hi-spd)	Not used.	
33 0061	Tolrnc ctrl flag	Not used.	
33 0062	crnr correct width	This sets the corner correction width at ACCS control. Set within a range that is 1/2 or less (normally approx. 1/4) of the minute line length.	0 to 10 (mm) (Standard value: 0.25)
33 0063		(Not used currently.)	(Standard value: 0.0)
33 0064		(Not used currently.)	(Standard value: 0.0)
33 0065	F1	F1 to F9 This sets the actual speed data to convert to when F1-digit code is commanded. FM1,FM2 This sets the upper limit value for the F1-digit speed change. FM1 : The clamp value for F1 to F4. FM2 : The clamp value for F5 to F9. K This sets the constant that determines the speed change amount per manual handle pulse during speed change.	F1 to F9 1 to 60000 (mm/min) FM1, FM2 1 to 60000 (mm/min) K 0 to 32767 $\Delta F = \Delta P \times \frac{FMn}{K}$ ΔP: Handle pulse (±)
33 0066	F2		
33 0067	F3		
33 0068	F4		
33 0069	F5		
33 0070	F6		
33 0071	F7		
33 0072	F8		
33 0073	F9		
33 0074	FM1		
33 0075	FM2		
33 0076	K		
33 0078	prec coef (curve) vald	This selects whether a precision coefficient or precision coefficient for curves is used as the compensation coefficient to further reduce the radius reduction amount of a curve (arc, spline, NURBS curve) during the high-accuracy control mode. When "0" is set, the precision coefficient is applied, and when "1" is set, the precision coefficient for curves is applied.	0: Precision coefficient 1: Precision coefficient for curves (Standard value: 0)

Number	Name	Details	Setting range (units)
33 0079	prec coef (curve)	This sets the compensation coefficient to further reduce the radius reduction amount of a curve (arc, spline, NURBS curve) during the high-accuracy control mode.	–1000 to 99 (%) (Standard value: 0)
33 0106	Tap back speed CLR	Set whether to hold the return spindle rotation speed command (,S) during multi-step acceleration/ deceleration after synchronous tap is canceled.	0: Hold 1: Do not hold
33 0107	SS ctrl std length	Adjust the maximum value of the pre-read range for recognition with SS control. To avoid the effect of steps or errors, etc., set a large value. To decelerate sufficiently, set a small value. SS control will be invalid when "0.000" is set.	0.000 to 100.000 (mm) (Standard value: 1.000)
33 0108	SS ctrl clamp coef	Set the degree of applying speed clamp on a corner less than the corner deceleration angle. The clamp speed will decrease as a larger value is set. SS control speed clamp will be invalid when "0" is set.	0 to 99 (%) (Standard value: 0)

2.3 Operation Parameters (Operation param screen)

The operation parameters are set. Parameters with an "." mark added are validated after restarting.

Number	Name	Details	Setting range (units)
37 0001	Sensor length (TL)	This sets the length to the touch sensor tip.	–999999.999 to 999999.999 (mm)
37 0002	Sensor diameter (TD)	This sets the ball diameter to the touch sensor tip.	–999999.999 to 999999.999 (mm)
37 0003	Center compen (H)	This designates the X axis direction for the spindle center deviation amount from the touch sensor center.	–999999.999 to 999999.999 (mm)
37 0004	Center compen (V)	This designates the Y axis direction for the spindle center deviation amount from the touch sensor center.	–999999.999 to 999999.999 (mm)
37 0005	Skip return amount	This sets the one-time return distance for contacting again.	–999999.999 to 999999.999 (mm)
37 0006	Skip feed rate	This sets the feedrate when contacting again.	1 to 80000 (mm/min)
37 0007	Skip past amout (H)	This sets the difference (horizontal axis direction) of the skip read value and actual skip position.	–999999.999 to 999999.999 (mm)
37 0008	Skip past amout (V)	This sets the difference (vertical axis direction) of the skip read value and actual skip position.	–999999.999 to 999999.999 (mm)
37 0009	tlml X	This sets the TLM reference length. Set the distance from the tool change point (reference point) 0 point to the measurement reference point (plane) for tool length measurement.	–99999.999 to 99999.999 (mm)
37 0010	tlml Y		
37 0011	tlml Z		
37 0012	Surface height	When using tool length measurement I, this sets the deviation amount of the reference measurement plane and actual measurement plane. When using tool length measurement II, this sets the distance from the table to the reference measurement plane.	–99999.999 to 99999.999 (mm)
37 0013	TLM L meas axis	This sets the tool length measurement axis.	Axis name
37 0014	TLM D meas axis	This sets the tool diameter measurement axis.	Axis name
37 0015	Meas ext menu invld∗	This invalidates the extended menu (Coordi EXT, SkipPos take in) on the Workpiece Measurement and Rotation Measurement screens.	Extended menu 0: Display 1: Do not display
37 0020	Sys1 draw plane ax1	This sets the control axis address when drawing System 1.	Axis name
37 0021	Sys1 draw plane ax2		
37 0022	Sys1 draw plane ax3		
37 0023	Sys2 draw plane ax1	This sets the control axis address when drawing System 2.	Axis name
37 0024	Sys2 draw plane ax2		
37 0025	Sys2 draw plane ax3		

Number	Name	Details		Setting range (units)
37 0030	Length measure speed	[Automatic tool length measurement]  	This sets the feedrate during automatic tool length measurement.	1 to 60000 (mm/min)
37 0031	L meas slow area r		This sets the distance from the measurement point to the deceleration start point.	0 to 999999.999 (mm)
37 0032	L meas slow area d		This sets the area of the point where the tool should stop.	0 to 999999.999 (mm)
37 0040	Program save type	This selects the method for saving the program in the Edit screen. 0: Save program being edited with Save file menu. 1: Save program being edited each time the INPUT key is pressed.		0,1
37 0041	STN contrast	This adjusts the contrast of STN display.		0 to 15
37 0042	Space mode in Editor	This selects the method of displaying the program on the Edit screen. 0: Display the texts as that was input. 1: Display with inserting a space between each word.		0,1
37 0043	Invalid gray menu∗	This shows or hides the menus that cannot be operated. 0: Display as gray menus. 1: Do not display.		0,1
37 0044	Work center pos H	Set the workpiece rotation center position on the machine coordinate system for each axis, using the table angle as 0 degrees. (Valid only during manual operation.)		–999999.999 to 999999.999 (mm)
37 0045	Work center pos V			
37 0046	List comment type	The list comments are changed when HD, FLD or IC card is selected as the Device on the Input/Output screen, etc. 0: The date and time are displayed as the comment. 1: The file comment is displayed.		0,1

2.4 Anshin-net Parameter 1

The notification party telephone number and comment are set.
If the setting range exceeds 12 characters, the data will be echo-backed into the data setting area.

Number	Name	Details	Setting range (units)
37 9001	Notice tel num 1	Set the telephone number 1 used for one-touch call and operator notification. Hyphens "–" can be used as a delimiting character.	Within 28 characters
37 9002	Comment 1	Set a comment, such as the party's name, for the notification party telephone number 1.	Within 20 characters
37 9003	Notice tel num 2	Set the telephone number 2 used for one-touch call and operator notification. Hyphens "–" can be used as a delimiting character.	Within 28 characters
37 9004	Comment 2	Set a comment, such as the party's name, for the notification party telephone number 2.	Within 20 characters
37 9005	Notice tel num 3	Set the telephone number 3 used for one-touch call and operator notification. Hyphens "–" can be used as a delimiting character.	Within 28 characters
37 9006	Comment 3	Set a comment, such as the party's name, for the notification party telephone number 3.	Within 20 characters

2.5 Input/Output Parameters (I/O param screen)

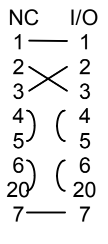
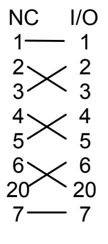
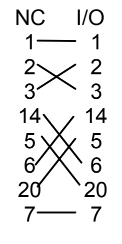
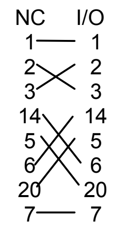
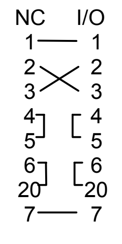
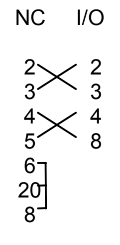
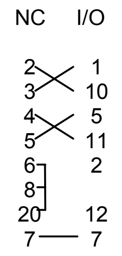
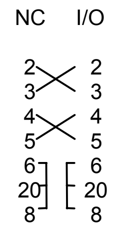
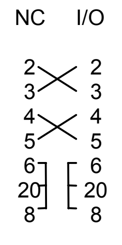
The necessary parameters are set when transferring files between differing devices. Parameters with an "." mark added are validated after restarting.

Number	Name	Details	Setting range (units)
35 0001	Data input port No.	This sets the I/O port No. and device No. when each file of machining program, tool data, parameters, etc., is input from the external device to the NC memory.	<Port> M6A: 1 to 2 M6B: 1 to 2 1 : Port 1 2 : Port 2 <Device> 1 : Device No. <1> ≀ ≀ 4 : Device No. <4>
35 0002	Data input dev No.		
35 0003	Data output port No.	This sets the I/O port No. and device No. when each file of machining program, tool data, parameters, etc., is output from the NC memory to the external device.	
35 0004	Data output dev No.		
35 0005	NC oper port No.	This sets the I/O port No. and device No. when the RS-232C is operating.	<Port> M6A : 1 to 2 M6B : 1 to 2 <Device> 1 : Device No. <1> ≀ ≀ 4 : Device No. <4>
35 0006	NC oper dev No.		
35 0007	Macro print port No.	This sets the I/O port No. and device No. of the output device when carrying out an external output command in the user macro.	<Port> M6A : 1 to 2 M6B : 1 to 2 1 : Port 1 2 : Port 2 <Device> 1 : Device No. <1> ≀ ≀ 4 : Device No. <4>
35 0008	Macro print dev No.		
35 0101	Dev 1 name	This sets the device name corresponding to the device No. It is used to easily discriminate each device. **(Example)** PTR/PTP	Three characters (alphabetic, numeric and symbols) or less
35 0102	Dev 1 baud rate	This sets the data transfer speed.	1200/2400/4800/9600/ 19200 (bit/s)
35 0103	Dev 1 stop bit	This sets the stop bit length in the start stop method. The bit length is set matching the specifications of the I/O device. Refer to the item "350104 Parity valid".	1 : 1 (bit) 2 : 1.5 3 : 2
35 0104	Dev 1 parity valid	This is the parameter when using a parity bit other than a data bit. It is set matching the specifications of the I/O device.	0 : No parity 1 : Parity
35 0105	Dev 1 even parity	This is the parameter that selects the odd or even parity when the parity above is valid. This parameter is ignored when the parity is invalid. It is set matching the specifications of the I/O device.	0 : Odd parity 1 : Even parity
35 0106	Dev 1 char length	This sets the data bit length. The character length (data bit) is set matching the specifications of the I/O device. Refer to the item "350104 Parity valid".	0 : 5 bit 1 : 6 bit 2 : 7 bit 3 : 8 bit

<table>
<tr><th>Number</th><th>Name</th><th>Details</th><th>Setting range (units)</th></tr>
<tr><td>35 0107</td><td>Dev 1 termina type</td><td>The code that terminates the data reading can be selected.</td><td>0 : No terminator
1 : EOR or EOB
2 : EOB
3 : EOR
4 : One random character
5 : Two random characters</td></tr>
<tr><td>35 0108</td><td>Dev 1 termina code 1</td><td>This sets the code that terminates the reading when the "350107 Termina type" setting is "4" or "5".</td><td>0 to FF (hexadecimal)</td></tr>
<tr><td>35 0109</td><td>Dev 1 termina code 2</td><td>This sets the code that terminates the reading when the "350107 Termina type" setting is "5".</td><td>0 to FF (hexadecimal)</td></tr>
<tr><td>35 0110</td><td>Dev 1 hndshk method</td><td>This is an RS-232C transmission control method.
It is set matching the control method of the I/O device to be connected.</td><td>1 : RTS/CTS
2 : No handshake
3 : DC code method</td></tr>
<tr><td>35 0111</td><td>Dev 1 DC code parity</td><td>This is only valid when "2" is selected in "350111 Hndshk method".
It is a parity addition for the DC code. It is set matching the specifications of the I/O device.
<table>
<tr><td colspan="2"></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></td></tr>
<tr><td rowspan="2">DC-3</td><td>No parity</td><td></td><td></td><td></td><td>○</td><td></td><td></td><td>○</td><td>○</td><td>(13H)</td></tr>
<tr><td>Parity</td><td>○</td><td></td><td></td><td>○</td><td></td><td></td><td>○</td><td>○</td><td>(93H)</td></tr>
</table></td><td>0 : No DC code parity
1 : Even code parity for DC codes</td></tr>
<tr><td>35 0112</td><td>Dev 1 DC2/DC4 output</td><td>This is set when starting the output device with a DC code while transmitting data from the NC memory to the output device.
It is set matching the specifications of the output device.</td><td>0 : DC2 invalid DC4 invalid
1 : DC2 valid DC4 invalid
2 : DC2 invalid DC4 valid
3 : DC2 valid DC4 valid</td></tr>
<tr><td>35 0113</td><td>Dev 1 CR output</td><td>During output with the ISO code, this is set when inserting a <CR> code immediately before the EOB (L/F) code.</td><td>0 : Invalid
1 : Valid</td></tr>
<tr><td>35 0114</td><td>Dev 1 EIA output</td><td>During data output, this sets output by either the ISO code or EIA code.
The ISO/EIA are automatically judged during data input.</td><td>0 : ISO output
1 : EIA output</td></tr>
<tr><td>35 0115</td><td>Dev 1 parity V</td><td>During data input into the NC memory, this is set when checking the parity V in one block.</td><td>0 : Invalid
1 : Valid</td></tr>
<tr><td>35 0116</td><td>Dev 1 timeout time</td><td>During data transfer, this sets the timeout time that detects the interruption of the data transfer.
An error occurs when the reading of one block or output time of 250 characters exceeds the designated time (timeout time), due to an I/O device fault or an exchange in the transmission.
The timeout time setting must be changed depending on the baud rate.</td><td>0 to 999 (1/10s)</td></tr>
</table>

Number	Name	Details	Setting range (units)
35 0118	Dev 1 EIA code 1 [	An alternate code can be designated for the codes at left that exist in the ISO but not in the EIA. Designate codes (odd-numbered codes) that do not duplicate preexisting EIA codes, and will not become parity H. **(Note)** Do not designate the following codes: 0 to 9, A to Z, +, –, •, ', EOR, EOB, (,), BS, TAB, SP, &, DEL, DC1 to DC4	0 to FF
35 0119	Dev 1 EIA code 2]		
35 0120	Dev 1 EIA code 3 #		
35 0121	Dev 1 EIA code 4 ∗		
35 0122	Dev 1 EIA code 5 =		
35 0123	Dev 1 EIA code 6 :		
35 0124	Dev 1 printer type	This sets the type of printer to output to. (Valid for device name PTR.)	0 : Other than device name PTR 1 : Mitsubishi printer 2 : EPSON (ESC/P)
35 0125	Dev 1 feed number	This designates the length of the paper tape feed section (feed holes only) output before and after the data when outputting the tape. The length is set as a number of characters. The feed length is the same for both before and after the data.	0 to 999 (characters)
35 0126	Dev 1 Rewind code	This sets the tape rewind code. Set the rewind code of the tape reader device being used. **(Note)** The tape will not rewind when "0" is set even if the rewinding command is executed.	0 to FF
35 0201 to 0226	Device 2 parameters	Same as device 1.	Same as device 1.
35 0301 to 0326	Device 3 parameters	Same as device 1.	Same as device 1.
35 0401 to 0426	Device 4 parameters	Same as device 1.	Same as device 1.

2.5.1 RS-232C I/O device parameter setting examples and cable connections

I/O device Parameter	Tape reader (Mitsubishi)		Tape puncher (Mitsubishi)	Printer (Mitsubishi)	Printer EPSON ESC/P support	Floppy disk (Kyoritsu)	Reader and puncher (Kyoritsu)	Floppy disk (Ricoh)	Floppy disk (Tanaka Business)
	PTR-240	PTR-02A	PTP-02A	PRT-02A/B	VP135K	D-30	KRP-8250	FD-3.5	TBM-F1
Device name									
Baud rate	2	2	2	2	1	2	2	2	2
Stop bit	1	3	3	3	1	3	3	3	3
Parity valid	1	0	0	0	1	0	0	0	0
Even parity	1	0	0	0	1	0	0	0	0
Character length	3	3	3	3	3	3	3	3	3
Terminator type	1	0	0	0	0	Input: 1 Output: 0	0	0	0
Code 1	00	00	00	00	00	00	00	00	00
Code 2	00	00	00	00	00	00	00	00	00
Rewind code	0: No rewind 1: Rewind	0	0	0	0	0	0	0	0
Handshake method	3	3	3	1	3	3	3	3	3
DC code parity	1	1	1	0	0	1	0	1	1
DC2/DC4 output	0	0	0	0	0	1	Puncher:1	0	1
CR output	0	0	0	0/1	0	0	0	0	0
EIA output	0	0	0/1	0/1	0	0	0/1	0/1	0/1
No. of feeds	0	0	No. of characters	0	0	0	No. of characters	0	0
Parity	0	0	0/1	0	0	0	0/1	0/1	0/1
Timeout time	100	100	100	100	100	100	100	100	
Printer type				1	2				
Cable connection (enclosed cable)									

2.6 Ethernet Parameters (Ethernet param screen)

The parameter related to the Ethernet operations are set. Parameters with an "." added are validated after restarting.
If the parameter length exceeds 12 characters, the data will be echo-backed into the data setting area.

Parameters 360001 to 360006 :	These are parameters required for the network connection. When connecting to a network, always set these parameters regardless of whether the Ethernet function is used. Windows must be restarted to validate these settings. When multiple TCP/IP drivers are installed, the same settings will be applied to all drivers.
Parameters 360101 to 360414 :	These parameters set the server information required for using the Ethernet function. Server information for up to four units can be set. These settings are validated immediately after setting.

Number	Name	Details	Setting range (units)
36 0001	Address	This sets the internet address. This sets the IP address of the TCP/IP assigned to the NC (Windows) computer. Contact the network controller for the address to be set.	15 characters or less Dot notation numeric value train
36 0002	Gateway	This sets the gateway of the TCP/IP assigned to the NC (Windows) computer.	15 characters or less Dot notation numeric value train
36 0003	Connection	This is not used currently.	0
36 0004	Timeout	This sets the timeout time (s) for when the communication is not completed correctly, or when there is no communication response.	10 to 99 (s) (Standard: 30)
36 0005	Host No.	This selects the number of the host to be used from host 1 to host 4.	1 to 4 : Host No.
36 0006	Sub net mask	This sets the subnet mask of the TCP/IP assigned to the NC (Windows) computer. Contact the network controller for the subnet mask to be set.	Within 15 characters Dot notation numeric value train (User setting)

Number	Name	Details	Setting range (units)
36 0101	Host1 host name	This sets the host computer name. This parameter allows the NC to easily recognize the host computer on the network. Set the host computer's name (name registered in C:\windows\hosts) or the IP address. When using the MELDAS 610/630/650, directly designate the IP address. **<Setting example>** For host name : Mspc160 For IP address : 150.40.0.111 **(Note)** Set the host computer's TCP/IP address if communication is not carried out correctly.	15 characters (alphanumeric) or less
36 0102	Host1 user name	This sets the user name when logging into the host computer.	8 characters (alphanumeric) or less
36 0103	Host1 password	This sets the password when logging into the host computer.	8 characters (alphanumeric) or less
36 0104	Host1 directory	This sets the directory name of the host computer.	15 characters (alphanumeric) or less
36 0105	Host1 address	Not used.	15 characters (alphanumeric) or less
36 0106	Host1 host type	This sets the type of host computer.	0 : UNIX 1 : PC (DOS)
36 0107	Host1 NOOP output	Not used.	0
36 0108	Host1 ABOR output	Not used.	0
36 0109	Host 1 Word pos: name	This sets the file name display position (nth word from left) of the list displayed when the ftp command "dir" is executed. Refer to "2.6.1 Setting the Ethernet Parameters (word position)". **(Note)** One word designates a character string divided by one or more spaces.	0 to 100 0: When using UNIX
36 0110	Host 1 Word pos: size	This sets the size display position (nth word from left) of the list displayed when the ftp command "dir" is executed. Refer to "2.6.1 Setting the Ethernet Parameters (word position)". **(Note)** One word designates a character string divided by one or more spaces.	0 to 100 0: Default value

Number	Name	Details	Setting range (units)
36 0111	Host 1 Word pos: <Dir>	This sets the <DIR> display position (nth word from left) of the list displayed when the ftp command "dir" is executed. Refer to "2.6.1 Setting the Ethernet parameters (word position)". **(Note)** One word designates a character string divided by one or more spaces.	0 to 100 0: Default value
36 0112	Host 1 Word pos: comnt	This sets the comment (date, time, etc.) display position (nth word from left) of the list displayed when the ftp command "dir" is executed. Refer to "2.6.1 Setting the Ethernet parameters (word position)". **(Note)** One word designates a character string divided by one or more spaces.	0 to 100 0: Default value
36 0113	Host 1 Word num: comnt	This sets the number of words to be displayed as a comment. **(Note)** One word designates a character string divided by one or more spaces.	0 to 100
36 0114	Host 1 no total char.	This sets whether to display the total number of characters registered in the machining programs of host1 when displaying the file list. If there are many files in the directory to be referred to, the list can be updated quickly by setting "1".	0: Display 1: Do not display
36 0201 to 0214	Host 2 parameters	Same as host 1.	
36 0301 to 0314	Host 3 parameters	Same as host 1.	
36 0401 to 0414	Host 4 parameters	Same as host 1.	

(Note 1) The user name and password are required when logging in.
(Note 2) It is necessary to enable reading/writing when exchanging files.
(Note 3) With the Personal WEB Server and Windows NT 4.0 fpt Server, the file list format can be selected from DOS or UNIX.

2.6.1 Setting the Ethernet parameters (word position)

Confirm the word positions and set each in the Ethernet parameters with the following method.
Underlined section: Input by user. *Italicized section*: Differs according to user. Confirm the setting before inputting.

(1)

Select the MS-DOS prompt from the NC computer "Start Menu".

The MS-DOS window will appear.

(2)

Using the ftp command, log into the host computer.

ftp *IP address*

(Example)

```
c: \windows>ftp 150.46.0.16
```

Display on MS-DOS window:

```
Connected to 150.46.0.100
220 mspc150 FTP server (SunOS 4.1) ready
User (150.46.100: (name)):
```

(3)

Input the user name for logging in.

User name

(Example)

```
User (150.46.100: (name)): m6
```

Display on MS-DOS window:

```
331 Password required for m6.
Password:
```

(4)

Input the password.

Password

(Example)

```
Password: m6
```

Display on MS-DOS window:

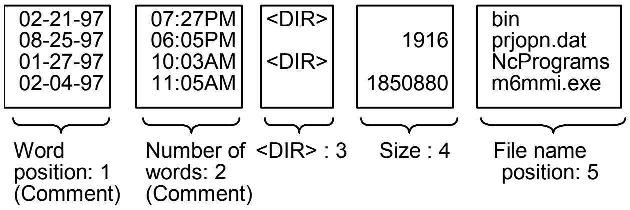
```
230 User m6 logged in.
```

(5)

Display the directory list.

```
ftp>dir
```

Display on MS-DOS window:



```
02-21-97   07:27PM   <DIR>              bin
08-25-97   06:05PM               1916   prjopn.dat
01-27-97   10:03AM   <DIR>              NcPrograms
02-04-97   11:05AM            1850880   m6mmi.exe
```

(6)

Confirm the file name position, size display position and <DIR> position in step (5).

File name position : 5
Size display position : 4
<DIR> display position: 3
Word position (Comment) : 1
No. of words (Comment) : 2

(7)

Log off.

```
ftp>by
```

Display on MS-DOS window:

```
c: \windows>
```

(8)

Close the MS-DOS window.

(9)

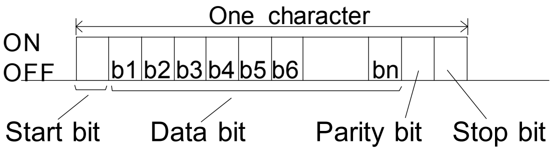
Set each position confirmed in step (5) into the Ethernet parameters.

<Setting example>

	Host type	Word position :file name	Word position :size	Word position :<DIR>	Word position :comment	Number of words (comment)
Chameleon (Windows 3.1)	1	1	2	2		
Chameleon (Windows 95/NT)	1	4	3	3	1	2
Personal WEB Server						
UNIX format	0	0	0	0	0	0
DOS format	1	4	3	3	1	2
Windows NT3.5.1 ftp Server	1	4	3	3	1	2
Windows NT4.0 ftp Server						
UNIX format	0	0	0	0	0	0
DOS format	1	4	3	3	1	2

2.7 Computer Link Parameters (Cmptr link param screen)

The computer link parameters are set. Parameters with an "∗" added are validated after restarting.

Number	Name	Details	Setting range (units)
38 0001	Port number	This sets the number of the I/O port for the computer link. The I/O port No. is fixed to 1.	0 : Port 0 1 : Port 1 2 : Port 2
38 0002	Link type	This sets the computer link function type. The computer link function type is fixed to 2.	1 : Link A 2 : Link B
38 0003	Baud rate	This sets the speed for transmitting the data.	2400 4800 9600 19200 (bit/s)
38 0004	Stop bit	This sets the stop bit length for the start-stop method. Refer to the item for "380005 Parity valid". Set the bit length that matches the input/output device's specifications.	1 : 1 (bit) 2 : 1.5 3 : 2
38 0005	Parity valid	This parameter is set to use a parity bit different from the data bit.  Set this to match the I/O device specifications.	0 : No parity bit at input/output 1 : Parity bit at input/output
38 0006	Even parity	This parameter selects the odd parity or even parity when the above parity is valid. This parameter is ignored when the parity is invalid. Set this to match the I/O device specifications.	0 : Odd parity 1 : Even parity
38 0007	Char length	This sets the data bit length. Refer to the item "38005 Parity valid" for details. Set this to match the I/O device specifications.	0 : 5 (bit) 1 : 6 2 : 7 3 : 8
38 0008	Handshake method	This is the RS-232C transmission control method. Set this to match the control method of the connected I/O device.	1 : RTS/CTS method 2 : No handshake 3 : DC code method
38 0009	Timeout time	This sets the timeout time for detecting an interruption in the data transmission during data input/output. An error occurs if the one block read or 250 characters output time exceeds the designated time, due to an I/O device fault or an exchange during transmission. Depending on the baud rate, the timeout time setting must be changed. The setting "0" is equivalent to approx. 90 minutes.	0 to 999 (1/10s)
38 0010	Data code	This sets the code to be used.	0 : ASCII code 1 : ISO code

Number	Name	Details	Setting range (units)
38 0011	Check sum	This sets the validity of the computer link A check sum function.	0 : Check sum invalid 1 : Check sum valid
38 0012	DC1 after NAK or SYN	This sets the presence of a DC1 code output after the NAK code or SYN code is output. This is valid only when "3" is selected for "380008 Handshake method".	0 : Do not output DC1 code 1 : Output DC1 code.
38 0013	Buffer correction	This selects whether to validate the buffer correction during operation	0 : Buffer correction invalid 1 : Buffer correction valid
38 0014	Reset validity	This sets whether to validate the reset during computer link. Normally, this is set to "0".	0 : Computer link reset valid 1 : Computer link reset invalid
38 0015	CR output	This selects whether to output the CR code just before the LF code.	0 : Do not output CR code 1 : Output CR code
38 0016	DC code parity	This is valid only when 3: DC code method is selected for "380008 Handshake method". The even parity in respect to the control code is added. Set this to match the I/O device specifications.	0 : DC code with no parity 1 : DC code with parity
38 0017	Parity V	This is set when the parity V in one block is to be checked during data input.	0 : Invalid 1 : Valid
38 0018	Start code	This sets the code instructing the start of the first transmission in the file data transmission. This is intended for specific users, and is normally set to "0". This is valid only when 3: DC code method is selected for "380008 Handshake method".	0 : DC1 1 : BEL
38 0019	NAK output	This selects whether to send an NAK code to the host if a communication error occurs in computer link B.	0 : Do not output NAK code 1 : Output NAK code
38 0020	SYN output	This selects whether to send a SYN code to the host if an NC reset or emergency stop occurs in computer link B.	0 : Do not output SYN code 1 : Output SYN code
38 0021	DC3 output	This selects whether to send a DC3 code to the host when the communication is completed in computer link B. This is valid only when 3: DC code method is selected for "380008 Handshake method".	0 : Do not output DC3 code 1 : Output DC3 code
38 0022	Wait time	When a command is received from the host in computer link A, a reply command is returned after the time set in the wait time has passed. Also, during the machining program download, the file transmission start code (DC1 or BEL) is sent after waiting the set time.	0 to 255 (1/10s)
38 0023	Buffer size	The DC3 code is output when the several bytes of data set in buffer size is received. Normally, "4096" is set.	248 to 4096 (byte)

Number	Name	Details	Setting range (units)
38 0024	Operation start size	Operation starts when enough data is received in the reception buffer. Set a value less than "380026 DC 3 output size". Normally, "248" is set.	248 to "380026 DC3 output size" setting value (byte)
38 0025	DC1 output size	The DC1 code is output when the number of data items in the reception buffer drops to below the number of bytes set in the DC1 output size. Normally, the same value as "380026 DC3 output size" is set.	248 to "380026 DC3 output size" setting value (byte)
38 0026	DC3 output size	The DC3 code is output when the number of data items in the reception buffer drops to below the number of bytes set in the DC3 output size. Normally, this is set as "380023 Buffer size" –16. Normally, set "4000".	248 to "380023 Buffer size" setting value –16 (byte)
38 0027	Poling time	This sets the time to wait after the control code in respect to the data sent from the host is received by the host, or after the control code in respect to the data sent from the NC is received. The next data or control code is transmitted after the set time has passed.	0 to 999 (1/10s)
38 0028	Retry counter	The number of times to retransmit the data when the data sent to the host or the data sent from the host is found illegal after inspections such as check sum.	0 to 99 (times)

3. Machine Parameters

A password is required to display and set the machine parameters.
The machine parameter display method and contents are explained in this section.

3.1 Displaying the Machine Parameters

The method for displaying the Machine parameter screen is explained below. Refer to the Instruction Manual for details on basic screen operations such as displaying and changing the menu, and setting the parameters.

(1)

Display the menu related to setup. ➡ The menu related to setup will appear.

(2)

Press the menu key Param .

(3)

Press the menu key M-para select . ➡ A message prompting the password input will appear.
If the password has been input even once after the power was turned ON, the Machine param menu will appear.

(4)

Set the password and press the INPUT key.

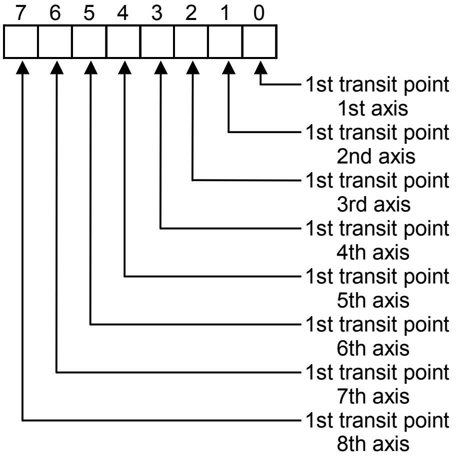
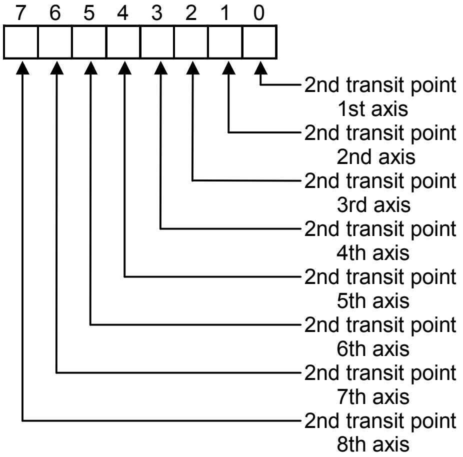
MPARA INPUT

➡ The Machine param menu will appear.
Each screen can be selected.

3.2 Base Common Parameters

For parameters indicated with an "*" in the table, turn the NC power OFF after setting. The setting is validated after the power is turned ON again.

No.	Name		Details	Setting range	Standard setting
11 0001	G92 counter preset	G92 preset of current value counter valid	Not used. Set to "0".	0	
11 0002	TLM increment set	TLM addition setting invalid	Not used. Set to "0".	0	
11 0003	';' for comment End	Comment end ; valid	Set "1" when using ';' to end a comment.	0, 1	
11 0004	9 digit prog. No.	9-digit program number valid	Not used. Set to "0".	0	
11 0005	Hold counter at M/L	Hold current value at reset during machine lock	0: The current value is set to the machine value when resetting after a machine lock. 1: The current value is held even when resetting after a machine lock.	0, 1	
11 0006	Lang	Display language	Select the language displayed on the setting and display unit.	0, 1 0: English 1: Secondary language (Japanese)	
11 0007	Fix_P	Fixed cycle editing valid	Set "1" when a fixed cycle program is input/output or edited. Data I/O screen, Edit screen and program list displays are usable with fixed cycle programs only. Return setting to "0" for input/output or editing user machining programs.	0: Invalid 1: Valid	0
11 0008	Edlk_c	Editing lock C	Validate editing lock for machining programs with label numbers 9000 to 9999.	0: Invalid 1: Valid	
11 0009	Mpronum	Number of machine maker macros	Set the maximum number of registered programs for the machine maker dedicated macros.	0 to 1000 programs	
11 0010	Mprosize	Machine maker macro size	Register the size of the machine maker dedicated macro registration area. The area will be secured after formatting.	0, 32, 128 (kB)	

No.	Name		Details	Setting range	Standard setting
11 0011	Ret1	Tool retract return transit point #1	Designate the axis for entering the 1st transit point as a bit.  	00000000 to 11111111	
11 0012	Ret2	Tool retract return transit point #2	Designate the axis for entering the 2nd transit point as a bit.  	00000000 to 11111111	
11 0013	Iout*	Output unit system	Select the unit system for the machine ball screw and linear scale. This parameter is common for the system. (The unit system for the rotation axis will be "degree" regardless of this parameter value.)	0: mm 1: inch	
11 0014	Extdcc	External decele-ration speed	Upper limit of feedrate when external deceleration speed signal is valid.	1 to 480000 (mm/min)	
11 0015	M_inch*	Machine parameter input unit system	Select the unit of each data in the machine parameters.	0: mm 1: inch	
11 0016	Pinc*	Machine error compensation incremental amount method	Designate whether the incremental amount method or absolute amount method is used for setting the machine error compensation data.	0: Absolute amount method 1: Incremental amount method	

No.	Name		Details	Setting range	Standard setting
11 0017	Iunit*	Minimum setting unit	Set the minimum unit that can be commanded. Set as A, B, C or D. If the setting exceeds the option range, the "No Option" alarm will occur when the power is turned ON. A: 0.01mm, 0.001inch B: 0.001mm, 0.0001inch C: 0.0001mm, 0.00001inch D: 0.00001mm, 0.000001inch	A, B, C, D	
11 0018	Counter selct invld*	Counter selection invalid	This invalidates the display counter selection on the Position display screen.	0: Selection valid 1: Selection invalid	
11 0019	Test	For NC testing	The Windows keys are validated.	0, 1	
11 0039	Origin zero invalid	Origin zero invalid	Not used. Set to "0".	0	
11 0040	Group select	Screen move-ment during screen group selection	Select the screen movement method. 0: After selecting the screen group, move to the screen when the screen is selected. 1: Move to the screen when the screen group is selected. (Screen displayed in previous group.)	0, 1	
11 0041	Default menu	Display menu during screen selection	Select the menu displayed during screen selection. 0: Operation menu 1: Screen selection menu	0, 1	
11 0042	G code format*	G code format	Select the G code format. 1: Lathe format 1 (MELDAS standard G code series A) 2: Lathe format 1 (MELDAS standard G code series B) 3: Lathe format 1 (MELDAS standard G code series C) 4: Machining center format 1 (MELDAS standard) 5: Machining center format 2 (M2 format)	1 to 5	
11 0043	M2 label 0	M2 label O	Set the program number label when using the M2 format.	0: L 1: O	
11 0044	TLM type*	Tool measure-ment type	Select the tool measurement type. 0: Use the position at TLM switch ON as the reference. 1: Use the machine zero point as the reference.	0, 1	
11 0045	Mmac_P	Machine maker macro editable	Input a code number to regist or to edit the machine maker macro program. After inputting the code, it is displayed as “macro”. In Data In/Out screen, Edit screen, and program list display area, the contents dedicated for machine maker macro are displayed. To input/output or edit the user machining program, set this parameter to “0”.	0: Invalid Code number: Valid	0
11 0046	HMI sleep time*	HMI sleep time	Set the sleep time for every 1 period of HMI when HMI system window is not active.	0 to 999 (ms)	0

No.	Name		Details	Setting range	Standard setting
11 0048	M2 macro convert	M2 macro converter valid	Set "1" or "2" to convert the M2/M0-format macro program input by RS-232C. When "2" is set, only the character strings in ( ) parentheses are not converted. When "0" is set, the programs are not converted.	0: Invalid 1: Valid ( ) With conversion 2: Valid ( ) No conversion	0
11 0049	Invld Continu menu*	Continuous menu invalid	This invalidates the continuous menu on the Common Variable and Local Variable screens.	0: Valid 1: Invalid	
11 0050	Menu status mode*	Menu status mode	This sets the ▶ mark, indicating subsequent menus, only to the right direction.	0: Left and right 1: Right	
11 0051	Op Tolcomp ofs valid	Changed tool offset valid	Select whether the changed tool offset amount becomes valid at the next block or not when the amount is changed by single block stop during tool offset.	0: Invalid 1: Valid	
11 0052	Axis1 slaveno*	Slave axis number	Set the NC axis number of the slave axis for the master axis. 0 indicates that there is no slave axis.	0 to 14	0
11 0053	Axis2 slaveno*	Slave axis number			
11 0054	Axis3 slaveno*	Slave axis number			
11 0055	Axis4 slaveno*	Slave axis number			
11 0056	Axis5 slaveno*	Slave axis number			
11 0057	Axis6 slaveno*	Slave axis number			
11 0058	Axis7 slaveno*	Slave axis number			
11 0059	Axis8 slaveno*	Slave axis number			
11 0060	Axis9 slaveno*	Slave axis number			
11 0061	Axis10 slaveno*	Slave axis number			
11 0062	Axis11 slaveno*	Slave axis number			
11 0063	Axis12 slaveno*	Slave axis number			
11 0064	Axis13 slaveno*	Slave axis number			
11 0065	Axis14 slaveno*	Slave axis number			
11 0066	AUX mac select*	Auxiliary axis connection selection	Select the card to communicate with the MR-J2-CT.	0: Standard card BASE I/O UNIT SV2 1: Expanded card	
11 0067	AUX axis nos*	Number of auxiliary axis connection axes	Set the number of connected auxiliary axes.	0 to 6	

<table>
<tr><th>No.</th><th colspan="2">Name</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>11 0068</td><td>Max mach-err corect</td><td>Maximum value of machine error compensation amount</td><td>Set the maximum value of machine error compensation amount.
When the actual machine error compensation amount exceeds this value, an alarm will occur. Note that the parameter "110070 Pos watch valid" (axis position monitor function) should be valid to validate this value.</td><td>0 to 99999 (mm)</td><td></td></tr>
<tr><td>11 0069</td><td>TLM clamp feed rate</td><td>Clamp speed at the manual measurement manual feed</td><td>Set the clamp speed to which the manual feed rate is clamped when tuning TLM switch ON.</td><td>0 to 480000 (mm/min)</td><td></td></tr>
<tr><td>11 0070</td><td>Pos watch valid</td><td>Axis position monitor function valid</td><td>Set whether to validate the axis position monitor function and backup operation information at emergency stop function.
<table>
<tr><th>Setting value</th><th>Axis position monitor function</th><th>Backup operation information at emergency stop function</th></tr>
<tr><td>0</td><td>Invalid</td><td>Invalid</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>Valid</td><td>Valid</td></tr>
</table>
The SRAM data cannot be automatically backed up with models not provided with an HD.</td><td>0 to 3</td><td></td></tr>
<tr><td>11 0071</td><td>V-analyzer valid*</td><td>Visual analyzer display valid</td><td>Set whether the screen to select the conditions about the visual analyzer can be displayed or not.</td><td>0: Invalid
1: Valid</td><td></td></tr>
<tr><td>11 0072</td><td>Plc const ext nos*</td><td>Number of extended PLC constants</td><td>Set the number of extended PLC constants.</td><td>0 to 450</td><td></td></tr>
<tr><td>11 0073</td><td>Hold modals by rest</td><td>Hold modals by reset</td><td>Set whether to hold the modal or not when NC reset 1.</td><td>0: Not hold
1: Hold</td><td></td></tr>
<tr><td>11 0074</td><td>Standard shape out</td><td>Precision measuring tool standard shape data</td><td>Set whether to save the standard shape data to the file of the HD or not.
The standard shape data, which is made by converting the drawn data during graphic check, is used by the precision measuring tool.</td><td>0: Not save
1: Save</td><td>0</td></tr>
<tr><td>11 0075</td><td>Sv on syncErr adjst*</td><td>Correcting synchronous error automatically when servo ON</td><td>Adjust the slave axis position to the master axis position when turning from servo OFF to servo ON.</td><td>0: Invalid
1: Valid</td><td>0</td></tr>
<tr><td>11 0076</td><td>Type of area check</td><td>Area check method selection</td><td>Set the position switch area check method.
0: Check the area using the commanded machine position after the acceleration/deceleration process as the machine position.
1: Check the area using the detector feedback position as the machine position.</td><td>0, 1</td><td></td></tr>
<tr><td>11 0078</td><td>Rot ax feed mgf</td><td>Rotation axis commanded speed scale</td><td>0: Invalid
1: During initial inching, the rotation axis command speed is multiplied by 10. In other words, 1000 °/min is commanded with F100. The unit for rotation axis speed display is 10 °/min.</td><td>0, 1</td><td></td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Name</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>11 0088</td><td>Tolerance err arc C</td><td>Tolerable arc center error compensation value</td><td>Set the tolerable value for compensating calculation errors of the R-designated arc's center coordinate values.
If the error between the "line connecting the start point and end point" and the "command radius × 2" is less than the set value, the center of the line connecting the start point and end point will be compensated to come to the arc center.<table><tr><th>Setting value</th><th>Tolerable value</th></tr><tr><td>Setting value < 0</td><td>0 (Do not compensate center error)</td></tr><tr><td>Setting value = 0</td><td>2 × minimum setting unit</td></tr><tr><td>Setting value > 0</td><td>Set value</td></tr></table></td><td>–1 to 0.100</td><td></td></tr>
<tr><td>11 0089</td><td>Power off Delay</td><td>Power OFF delay time</td><td>Set the time to forcibly turn the NC OFF after the power OFF button is pressed.</td><td>0: 30 (s)
1 to 100 (s)</td><td>0</td></tr>
<tr><td>11 0090</td><td>DPRINT leading 0</td><td>User macro external output command (DPRNT) leading 0</td><td>The leading zero for the user macro external output command (DPRNT) is validated.
0: Leading 0 invalid
1: Leading 0 valid
2: Output blank space instead of leading 0</td><td>0, 1, 2</td><td>0</td></tr>
<tr><td>11 0091</td><td>Lost motion restrain</td><td>Restrain lost motion compensation at G00 & handle feed</td><td>0: Invalid
1: Restrain the lost motion compensation at G00 and during handle feed</td><td>0, 1</td><td>0</td></tr>
<tr><td>11 0092</td><td>fix prec ss coef</td><td>SS control adjustment coefficient fixed value selection</td><td>The pre-read range recognized with SS control is fixed.</td><td>0, 1</td><td>0</td></tr>
<tr><td>11 0093</td><td>signal_ trigger</td><td>PLC data save trigger</td><td>0: Power ON, NC alarm
Occurrence of an emergency stop (SRV) after power ON is used as the trigger.
1: Invalid
2: PLC signal ON/OFF
The "0" input after "1" is input to the PLC signal (Y354) is used as the trigger.</td><td>0, 2</td><td>0</td></tr>
<tr><td>11 0094</td><td>Call time</td><td>Call time</td><td>Set the call time for calling back.</td><td>1 to 90 (s)</td><td>20</td></tr>
<tr><td>11 0095</td><td>Machine num</td><td>Machine serial No.</td><td>This is used for authentication when receiving a call from the machine maker.</td><td>20 or less half-byte alpha-numeric characters</td><td></td></tr>
<tr><td>11 0100</td><td>Samp trigger*</td><td>Setting of start condition and stop cause trigger condition</td><td>Set the start condition recording the data and to stop cause trigger condition.
Recording data starts and stops when;
0: Power ON and NC alarm
Starts :the power is turned ON.
Stops :an emergency stop (SRV) occurs.
1: Command in program
Starts :system variable #9000=1.
Stops :system variable #9000=0.
2: PLC signal ON/OFF (Y352)
Starts :input “1” to PLC signal (device).
Stops :input “0” to PLC signal (device).</td><td>0 to 2</td><td>0</td></tr>
</table>

No.	Name		Details	Setting range	Standard setting
11 0101	Samp intrval*	Sampling interval	Set the cycle for sampling the data records. "Setting value × 3.4ms" is the sampling cycle.	0 to 9999 0: Same as 1	
11 0102	Valid sampling	Meldas-net valid	Retrieval of the tracking data is validated.	0: Invalid 1: Valid	0
11 0103	Hist nos*	Stop condition (history data)	Set the amount of history data to be retrieved after the stop trigger is input. Designate in one-quarter increments of the total retrieval amount. After the amount of data designated here is retrieved, the recording of the history data will stop.	0: 0 1: 1/4 amount 2: 2/4 amount 3: 3/4 amount	0
11 0104	Samp nos*	Stop condition (sampling data)	Set the amount of sampling data to be retrieved after the stop trigger is input. Designate in one-quarter increments of the total retrieval amount. After the amount of data designated here is retrieved, recording of the sampling data will stop.	0: 1/4 amount 1: 2/4 amount 2: 3/4 amount 3: 4/4 amount	0

No.	Name		Details	Setting range	Standard setting
11 0105	Samp plc dev1*	Random PLC signal history device 1	Set the device name and address of a random PLC signal history as a character string. Up to 16 strings can be designated. The character string combines the device name and address such as in "Y721". The device names that can be used are as follows. Bit devices X, Y, M, L, F, SM, TI, TO, CI, CO Data devices R, D, TS, TA, CS, CA The history will not be retrieved if an empty character string is set.	Max. six characters X0 to AFF Y0 to DFF M0 to 8191 L0 to 255 F0 to 255 SM0 to 127 TI0 to 255 TO0 to 255 CI0 to 127 CO0 to 127 R0 to 8191 D0 to 1023 TS0 to 255 TA0 to 255 CS0 to 127 CA0 to 127	
11 0106	Samp plc dev2*	Random PLC signal history device 2			
11 0107	Samp plc dev3*	Random PLC signal history device 3			
11 0108	Samp plc dev4*	Random PLC signal history device 4			
11 0109	Samp plc dev5*	Random PLC signal history device 5			
11 0110	Samp plc dev6*	Random PLC signal history device 6			
11 0111	Samp plc dev7*	Random PLC signal history device 7			
11 0112	Samp plc dev8*	Random PLC signal history device 8			
11 0113	Samp plc dev9*	Random PLC signal history device 9			
11 0114	Samp plc dev10*	Random PLC signal history device 10			
11 0115	Samp plc dev11*	Random PLC signal history device 11			
11 0116	Samp plc dev12*	Random PLC signal history device 12			
11 0117	Samp plc dev13*	Random PLC signal history device 13			
11 0118	Samp plc dev14*	Random PLC signal history device 14			
11 0119	Samp plc dev15*	Random PLC signal history device 15			
11 0120	Samp plc dev16*	Random PLC signal history device 16			

No.	Name		Details	Setting range	Standard setting
11 0121	Counter type1	Counter type 1	The selected counter type is held. When 0 is set, the default counter type is displayed.	0 to 255	
11 0122	Counter type2	Counter type 2			
11 0123	Counter type3	Counter type 3			
11 0124	Counter type4	Counter type 4			
11 0125	Counter type5	Counter type 5			
11 0126	Counter type6	Counter type 6			
11 0127	Counter type7	Counter type 7			
11 0128	PRG ERR strict check	Program warning/error changeover	Designate whether to issue a program warning or program error when a description, judged to be incorrect, is found in the program. 0: Issue program warning, and continue operation. 1: Issue program error, and stop operation.	0, 1	0
11 0129	Customdef invalid*		Set the validity of custom application startup.	0: Valid 1: Invalid	
11 0130	MTB net valid*	MTB net screen automatic selection	Set whether to change to the MTB net screen during machine net communication.	0: Do not change 1: Change	
11 0131	Ofs clr hld mdl rst	Tool position offset amount hold	Set whether to hold the tool position offset amount with the NC reset modal hold.	0: Do not hold 1: Hold	0
11 0132	SEQ NUM single skip	N No. single skip	Set whether to skip the Nn; N No. independent blocks.	0: Do not skip 1: Skip	
11 0133	Invalid HD heatup*	HD heat up invalid	Set the validity of HD heating up.	0: Valid 1: Invalid	
11 0134	Valid ADR_K FIX	No. of repetition address K valid	Set the validity of the No. of repetition designating address K during the fixed cycle command.	0: Invalid 1: Valid	
11 0135	Cancel G43 MDL M-REF	G43/G44 cancel during manual reference point return	Set whether to cancel the tool length offset during manual reference point return in the tool length offset.	0: Do not cancel 1: Cancel	
11 0136	CIR to G1 no CENT OP	Arc-line replace at no arc center designation	During the arc command, if there is no center designation or radius designation, a program error will not occur. Instead the arc will be replaced with a line.	0: Program error 1: Replace with line	
11 0137	Hold modal S-tap F/E	Synchronous tap F/E modal hold	Set whether to hold the F/E value during the synchronous tap command.	0: Do not hold 1: Hold	
11 0138	Macro call LVAR type	Local variable hold during macro call	Set the variable setting type for macro call.	0: Set when reading 1: Set when calling	
11 0139	HMI sleep time2*	HMI sleep time 2	Set the sleep time per HMI1 cycle when the HMI system window is active	0 to 999ms	0

No.	Name		Details	Setting range	Standard setting
11 0141	Hold pos at syncZRN*	Synchronous designation for reference point return	Set whether to stop the slave axis when the master axis reaches the reference point during manual reference point return. (Arrival at the slave axis' reference point is ignored.)	0: Invalid 1: Valid	0
11 0142	Filtered SP current FB	Spindle current feedback value selection	Set the selection of the spindle current feedback value retrieval data. 0: Spindle current feedback value 1: Spindle current feedback value + filter	0, 1	
11 0143	APC type*	APC screen display type selection	Set the type of screen displayed with the Pallete prog regist screen. (This setting is validated after the NC is restarted.) 0: Standard Pallet Registration screen 1: Pallet 4-page Registration screen	0, 1	
11 0144	Valid pallete num*	Number of pallets setting	Set the number of pallets validated on the Pallete prog regist screen.	2 to 12 (Interpreted as 2 when 0 is set.)	
11 0201	Aux1 no amp*	Auxiliary axis 1 no amplifier mounted	Set whether to connect the auxiliary axis to the amplifier.	0: Auxiliary axis connected to amplifier 1: Auxiliary axis not connected to amplifier	
11 0202	Aux2 no amp*	Auxiliary axis 2 no amplifier mounted			
11 0203	Aux3 no amp*	Auxiliary axis 3 no amplifier mounted			
11 0204	Aux4 no amp*	Auxiliary axis 4 no amplifier mounted			
11 0205	Aux5 no amp*	Auxiliary axis 5 no amplifier mounted			
11 0206	Aux6 no amp*	Auxiliary axis 6 no amplifier mounted			
11 0300	Common sample rate	Sampling rate	Set the interval for sampling. The data is sampled at an interval multiplied by 1.77.	0 to 1000	
11 0301	Common h-scale	Horizontal scale	This is used on the Visual analyzer screen. Set the time per horizontal scale as an ms unit.	0 to 9999	
11 0302	Common stop trigger	Stop trigger signal	Set the PLC signal that acts as the trigger to stop sampling.	X and Y PLC signal	
11 0303	Common stop level	Stop signal level	Set whether to stop sampling at the rising edge or falling edge of the stop trigger signal.	0: Falling edge 1: Rising edge	
11 0304	Common delay time	Delay time	Set the time to stop sampling after the stop conditions (stop trigger signal and stop signal level conditions) are established.	0 to 1000000	

No.	Name		Details	Setting range	Standard setting
11 0305	Common start delay	Sampling start delay	Set the time to delay the timing to start data retrieval after sampling is started. Set the N for 1.7∗N [ms]. 0: Normal sampling 1 to 2147483647: Sampling is started at automatic start, and the timing to start of sampling data retrieval is delayed by the designated time.	0 to 2147483647	0
11 0310	Ch1 object ID	Ch1: Object No.	Set the object No. of the data to be sampled.	0 to 9999	
11 0311	Ch1 sub ID	Ch1: Sub-No.	Set the sub-No. of the data to be sampled.	0 to 9999	
11 0312	Ch1 item number	Ch1: Item No.	Set the item No. of the data to be sampled.	0 to 9999	
11 0313	Ch1 data number	Ch1: Data No.	Set the data No. of the data to be sampled.	0 to 9999	
11 0314	Ch1 v-scale/div	Ch1: Vertical scale	Set the amount per vertical scale on the Visual analyzer screen. This is used on the Visual analyzer screen.	0 to 10000000	
11 0315	Ch1 base line	Ch1: Base line	Set the position of the vertical axis when the sampled data is 0. This is used on the Visual analyzer screen.	–8 to 8	
11 0316	Ch1 offset	Ch1: Offset	Set the value to add to the sample data as the offset value. This is used on the Visual analyzer screen.	–10000000 to 100000000	
11 0317	Ch1 samp valid	Ch1: Sampling valid	Set whether to validate sampling of the channel.	0: Invalid 1: Valid	
11 0320 to 11 0327		Ch2 parameter	This is the same as Ch1.		
11 0330 to 11 0337		Ch3 parameter	This is the same as Ch1.		
11 0340 to 11 0347		Ch4 parameter	This is the same as Ch1.		
11 0350 to 11 0357		Ch5 parameter	This is the same as Ch1.		
11 0360 to 11 0367		Ch6 parameter	This is the same as Ch1.		
11 0370 to 11 0377		Ch7 parameter	This is the same as Ch1.		
11 0380 to 11 0387		Ch8 parameter	This is the same as Ch1.		
11 0390 to 11 0397		Ch9 parameter	This is the same as Ch1.		
11 0400 to 11 0407		Ch10 parameter	This is the same as Ch1.		

3.3 Anshin-net Parameter 2

No.	Name	Details	Setting range	Standard setting
11 9001	Modem tel num	Set the modem's registered No. (telephone No.). A hyphen "–" can be used as a delimiting character.	Within 28 characters	
11 9002	Num dispatch call	Set the Call Center's telephone No. A hyphen "–" can be used as a delimiting character.	Within 28 characters	
11 9003	Num dispatch maker	Set the machine maker's telephone No. A hyphen "–" can be used as a delimiting character.	Within 28 characters	
11 9004	Num arrival call 1	Set the Call Center telephone No. This No. is used to confirm that the received call is from the Call Center. A hyphen "–" can be used as a delimiting character.	Within 28 characters	
11 9005	Num arrival call 2			
11 9006	Num arrival call 3			
11 9007	Num arrival call 4			
11 9008	Num arrival call 5			
11 9009	Num com maker 1	Set the machine maker's telephone No. This No. is used to confirm that the received call is from the machine maker. A hyphen "–" can be used as a delimiting character.	Within 28 characters	
11 9010	Num com maker 2			
11 9011	Num com maker 3			
11 9012	Num com maker 4			
11 9013	Num com maker 5			
11 9014	Num retry	Set the number of times to retry when a control command transmission error.	0 to 255	3
11 9015	Auto select anet	Set whether to change to the Anshin-net screen when a call is automatically received from the NC. (Currently not used)	0: Do not change 1: Change	
11 9016	Condition kind 1	Set the notification conditions (alarm type, PLC signal) to be automatically notified when an alarm occurs. <When using alarm as notification conditions> Set the alarm type. System common (SY), servo (SV), spindle (SP), axis (AX), automatic operation (OP), program (PR), user PLC (PL), macro message (MM), auxiliary axis servo (AS), auxiliary axis system (AZ), auxiliary axis common (AY), auxiliary axis emergency stop (AQ) <When using PLC signal as notification conditions> Set the device (register) name. 1-bit data ... X, Y, M, F, L, SM, TI, TO, CI, CO 16-bit data ... TB, TS, TA, CS, CA, D, R	Within 5 characters	
11 9017	Condition num 1	Set the notification conditions (alarm type, PLC signal status value) to be automatically notified when an alarm occurs. <When using alarm as notification conditions> Set the alarm No. <When using PLC signal as notification conditions> Set the status value.	Within 4 characters	

No.	Name	Details	Setting range	Standard setting
11 9018	Condition kind 2	Same as condition 1.	Same as condition 1.	
11 9019	Condition num 2			
11 9020	Condition kind 3			
11 9021	Condition num 3			
11 9022	Condition kind 4			
11 9023	Condition num 4			
11 9024	Condition kind 5			
11 9025	Condition num 5			
11 9026	Condition kind 6			
11 9027	Condition num 6			
11 9028	Condition kind 7			
11 9029	Condition num 7			
11 9030	Condition kind 8			
11 9031	Condition num 8			
11 9032	Condition kind 9			
11 9033	Condition num 9			
11 9034	Condition kind 10			
11 9035	Condition num 10			
11 9036	Command time out (s)	Set the timeout time for reception command standby.	0 to 65535 (s)	30
11 9037	Interval of redial (s)	Set the interval (s) for redialing.	0 to 65535 (s)	100
11 9038	Frequ of redial	Set the number of times to redial.	0 to 255	3
11 9039	Modem connect port	Set the modem connection port.	0 to 2 0: None 1: Port 1 2: Port 2	
11 9040	Dial mode	Set the dialing method. 0: Fixed by modem (default) 1: Dial with tone (push) method 2: Dial with pulse (dial) method	0 to 2	
11 9041	Call-back time out	Set the time to wait for a call during call back.	0 to 90 (s)	

3.4 Base System Parameters

No.	Name		Details	Setting range	Standard setting
12 0001	Mfig	M number	Set the number of codes that can be commanded in the same block.	1 to 4	
12 0002	Mbin	M binary	Set the output data type. 0: BCD code 1: Unsigned binary −1: Signed binary	0, 1, −1	
12 0003	Sfig	S number	Set the number of codes that can be commanded in the same block.	1 to 4	
12 0004	Sbin	S binary	Set the output data type. Set the number of spindles instead of the number of same blocks. 1: Unsigned binary −1: Signed binary	1, −1	
12 0005	Tbin	T binary	Set the output data type. 0: BCD code 1: Unsigned binary −1: Signed binary	0, 1, −1	
12 0006	M2bin	2nd miscellaneous function code binary			
12 0007	M2name	2nd miscellaneous function code	Set address used as 2nd miscellaneous function; selected from among A, B, C codes not used for movement control axis. If the same name as the NC control axis is designated, an alarm will occur when the power is turned ON.	(No setting), A, B, C	
12 0008	Tapovr	Tap return override	Set the override value of the tap return cycle feedrate for the synchronous tap cycle.	1 to 999 (%)	100 (%)
12 0009	Tap_tl	Tap time constant	Set the acceleration/deceleration time constant for the synchronous tap cycle.	1 to 1500 (ms)	500 (ms)
12 0010	Skip	G31 skip rate	Set feedrate when F command is not contained in program once G31 command has been issued.	1 to 480000 (mm/min or mm/rev)	
12 0011	Dwlskp	G04 skip condition	This sets which skip signal should be input to skip to the next block when executing the G04 command. For example, if "7" is set, the block will be skipped when either skip 1,2 or 3 is input.	Skip condition: 0 to 255	

Set-ting	PLC interface signal							
	8	7	6	5	4	3	2	1
0	×	×	×	×	×	×	×	×
1	×	×	×	×	×	×	×	○
2	×	×	×	×	×	×	○	×
3	×	×	×	×	×	×	○	○
4	×	×	×	×	×	○	×	×
5	×	×	×	×	×	○	×	○
6	×	×	×	×	×	○	○	×
7	×	×	×	×	×	○	○	○
8	×	×	×	×	○	×	×	×
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
253	○	○	○	○	○	○	×	○
254	○	○	○	○	○	○	○	×
255	○	○	○	○	○	○	○	○

No.	Name		Details	Setting range	Standard setting
12 0012	Skip1	G31.1 skip condition	This sets which skip signal should be input to skip to the next block when executing the G31 command. For example, if "7" is set, the block will be skipped when skip 1 to 3 is input.	0 to 255	
12 0013	Skip1f	G31.1 skip rate	Set feedrate when F command is not contained in program once G31 and G160 commands have been issued.	1 to 480000 (mm/min or mm/rev)	
12 0014	Skip2	G31.2 skip condition	Same as "120012 Skip1".	0 to 255	
12 0015	Skip2f	G31.2 skip rate	Same as "120013 Skip1f".	1 to 480000 (mm/min or mm/rev)	
12 0016	Skip3	G31.3 skip condition	Same as "120012 Skip1".	0 to 255	
12 0017	Skip3f	G31.3 skip rate	Same as "120013 Skip1f".	1 to 480000 (mm/min or mm/rev)	
12 0018	Skip4	G31.4 skip condition	Same as "120012 Skip1".	0 to 255	
12 0019	Skip4f	G31.4 skip rate	Same as "120013 Skip1f".	1 to 480000 (mm/min or mm/rev)	
12 0020	Mmac	M call macro valid	Set whether macro call with M command is to be executed or not when user macro specifications are valid.	0: Invalid 1: Valid	
12 0021	Smac	S call macro valid	Set whether macro call with S command is to be executed or not when user macro specifications are valid.	0: Invalid 1: Valid	
12 0022	Tmac	T call macro valid	Set whether macro call with T command is to be executed or not when user macro specifications are valid.	0: Invalid 1: Valid	
12 0023	M2mac	2nd miscellaneous function code call macro valid	Set whether macro call with 2nd miscellaneous command is to be executed or not when user macro specifications are valid.	0: Invalid 1: Valid	
12 0024	G96_ax	Constant surface speed axis	Not used.	0	
12 0025	G96_g0	Rapid traverse command constant surface speed control	Not used.	0	
12 0026	G30s1	G30 soft limit invalid	Define whether the soft limit is valid during the G30 reference point return.	0: Soft limit valid at G30 1: Soft limit invalid at G30	
12 0027	S_trg	Macro interrupt status trigger method	Set whether the user macro interrupt signal (UIT) is valid at the OFF-ON rising edge signal (edge trigger) or at the ON status (status trigger).	0: Edge trigger method 1: Status trigger method	

No.	Name		Details	Setting range	Standard setting
12 0028	Int_2	Interrupt method type 2 valid	Set whether the interrupt program is executed without waiting for the block execution (type 1), or whether the program is executed after the block is completed (type 2) when the interrupt signal (UIT) is input.	0: Type 1 1: Type 2	
12 0029	Subs_m	Macro interrupt substitute M code valid	Set whether the user macro interrupt by the substitute M code is valid. This setting is not required when using the M2 format compliance.	0: Substitute M code invalid 1: Substitute M code valid	
12 0030	M96_m	M96 substitute M code	When the M96 code is used in another application, the user interrupt can be applied with another M code. Set the value of the M code to substitute for M96. This setting is not required when using the M2 format compliance.	3 to 97 (Note that 30 is excluded)	
12 0031	M97_m	M97 substitute M code	When the M97 code is used in another application, the user interrupt can be applied with another M code. Set the value of the M code to substitute for M97. This setting is not required when using the M2 format compliance.	3 to 97 (Note that 30 is excluded)	
12 0032	Gmac_p	G code parameter priority	Select whether the G code used in the system has the priority or whether the G code by the G code parameter has the priority when calling macros with the G command.	0: System G code priority 1: G code parameter priority	
12 0033	C_min	Normal line control turning minimum angle	Set the minimum angle of the C axis rotation at the block seam when carrying out normal line control.	0.000 to 90.000 (°)	
12 0034	C_axis	Normal line control axis	Set the number of the axis to be executed with normal line control. (The normal line control plane is the 1st axis and 2nd axis planes.)	1 to maximum number of control axes in system	
12 0035	C_feed	Normal line control axis turning speed	Set the speed for C axis rotation at the block seam when carrying out normal line control. This is valid only for the normal line control type 1.	1 to 480000 (1/1000 °/min)	
12 0036	C_type	Normal line control type	Set the normal line control type (Type 1: grinding machining, Type 2: spring machining).	0: Type 1 1: Type 2	
12 0037	G1bf	Maximum cutting feedrate for acceleration/ deceleration before interpolation	Set the cutting feedrate for acceleration/ deceleration before interpolation.	1 to 999999 (mm/min)	
12 0038	G1btL	G1 time constant for acceleration/ deceleration before interpolation	Set the linear control time constant used in the cutting feed acceleration during acceleration/deceleration before interpolation.	1 to 500 (ms)	

No.	Name		Details	Setting range	Standard setting
12 0039	G0bdcc	Acceleration/ deceleration before G0 interpolation valid	Designate whether to validate the acceleration/deceleration before G0 interpolation. 0: The G0 acceleration/deceleration is always the acceleration/deceleration after interpolation. 1: Regardless of whether or not in the high-accuracy mode, the G0 acceleration/ deceleration is the acceleration/ deceleration before interpolation.	0, 1	
12 0040	Real_fd	Real feedrate display	The real machine feedrate is displayed on the screen.	0: F command × override 1: Real feedrate	
12 0041	Mlk_co	Machine lock immediate validity	Not used. Set to "0".	0	
12 0042	Prog mirror center	Ignore program mirror center local workpiece	Not used. Set to "0".	0	
12 0044	Axname[0]	System 1st axis axis name	Set the axis name with one alphabetic character. If the same axis name is used in one system, an alarm will occur when the power is turned ON.	Axis name	
12 0045	Axname[1]	System 2nd axis axis name			
12 0046	Axname[2]	System 3rd axis axis name			
12 0047	Axname[3]	System 4th axis axis name			
12 0048	Axname[4]	System 5th axis axis name			
12 0049	Axname[5]	System 6th axis axis name			
12 0050	Axname[6]	System 7th axis axis name			
12 0051	Axname[7]	System 8th axis axis name			
12 0052	Axnum[0]	System 1st axis axis number	Set the NC axis number.	1 to maximum number of control axes	
12 0053	Axnum[1]	System 2nd axis axis number			
12 0054	Axnum[2]	System 3rd axis axis number			
12 0055	Axnum[3]	System 4th axis axis number			
12 0056	Axnum[4]	System 5th axis axis number			
12 0057	Axnum[5]	System 6th axis axis number			
12 0058	Axnum[6]	System 7th axis axis number			
12 0059	Axnum[7]	System 8th axis axis number			

No.	Name		Details	Setting range	Standard setting
12 0060	No_dsp[0]	Non-displayed axis	Designate the axis that is not displayed in the axis counter. (Use this when the counter for the axis on the synchronous control slave side is not to be displayed, etc.)	0: Display axis 1: Non-displayed axis	
12 0061	No_dsp[1]	Non-displayed axis			
12 0062	No_dsp[2]	Non-displayed axis			
12 0063	No_dsp[3]	Non-displayed axis			
12 0064	No_dsp[4]	Non-displayed axis			
12 0065	No_dsp[5]	Non-displayed axis			
12 0066	No_dsp[6]	Non-displayed axis			
12 0067	No_dsp[7]	Non-displayed axis			
12 0068	Main M99 alarm stop	Main program M99 alarm stop	If M99 is commanded in the main program, the program will stop with an error.	0: Invalid 1: Valid	
12 0069	S-tap Slope/Time	Synchronous tap constant slope/constant time constant changeover	Set whether the acceleration/deceleration is to a constant slope or a constant time constant during synchronous tapping.	0: Constant time constant 1: Constant slope	
12 0070	Top idx of T offset	System common tool compensation number	Set the head of the tool compensation number used in each system.	0 to 999999999	
12 0071	Prec soft time cnst	High-accuracy control soft acceleration/ deceleration time constant	The pattern acceleration/deceleration before interpolation is made smooth.	0 to 200 (ms)	
12 0072	M_lock rapid feed	Machine lock high-speed feedrate	Set the feedrate for high-speed machine lock.	0 to 480000 (mm/min)	
12 0073	Chop axis num	Chopping axis	Designate the number of the axis to carry out chopping.	0 to maximum number of control axes	
12 0074	Chop correct coeff	Chopping axis correction coefficient	Set the servo delay correction coefficient for chopping.	0 to 10	8
12 0075	Chop correct toleran	Tolerable chopping error	Set the tolerable servo delay error for chopping. Correction is carried out until this tolerance range is entered.	0 to 10000 (μm)	
12 0076	Chop clamp feed	Chopping clamp speed	Set the clamp speed for chopping.	0 to 480000 (mm/min)	
12 0077	Comp base rotate ax*	Compensation base rotation axis	Set the name of the rotation axis to be the compensation base.	Axis name	
12 0078	Comp plane H*	Compensation plane horizontal axis	Set the name of the horizontal axis on the compensation plane.	Axis name	
12 0079	Comp plane V*	Compensation plane vertical axis	Set the name of the vertical axis on the compensation plane.	Axis name	

No.	Name		Details	Setting range	Standard setting
12 0080	Comp rot center H*	Rotation axis rotation center (Horizontal)	Set the position of the rotation axis' rotation center on the machine coordinate system. Set this for each machine.	–999999.999 to 999999.999 (mm)	
12 0081	Comp rot center V*	Rotation axis rotation center (Vertical)	Set the position of the rotation axis' rotation center on the machine coordinate system. Set this for each machine.	–999999.999 to 999999.999 (mm)	
12 0082	Prec soft time cont2	High-accuracy control soft acceleration/ deceleration time constant 2	Set this to smooth the speed pattern of each axis during acceleration/deceleration before interpolation. This will not activate when "0" or "1" is set.	0 to 50 (ms)	0
12 0083	T-ofs set at running		Set the validity of tool compensation amount setting during automatic operation.	0: Setting prohibited during automatic operation 1: Setting possible during automatic operation	
12 0090	Glbf2	Maximum feedrate	Set the maximum feedrate at G0, G1 when the high-precision control deceleration check 2 function is valid.	1 to 999999 (mm/min)	
12 0091	Glbtl2	Time constant	Set the linear control time constant for maximum feed acceleration at G0, G1 when the high-precision control deceleration check 2 function is valid.	1 to 500 (ms)	
12 0092	Disable skip 3D*	Skip coordinate value 3D conversion invalid	The coordinate system of the skip coordinate value in the 3D conversion modal is changed. 0: Output as G68 program coordinate value 1: Output as local coordinate value before G68 is commanded	0, 1	0
12 0093	Chop time const	Chopping time constant	Set the time constant for chopping acceleration/deceleration. The time constant is automatically calculated so that the acceleration rate (cutting feed clamp speed/chopping time constant) during acceleration/deceleration is always constant. The cutting feed time constant value will be validated when 0 is set.	0 to 1500 (ms)	

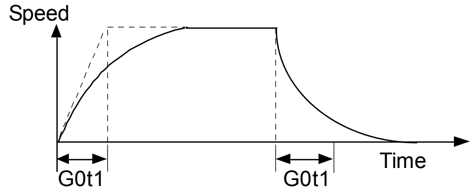
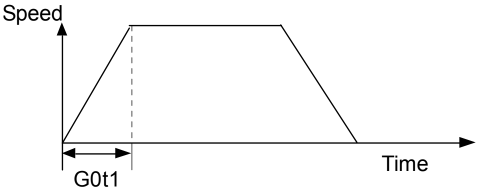
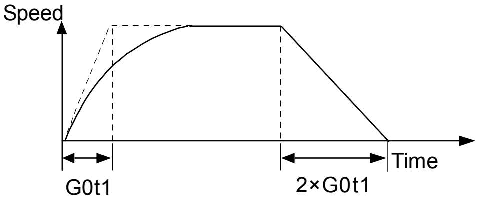
3.5 Analog Input/Output Parameters

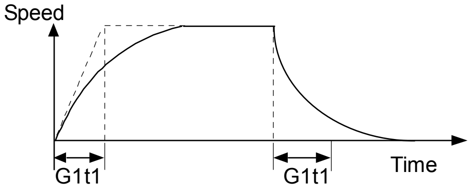
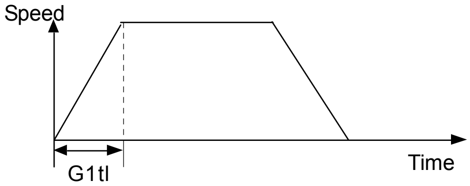
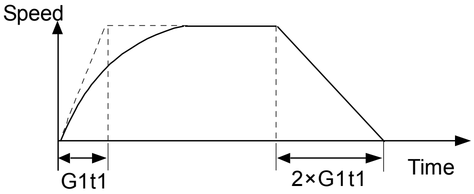
<table>
<tr><th>No.</th><th>Name</th><th></th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>14 0001</td><td>AO remote IO Ch. [0]</td><td>AO0 remote IO channel number</td><td>Designate the number of the channel to which the analog output unit is connected.
<table>
<tr><td>2nd digit</td><td>1st digit</td></tr>
<tr><td>Unit number</td><td>Channel number</td></tr>
</table>
For RI01 1ch to 8ch, set 11 to 18
For RI02 1ch to 8ch, set 21 to 28
For RI03 1ch to 8ch, set 31 to 38</td><td>0: No analog output
11 to 18
21 to 28
31 to 38</td><td></td></tr>
<tr><td>14 0002</td><td>AO port No. [0]</td><td>AO0 port number</td><td>Not used.</td><td>1 to 2</td><td></td></tr>
<tr><td>14 0003</td><td>AO offset [0]</td><td>AO0 offset voltage</td><td>Set the offset voltage for the analog output.
<Adjustment method>
1) Set the standard setting value "0".
2) Measure the output voltage of the designated port.
3) Set the setting value obtained with the following expression into this parameter.
$\text{Setting value} = \frac{-8191\times\text{offset voltage (V)}}{10.56}$
4) After setting this parameter, confirm that the output voltage is "0V" again.</td><td>–4095 to 4095</td><td></td></tr>
<tr><td>14 0004</td><td>AO analog out gain [0]</td><td>AO0 gain for analog output adjustment</td><td>Set the gain adjustment data for analog output.
<Adjustment method>
1) Set the standard setting value "4095" as the number of the specified file register R.
2) Measure the output voltage of the designated port.
3) Set the setting value obtained with the following expression into this parameter.
$\text{Setting value} = \frac{\text{Correct voltage (V)}}{\text{Measured voltage (V)}} \times 4096$
4) After setting this parameter, confirm that the output voltage is "10.0V" again.</td><td>0 to 9999</td><td></td></tr>
<tr><td>14 0101 to 0104</td><td></td><td>AO1 parameter</td><td>Same as AO0.</td><td></td><td></td></tr>
<tr><td>14 0201 to 0204</td><td></td><td>AO2 parameter</td><td>Same as AO0.</td><td></td><td></td></tr>
<tr><td>14 0301 to 0304</td><td></td><td>AO3 parameter</td><td>Same as AO0.</td><td></td><td></td></tr>
<tr><td>14 0401 to 0404</td><td></td><td>AO4 parameter</td><td>Same as AO0.</td><td></td><td></td></tr>
<tr><td>14 0501 to 0504</td><td></td><td>AO5 parameter</td><td>Same as AO0.</td><td></td><td></td></tr>
<tr><td>14 0601 to 0604</td><td></td><td>AO6 parameter</td><td>Same as AO0.</td><td></td><td></td></tr>
</table>

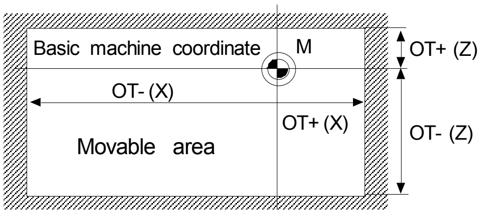
No.	Name		Details	Setting range	Standard setting
14 0701 to 0704		AO7 parameter	Same as AO0.		
14 1001	AI remote IO Ch. [0]	AI0 remote IO channel number	Designate the number of the channel to which the analog input unit is connected. For RI01 1ch to 8ch, set 11 to 18 For RI02 1ch to 8ch, set 21 to 28 For RI03 1ch to 8ch, set 31 to 38 Analog input is not used when 0 is set.	0: No analog input 11 to 18 21 to 28 31 to 38	
14 1002	AI port No. [0]	AI0 port number	The analog input unit has four ports. Designate a port number used.	1 to 4	
14 1003	AI offset [0]	AI0 offset voltage	Set the offset voltage for the analog input.	–4095 to 4095	
14 1101 to 1103		AI1 parameter	Same as AI0.		
14 1201 to 1203		AI2 parameter	Same as AI0.		
14 1301 to 1303		AI3 parameter	Same as AI0.		
14 1401 to 1403		AI4 parameter	Same as AI0.		
14 1501 to 1503		AI5 parameter	Same as AI0.		
14 1601 to 1603		AI6 parameter	Same as AI0.		
14 1701 to 1703		AI7 parameter	Same as AI0.		

3.6 Axis Specification Parameters

No.	Name		Details	Setting range	Standard setting
13 0001	NC Axis name	NC axis name	Define the correspondence of the axis number and axis name.	Axis name	2 characters
13 0002	Rapid	Rapid traverse rate	Set rapid traverse rate for each axis. Maximum setting value depends on machine system and so care is required in this respect.	<1μm system> 1 to 480000 (mm/min) <0.1μm system> 1 to 100000 (mm/min)	
13 0003	Clamp	Cutting feed clamp speed	Define maximum cutting feedrate for each axis.	<1μm system> 1 to 480000 (mm/min) <0.1μm system> 1 to 100000 (mm/min)	
13 0004	G0smgst	Rapid traverse acceleration/ deceleration mode	0: Exponential acceleration/deceleration 1: Soft acceleration/deceleration 2: Exponential acceleration, linear deceleration	0, 1, 2	
13 0005	G1smgst	Cutting feed acceleration/ deceleration mode	0: Exponential acceleration/deceleration 1: Soft acceleration/deceleration 2: Exponential acceleration, linear deceleration	0, 1, 2	
13 0006	Otdcc	OT deceleration type	0: Position loop step stop 1: Smoothing (linear deceleration) stop 2: Droop 1/2 linear deceleration stop (Valid only for exponential acceleration/ deceleration, exponential acceleration and linear deceleration)	0, 1, 2	

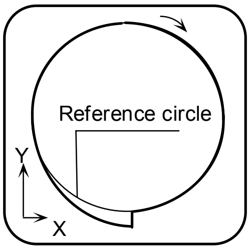
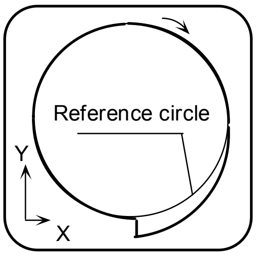
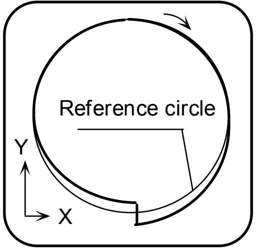
No.	Name		Details	Setting range	Standard setting
13 0007	G0t1	Rapid traverse time constant 1	Set time constant with rapid traverse acceleration/deceleration. **<Exponential acceleration - exponential deceleration rapid traverse>**  **<Rapid traverse during soft acceleration/deceleration>** (When G0t2=0)  **<Exponential acceleration - linear deceleration rapid traverse>**  	0 to 1500 (ms)	
13 0008	G0t2	Rapid traverse time constant 2	For soft acceleration/deceleration	0 to 200 (ms)	

No.	**Name**		**Details**	**Setting range**	**Standard setting**
13 0009	G1t1	Cutting feed time constant 1	Set the time constant with cutting feed acceleration/deceleration. **<Exponential acceleration - exponential deceleration cutting feed>**  **<Cutting feed during soft acceleration/deceleration>** (When G1t2=0)  **<Exponential acceleration - linear deceleration cutting feed>** 	0 to 1500 (ms)	
13 0010	G1t2	Cutting feed time constant 2	For soft acceleration/deceleration	0 to 200 (ms)	
13 0011	OTtm	OT time	When the speed loop step stop is selected for the Stroke end stop type, it keeps the speed loop state during the time set. (The position loop is cut off, and the speed is set to "0".)	1 to 32767 (ms)	
13 0012	G0back	G0 backlash	Set the backlash compensation amount with movement command in rapid traverse mode or with reverse direction in manual mode. Note that "G1back" is used for the movement in the handle mode.	-99999 to 99999 (Interpolation unit)	
13 0013	G1back	G1 backlash	Set the backlash compensation amount with movement command in the cutting feed mode or with reverse direction in the manual mode.	-99999 to 99999 (Interpolation unit)	

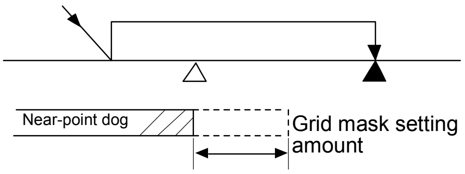
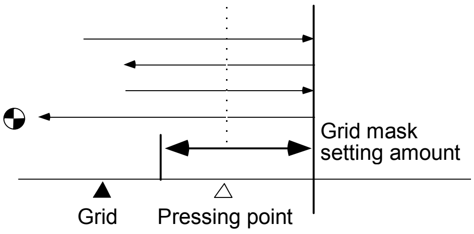
No.	Name		Details	Setting range	Standard setting
13 0014	Swot –	Soft limit –	Set the valid movement area determined by the machine's stroke. (To make the applicable range smaller during use, use the "340008 Soft limit –" and "340009 Soft limit +" parameters.) Set the coordinates in the (–) and (+) directions of the stored stroke limit I movement area. Use the zero point of the basic machine coordinates as the reference point of the coordinates. If the same values, including signs and number, are set for parameters 130014 and 130015, the stored stroke limit I function will be invalidated. 	–999999.999 to +999999.999 (mm)	
13 0015	Swot +	Soft limit +			
13 0016	Tlml	TLM reference length	Set the distance from the zero point of the tool change point (reference point) for measuring the tool diameter or tool length to the measurement reference point (plane).	–999999.999 to +999999.999 (mm)	
13 0017	Ref-	Zero point approach	Set the width for outputting the zero point approach signal using the machine zero point at the reference point. (When "0" is set, the signal will be output at the grid width range of both the positive and negative directions.)	0 to 179.999 (mm)	
13 0018	Ref+	Zero point approach		0 to 179.999 (mm)	
13 0019	Tap_g	Position loop gain during tapping	Set the position loop gain of the linear axis for the synchronous tap cycle.	0 to 100.00 (rad/s)	
13 0020	G0fwdg	G00 feed forward gain	Set the feed forward gain for the acceleration/ deceleration before G0 interpolation. The larger the setting value is, the shorter the positioning time will be during the in-position check. If machine vibration occurs, the setting value must be lowered.	0 to 200 (%)	70
13 0021	Fwdg	Feed forward gain	Set the feed forward gain for acceleration/ deceleration before interpolation. The larger the setting value is, theoretically, the smaller the control error will be. However, if machine vibration occurs, the setting value must be lowered.	0 to 200 (%)	70
13 0022	Synerr	Tolerable synchronization error value	Set the maximum synchronization error that can be tolerated during the synchronization error check. If "0" is set, the error will not be checked.	0 to 999.999	
13 0023	G0inps	G00 command deceleration range	Set the command remaining distance width used for carrying out the deceleration stop check during the G00 command.	0.000 to 100.000	
13 0024	G1inps	G01 command deceleration range	Set the command remaining distance width used for carrying out the deceleration stop check during the G01 command.	0.000 to 100.000	

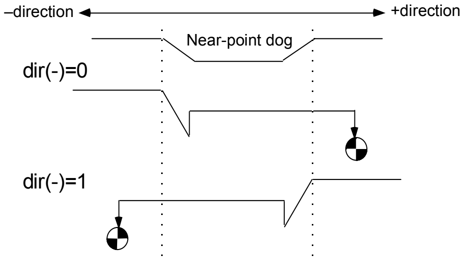
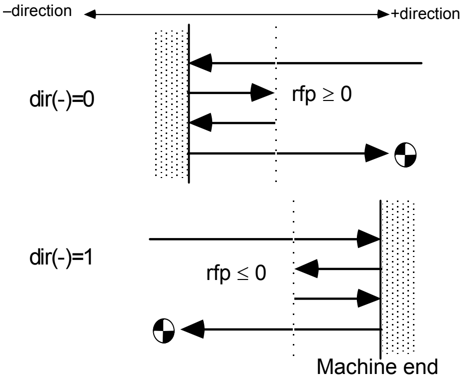
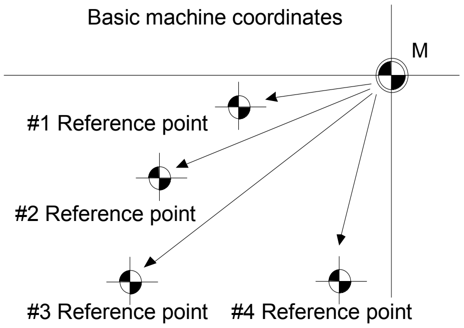
No.	Name		Details	Setting range	Standard setting
13 0025	OT_1B–	Stored stroke limit inside (lower limit value)	Set the lower limit value and upper limit value coordinates of the stored stroke limit IB/IC prohibited area. Set the value on the basic machine coordinates system. If the same values, including signs and number, are set for parameters 130025 and 130026, the stored stroke limit IB function will be invalidated. The area determined by the two points will be prohibited even if parameters 130025 and 130026 are set in reverse. If this area is not connected to the stored stroke limit I area, this setting will be invalid.	–999999.999 to +999999.999 (mm)	
13 0026	OT_1B+	Stored stroke limit inside (upper limit value)			
13 0027	1B_off	Stored stroke limit selection	Select the stored stroke limit IB or IC. 0: Soft limit IB valid 1: Invalid 2: Soft limit IC valid	0 to 2	
13 0030	Jog backlash G1	JOG mode backlash G1	The JOG mode backlash is applied as the G1 mode backlash.	0: G0 mode 1: G1 mode	
13 0031	Axis_type*	Axis type	Set the control axis type.	0: Servo axis 1: Spindle	
13 0032	Index unit	Indexing unit	Set the indexing unit that can be used for positioning the rotation axis.	0 to 180	
13 0033	Rot*	Rotation axis designation	Designate the rotation axis.	0: Linear axis 1: Rotation axis	
13 0034	Ccw*	Motor rotation direction	Set the motor rotation direction for moving in the + side. Set "0" when the clockwise rotation direction looking from the motor load side is + movement. Set "1" when the counterclock-wise rotation direction is the + movement.	0: + movement 1: – movement	
13 0035	Svof	Servo OFF error correction	Set "1" when the coordinate values are to be updated with the motor movement amount during servo OFF. Set "0" when the motor rotates the amount moved during servo ON to return the position to the original position.	0: Do not correct error 1: Correct error	
13 0036	Axoff	Axis removal	Set "1" to validate the axis removal control, and "0" to invalidate the axis removal control.	0: Invalid 1: Valid	
13 0037	Soft lmt bef. R-ret	Soft limit before reference point return valid	Not used.	0	
13 0038	Intabs	Automatic handle interrupt ABS update	Define whether the absolute data on the workpiece coordinate system is to be updated during automatic handle interrupt.	0: Do not update absolute value 1: Update absolute value 2: Follow external switch	
13 0039	Measure direction	Manual measurement direction	Set the direction that the axis can move in during measurement.	+: + direction –: – direction Other than +, – : No direction	
13 0040	Slavno	Slave axis number	Designate the number of the slave axis to be synchronized with the synchronous control axis.	0 to maximum number of control axes	

No.	Name		Details	Setting range	Standard setting
13 0041	Abs On*	Position detection method	Select the position detection method.	0: Relative position detection method 1: Dog-type absolute position detection method 2: Dogless type absolute position detection method	
13 0042	No amp*	No amplifier connection	Set whether an amplifier is connected. Set "1" when an amplifier is not connected.	0: Amplifier connection 1: No amplifier connection	
13 0060	OT_1C–	Stored stroke limit (lower limit value)	Set the lower limit value and upper limit value coordinates of the stored stroke limit IC prohibited area. Set the value on the basic machine coordinates system. If the same values, including signs and numbers, are set for parameters 130060 and 130061, the stored stroke limit IC function will be invalidated. The area determined by the two points will be prohibited even if parameters 130060 and 130061 are set in reverse. If this area is not connected to the stored stroke limit I area, this setting will be invalid. **(Note)** The parameters 130060 to 130062 stored stroke limit IC settings are valid when "130027 1B_off" is set to "0" or "1". When set to "2", the range set with 130025 to 130026 will be the IC area.	–999999.999 to 999999.999 (mm)	
13 0061	OT_1C+	Stored stroke limit (upper limit value)			
13 0062	1C_off	Stored stroke limit IC invalid	Select the stored stroke limit IC. 0: Soft limit IC valid 1: Invalid	0, 1	
13 0063	Clamp (high prec mod)	High-accuracy control mode cutting clamp speed	Set the maximum cutting feedrate for each axis in the high-accuracy control mode. When "0" is set, "130003 Clamp" is used.	0 to 480000 (mm/min)	0
13 0064	Rapid (high prec mod)	High-accuracy control mode rapid traverse rate	Set the rapid traverse rate for each axis in the high-accuracy control mode. When "0" is set, "130002 Rapid" is used.	0 to 480000 (mm/min)	0
13 0106	CVbackDV N01DIST	Division point No. 1 distance	Set the distance from the reference point position to the division point No. 1.	–99999.999 to 99999.999 (mm)	
13 0107	CVbackSP	Division point interval	Set the interval of the division points divided uniformly.	0 to 99999.999 (mm)	
13 0108	CVbackSC	Compensation amount scale	Set the scale for the continuous variable backlash compensation amount.	1 to 99 (fold)	

No.	Name		Details	Setting range	Standard setting
13 0109	CVbackDIR	Compensation direction	Set the direction to change the compensation. • During quadrant changeover, if a step is formed in the plus movement direction in respect to the reference circle, or if the pitch error is measured in the minus direction, set the plus direction for the Y axis. **Example)**  • During quadrant changeover, if a step is formed in the minus movement direction in respect to the reference circle, or if the pitch error is measured in the plus direction, set the minus direction for the Y axis. **Example)**  • During quadrant changeover, if a step that extends the reference circle is formed, set the Y axis in both directions. **Example)** 	0: Both directions 1: Plus direction 2: Minus direction	
13 0110 to 13 0119	CVbackOFS data1 to CvbackOFS data 10	Backlash compensation amount	Set the backlash compensation amount for each division point.	–99999999 to 99999999 (interpolation unit)	
13 0120	Corner acceler coef	Corner deceleration speed adjustment coefficient	Set the adjustment coefficient of each axis in respect to the pre-interpolation acceleration/deceleration tolerable acceleration rate. When "0" (%) is set, the operation will be the same as when "100" (%) is set.	0 to 200 (%)	0

3.7 Zero (Reference) Point Return Parameters

No.	Name		Details	Setting range	Standard setting
15 0001	G28rap	G28 rapid traverse rate	Set the rapid traverse rate for the dog-type reference point return.	<1µm system> 0 to 480000 (mm/min) <0.1µm system> 0 to 100000 (mm/min)	
15 0002	G28crp	G28 approach speed	Set the speed for approaching the reference point after decelerating to a stop with the dog detection.	<1µm system> 0 to 480000 (mm/min) <0.1µm system> 0 to 100000 (mm/min)	
15 0003	G28sft	Reference point shift amount	Define distances from electrical zero point detection position to actual machine reference point for reference point return control. Operation will take place with a µm unit regardless of the control unit.	0 to 65535 (µm)	
15 0004	Grspc	Grid interval	Set the grid interval value for detector. In common practices, the setting of detector grid interval should be identical to that of ball screw pitch. In case that the detector grid interval and the screw pitch are different for linear scaling, set the detector grid interval value. When reducing a grid interval value, use a common divisor of grid interval. Operation will take place with a mm unit regardless of the control unit. Note that the unit can be changed by the parameter #15 0012.	0 to 32767 (mm)	
15 0005	Grmask	Grid mask amount	Set intervals where grid points are ignored when near-point dog OFF signal is near-grid point during dog-type reference point return.  Set the mask amount (interval that ignores the grid) from the stopper point when using the dogless type reference point return.  **(Note)** Effective range of grid mask is distance equivalent to 1 grid. Even if a higher value is set, the actual mask will only be for 1 grid.	0 to 65535 (µm) Also set the submicrometer specifications in (µm) units.	

No.	Name		Details	Setting range	Standard setting
15 0006	Dir (–)*	Reference point direction (–)	Set the direction of the reference point looking from the near-point dog. **<For a dog-type reference point return>** Looking from the near-point dog, in the direction establishing the zero point.  **<For a dog-less reference point return>** (when base=0) Looking from the stopper point, in the direction establishing the absolute position  	0: Positive direction 1: Negative direction	
15 0007	Noref	Axis without reference point	Designate for axis without reference point; reference point return is not necessary prior to automatic operation.	0: Normal control axis 1: Axis without reference point	
15 0008	#1_rfp	#1 reference points	Set positions of 1st to 4th reference points with basic machine coordinate zero point as reference points.  The 1st to 4th reference points can be selected for the automatic dogless type reference point return position using the PLC signals (Y200, Y201). **(Note)** When this signal is validated, the status when started will be memorized, so the status cannot be changed during operation.	–999999.999 to +999999.999 (mm)	
15 0009	#2_rfp	#2 reference points			
15 0010	#3_rfp	#3 reference points			
15 0011	#4_rfp	#4 reference points			

No.	Name		Details	Setting range	Standard setting
15 0012	Grspc unit	Grid interval unit	Set the inverse number of the unit set in the #150004 "grid interval" parameter. For example, if the "grid interval" parameter setting unit is 0.1mm (°), set the inverse number "10".	1 to 10000 (Same as "1" when "0" is set.)	0

3.8 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	–	○	–

3.8.1 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
16 0001 (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
16 0002 (PR)	SV002 PC2	Machine side gear ratio		1 to 32767
16 0003	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)
16 0004	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)
16 0005	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
16 0006			Not used. Set to “0”.	0
16 0007			Not used. Set to “0”.	0
16 0008	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
16 0009	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
16 0010	SV010 IDA	Current loop d axis lead compensation		1 to 20480
16 0011	SV011 IQG	Current loop q axis gain		1 to 2560
16 0012	SV012 IDG	Current loop d axis gain		1 to 2560

No.	Items		Details	Setting range
16 0013	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 %)
16 0014	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 %)
16 0015	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 (%)
16 0016	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>16 0017
(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></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>abs</td><td></td><td>vdir</td><td></td><td>mc</td><td></td><td></td><td>dmk</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>dmk</td><td>Deceleration control stop (SVJ2 standard)</td><td>Dynamic brake stop</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>mc</td><td>Contactor control output invalid</td><td>Contactor control output valid</td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td>vdir</td><td>HA053N to HA33N motor Detector installation position standard (A, C)</td><td>HA053N to HA33N 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></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>
(Note) Set to “0” for bits with no particular description.</td></tr>
<tr><td>16 0018
(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>16 0019
(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.
<table>
<tr><th rowspan="2">Motor model name</th><th colspan="2">Setting value</th></tr>
<tr><th>SV019</th><th>SV020</th></tr>
<tr><td>HC*-E42/A42/A47, HC*R-E42/A42/A47
HA*N-E42/A42</td><td>100</td><td>100</td></tr>
<tr><td>HC*-E33/A33, HC*R-E33/A33
HA*N-E33/A33</td><td>25</td><td>25</td></tr>
<tr><td>HC-SF, HC-RF</td><td>16</td><td>16</td></tr>
<tr><td>HA-FF, HC-MF</td><td>8</td><td>8</td></tr>
</table></td><td rowspan="2">8 to 100
(kp/rev)</td></tr>
<tr><td>16 0020
(PR)</td><td>SV020
RNG2</td><td>Speed detector resolution</td></tr>
<tr><td>16 0021</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 300
(s)</td></tr>
<tr><td>16 0022</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>50 to 180
(Stall [rated] current %)</td></tr>
</table>

No.	Items		Details	Setting range
16 0023	SV023 OD1	Excessive error detection width during servo ON	Set the excessive error detection width when servo ON. <Standard setting value> $OD1=OD2=\frac{\text{Rapid traverse rate (mm/min)}}{60*PGN1}/2$ (mm) When "0" is set, the excessive error detection will not be performed.	0 to 32767 (mm)
16 0024	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
16 0025 (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		

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)

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td></td><td></td><td></td><td colspan="2">(Continued from the previous page)
<table>
<tr><th colspan="2">bit</th><th>Explanation</th></tr>
<tr><td>8
9
A
B</td><td>ent</td><td>Set the speed detector type.
Set to “2”.</td></tr>
<tr><td>C
D
E
F</td><td>pen</td><td>Set the position detector type.
Set to “2”.</td></tr>
</table></td></tr>
<tr><td>16 0026</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>16 0027</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></td><td></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></td><td colspan="2">vfct</td><td></td><td></td><td></td><td>zup</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>zup</td><td>Vertical axis lift-up control stop</td><td>Vertical axis lift-up control start</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
5</td><td>vfct</td><td colspan="2">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</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</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: Setting prohibited</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>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>16 0028</td><td>SV028</td><td></td><td>Not used. Set to “0”.</td><td>0</td></tr>
<tr><td>16 0029</td><td>SV029</td><td></td><td>Not used. Set to “0”.</td><td>0</td></tr>
</table>

No.	Items		Details	Setting range
16 0030	SV030 IVC	Voltage dead time compensation	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 (%)
16 0031	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)/ 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.	
16 0032	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>16 0033</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></td><td></td><td></td><td></td><td colspan="4">afs</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 colspan="2">fhz2</td><td colspan="4">nfd</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
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.
<table>
<tr><td>Value</td><td>0</td><td>2</td><td>4</td><td>6</td><td>8</td><td>A</td><td>C</td><td>E</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
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></tr>
</table>

No.	Items		Details	Setting range
16 0034	SV034 SSF3	Servo function selection 3		

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 1 2 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.

No.	Items		Details	Setting range
16 0035	SV035 SSF4	Servo function selection 4		

F	E	D	C	B	A	9	8
cl2n	clG1						

7	6	5	4	3	2	1	0

bit		Meaning when “0” is set	Meaning when “1” is set
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			
A			
B			
C	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.	
D			
E			
F	cl2n	Collision detection method 2 valid	Collision detection method 2 invalid

(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>16 0036
(PR)</td>
<td>SV036
PTYP</td>
<td>Regenerative 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</td><td></td><td rowspan="4">Always set to “0(0000)”.</td></tr>
<tr><td>1</td><td></td></tr>
<tr><td>2</td><td></td></tr>
<tr><td>3</td><td></td></tr>
<tr><td>4</td><td rowspan="4">emgx</td><td rowspan="4">Set the external emergency stop function. (Setting is prohibited for values with no description.)
<table>
<tr><th>Setting</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>5</td></tr>
<tr><td>6</td></tr>
<tr><td>7</td></tr>
<tr><td>8</td><td rowspan="4">rtyp</td><td rowspan="4">Set the regenerative resistor type.
<table>
<tr><th>Setting</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>9</td></tr>
<tr><td>A</td></tr>
<tr><td>B</td></tr>
<tr><td>C</td><td rowspan="4">amp</td><td rowspan="4">Always set to “0(0000)”.</td></tr>
<tr><td>D</td></tr>
<tr><td>E</td></tr>
<tr><td>F</td></tr>
</table>
</td>
<td></td>
</tr>
</table>

No.	Items		Details	Setting range
16 0037	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 (%)
16 0038	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)
16 0039	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)
16 0040	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)
16 0041	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 %)
16 0042	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 %)
16 0043	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)
16 0044	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 (%)
16 0045	SV045 TRUB	Frictional torque	Set the frictional torque when using the collision detection function.	0 to 100 (Stall [rated] current %)
16 0046	SV046		Not used. Set to “0”.	0
16 0047	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 (%)
16 0048	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
16 0049	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)
16 0050	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)
16 0051	SV051		Not used. Set to “0”.	0
16 0052	SV052		Not used. Set to “0”.	0
16 0053	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)
16 0054	SV054		Not used. Set to “0”.	0
16 0055	SV055		Not used. Set to “0”.	0
16 0056	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)
16 0057	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)
16 0058	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)
16 0059	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 (%)
16 0060	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
16 0061	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
16 0062	SV062 DA2NO	D/A output channel 2 data No.		
16 0063	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)
16 0064	SV064 DA2MPY	D/A output channel 2 output scale		
16 0065	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

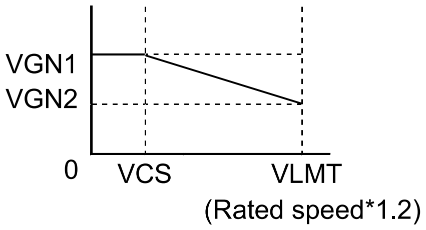
3.8.2 MDS-C1-Vx HIGH-GAIN (MDS-B-Vx4 Compatible)

(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
16 0001 (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
16 0002 (PR)	SV002 PC2	Machine side gear ratio		1 to 32767
16 0003	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)
16 0004	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)
16 0005	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
16 0006	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
16 0007	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.	
16 0008	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
16 0009	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
16 0010	SV010 IDA	Current loop d axis lead compensation		
16 0011	SV011 IQG	Current loop q axis gain		1 to 4096 (In case of MDS-B-Vx4, 1 to 8192)
16 0012	SV012 IDG	Current loop d axis gain		
16 0013	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 %)
16 0014	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
16 0015	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(%)
16 0016	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>16 0017
(PR)</td><td>SV017
SPEC</td><td>Servo specification selection</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">spm</td><td>drvall</td><td>drvup</td><td>mpt3</td><td>mp</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>abs</td><td></td><td>vdir</td><td>fdir</td><td>vfb</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>vfb</td><td>Speed feedback filter stop</td><td>Speed feedback filter stop (2250Hz)</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>drvup</td><td>Standard setting</td><td>Possible to connect a drive unit whose capacity is 1 rank higher/lower than the standard one.</td></tr>
<tr><td>B</td><td>drvall</td><td>Setting for normal use</td><td>Possible to connect a drive unit with any capacity.</td></tr>
<tr><td>C
D
E
F</td><td>spm</td><td colspan="2">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</td></tr>
</table>
(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>16 0018
(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="3">16 0019
(PR)</td><td rowspan="3">SV019
RNG1</td><td rowspan="3">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>
<tr><td colspan="2">
<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>RCN723 (Heidenhain)</td><td>8,000,000(p/rev)</td><td>8000</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>
<tr><td>AT343 (Mitsutoyo)</td><td>0.05 (µm/p)</td><td>20 times as big as SV018 (PIT)</td></tr>
<tr><td>LC191M (Heidenhain)</td><td>Refer to specification manual for each detector</td><td>PIT/Resolution (µm)</td></tr>
<tr><td>LC491M (Heidenhain)</td><td>Refer to specification manual for each detector</td><td>PIT/Resolution (µm)</td></tr>
</table>
</td></tr>
<tr><td>16 0020
(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>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>16 0021</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>16 0022</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>
</table>

No.	Items		Details	Setting range
16 0023	SV023 OD1	Excessive error detection width during servo ON	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.	0 to 32767 (mm)
16 0024	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
16 0025 (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 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)

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			HA-LF15K2					
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	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 synchronization)	The setting of the slave axis in the speed/current synchronization control. When the master axis is the semi-closed control.
D	E (Current synchronization)	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>16 0026</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>16 0027</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>16 0028</td><td>SV028</td><td></td><td>Not used. Set to “0”.</td><td>0</td></tr>
<tr><td>16 0029</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
16 0030	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
16 0031	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.	
16 0032	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>16 0033</td><td>SV033
SSF2</td><td>Servo function selection 2</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">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 colspan="4">Meaning when “0” is set</th><th colspan="5">Meaning when “1” is set</th></tr>
<tr><td>0</td><td>zck</td><td colspan="4">Z phase check valid (Alarm 42)</td><td colspan="5">Z phase check invalid</td></tr>
<tr><td>1</td><td rowspan="4">nfd1</td><td colspan="9">Set the filter depth for Notch filter 1 (SV038).</td></tr>
<tr><td>2</td><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 rowspan="2">3</td><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>
<tr><td colspan="4">Deep←</td><td colspan="5">→ Shallow</td></tr>
<tr><td>4</td><td>nf3</td><td colspan="4">Notch filter 3 stop</td><td colspan="5">Notch filter 3 start (1125Hz)</td></tr>
<tr><td>5</td><td rowspan="4">nfd2</td><td colspan="9">Set the operation frequency of Notch filter 2 (SV046).</td></tr>
<tr><td>6</td><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 rowspan="2">7</td><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>
<tr><td colspan="4">Deep←</td><td colspan="5">→ Shallow</td></tr>
<tr><td>8</td><td>svx</td><td colspan="9" rowspan="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>9</td><td>hvx</td></tr>
<tr><td>A</td><td></td><td colspan="4"></td><td colspan="5"></td></tr>
<tr><td>B</td><td></td><td colspan="4"></td><td colspan="5"></td></tr>
<tr><td>C</td><td rowspan="4">dos</td><td colspan="9" rowspan="4">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>
<tr><td>D</td></tr>
<tr><td>E</td></tr>
<tr><td>F</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>16 0034</td><td>SV034
SSF3</td><td>Servo function selection 3</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">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><td></td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>16 0035</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>clt</td><td colspan="3">clG1</td><td>cl2n</td><td>clet</td><td colspan="2">cltq</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>ckab</td><td>iup</td><td colspan="6">tdt</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
2
3
4
5</td><td>tdt</td><td colspan="2">Td creation time setting
Set to “0”. (For machine tool builder adjustment)</td></tr>
<tr><td>6</td><td>iup</td><td colspan="2">Set to “1” when using any of motors from HC152 to HC702 and from HC153 to HC453.</td></tr>
<tr><td>7</td><td>ckab</td><td>Setting for normal use</td><td>No signal 2 (Alarm 21) special detection</td></tr>
<tr><td>8
9</td><td>cltq</td><td colspan="2">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%</td></tr>
<tr><td>A</td><td>clet</td><td>Setting for normal use</td><td>The disturbance torque peak of the latest two seconds is displayed in MPOS of the servo monitor screen.</td></tr>
<tr><td>B</td><td>cl2n</td><td>Collision detection method 2 valid</td><td>Collision detection method 2 invalid</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>clt</td><td>Setting for normal use</td><td>The guide value of the SV059 setting value is displayed in MPOS of the servo monitor screen.</td></tr>
</table>
(Note) bit7 (ckab) 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>16 0036
(PR)</td><td>SV036
PTYP</td><td>Power supply type</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">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 F</td><td>No setting</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>C
D
E
F</td><td>amp</td><td>Always set to “0”.</td></tr>
</table>
</td></tr>
<tr><td>16 0037</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.

$$\text{SV037 (JL)} = \frac{\text{Jl+Jm}}{\text{Jm}} *100$$

Jm: Motor inertia
Jl: Motor axis conversion load inertia</td><td>0 to 5000
(%)</td></tr>
<tr><td>16 0038</td><td>SV038
FHz1</td><td>Notch filter frequency 1</td><td>Set the vibration frequency to suppress if machine vibration occurs.
(Valid at 36 or more) When not using, set to “0”.</td><td>0 to 9000
(Hz)</td></tr>
</table>

No.	Items		Details	Setting range
16 0039	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)
16 0040	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
16 0041	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 %)
16 0042	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 %)
16 0043	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)
16 0044	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 (%)
16 0045	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
16 0046	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)
16 0047	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 (%)
16 0048	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
16 0049	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)
16 0050	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)
16 0051	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)
16 0052	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)
16 0053	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
16 0054	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)
16 0055	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)
16 0056	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)
16 0057	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)
16 0058	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)

No.	Items		Details	Setting range
16 0059	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
16 0060	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 %)
16 0061	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
16 0062	SV062 DA2NO	D/A output channel 2 data No.		
16 0063	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)
16 0064	SV064 DA2MPY	D/A output channel 2 output scale		
16 0065	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. $\text{Compensation amount} = \frac{F\ (\text{mm/min})^2 * \text{SV065}}{R\ (\text{mm}) * 10^9}\ (\mu\text{m})$ 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

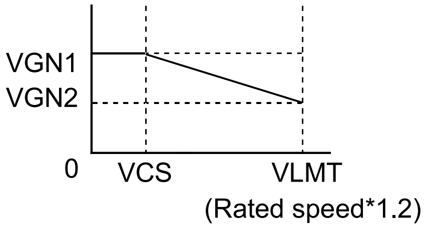
3.8.3 MDS-C1-Vx Standard Specification (MDS-B-Vx Compatible)

(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
16 0001 (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
16 0002 (PR)	SV002 PC2	Machine side gear ratio		1 to 32767
16 0003	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)
16 0004	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)
16 0005	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
16 0006	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
16 0007	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.	
16 0008	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
16 0009	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
16 0010	SV010 IDA	Current loop d axis lead compensation		1 to 20480
16 0011	SV011 IQG	Current loop q axis gain		1 to 2560
16 0012	SV012 IDG	Current loop d axis gain		1 to 2560
16 0013	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 %)
16 0014	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
16 0015	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 (%)
16 0016	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>16 0017
(PR)</td><td>SV017
SPEC</td><td>Servo specification selection</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>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><td></td></tr>
<tr><td>16 0018
(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="3">16 0019
(PR)</td><td rowspan="3">SV019
RNG1</td><td rowspan="3">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 full-closed loop control
Set the number of pulses per ball screw pitch.</td><td>1 to 9999
(kp/pit)</td></tr>
<tr><td colspan="2">
<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>
</td></tr>
<tr><td>16 0020
(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>16 0021</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>16 0022</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>16 0023</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>

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>16 0024</td><td>SV024
INP</td><td>In-position detection width</td><td>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”.</td><td>0 to 32767
(µm)</td></tr>
<tr><td>16 0025
(PR)</td><td>SV025
MTYP</td><td>Motor/ Detector type</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">pen</td><td colspan="4">ent</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 colspan="8">mtyp</td></tr>
</table>
<table>
<tr><th colspan="2">bit</th><th>Explanation</th></tr>
<tr><td>0</td><td rowspan="8">mtyp</td><td rowspan="8">Set the motor type.
<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></tr>
<tr><td>x0</td><td>HA40N</td><td></td><td>HA50L</td><td>HA53L</td><td></td><td></td><td></td><td></td></tr>
<tr><td>x1</td><td>HA80N</td><td></td><td>HA100L</td><td>HA103L</td><td></td><td></td><td></td><td></td></tr>
<tr><td>x2</td><td>HA100N</td><td></td><td>HA200L</td><td>HA203L</td><td></td><td></td><td></td><td></td></tr>
<tr><td>x3</td><td>HA200N</td><td></td><td>HA300L</td><td>HA303L</td><td></td><td></td><td></td><td></td></tr>
<tr><td>x4</td><td>HA300N</td><td></td><td>HA500L</td><td>HA503L</td><td></td><td></td><td></td><td></td></tr>
<tr><td>x5</td><td>HA700N</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>x6</td><td>HA900N</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>x7</td><td></td><td></td><td>HA-LH11K2</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>x8</td><td></td><td></td><td>HA-LH15K2</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>x9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>xA</td><td></td><td></td><td>HA150L</td><td>HA153L</td><td></td><td></td><td></td><td></td></tr>
<tr><td>xB</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>xC</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>xD</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>xE</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>xF</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
<table>
<tr><th>Set-ting</th><th>8x</th><th>9x</th><th>Ax</th><th>Bx</th><th>Cx</th><th>Dx</th><th>Ex</th><th>Fx</th></tr>
<tr><td>x0</td><td>HA43N</td><td></td><td></td><td>HC52</td><td>HC53</td><td></td><td></td><td></td></tr>
<tr><td>x1</td><td>HA83N</td><td></td><td></td><td>HC102</td><td>HC103</td><td></td><td>HC103R</td><td></td></tr>
<tr><td>x2</td><td>HA103N</td><td></td><td></td><td>HC152</td><td>HC153</td><td></td><td>HC153R</td><td></td></tr>
<tr><td>x3</td><td>HA203N</td><td></td><td></td><td>HC202</td><td>HC203</td><td></td><td>HC203R</td><td></td></tr>
<tr><td>x4</td><td>HA303N</td><td></td><td></td><td>HC352</td><td>HC353</td><td></td><td>HC353R</td><td></td></tr>
<tr><td>x5</td><td>HA703N</td><td></td><td></td><td>HC452</td><td>HC453</td><td></td><td>HC503R</td><td></td></tr>
<tr><td>x6</td><td></td><td></td><td></td><td>HC702</td><td>HC703</td><td></td><td></td><td></td></tr>
<tr><td>x7</td><td></td><td></td><td></td><td>HC902</td><td></td><td></td><td></td><td></td></tr>
<tr><td>x8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>x9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>xA</td><td>HA93N</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>xB</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>xC</td><td>HA053(N)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>xD</td><td>HA13(N)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>xE</td><td>HA23N</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>xF</td><td>HA33N</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
(To be continued to the next page)</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></tr>
<tr><td>6</td></tr>
<tr><td>7</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td></td><td></td><td></td><td>(Continued from the previous page)
<table>
<tr><th colspan="2">bit</th><th>Explanation</th></tr>
<tr><td>8
9
A
B</td><td>ent</td><td rowspan="2">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”.
<table>
<tr><th>pen setting</th><th>ent setting</th><th>Detector model name</th></tr>
<tr><td>0</td><td>0</td><td>OHE25K (Only for MDS-B-Vx), OSE104</td></tr>
<tr><td>1</td><td>1</td><td>OHA25K (Only for MDS-B-Vx), OSA104</td></tr>
<tr><td>2</td><td>2</td><td>OSE105, OSA105</td></tr>
<tr><td>3</td><td>3</td><td>Equipped to HA053, HA13 (Only for MDS-B-Vx)</td></tr>
<tr><td>4</td><td>Setting impossible</td><td>OHE25K-ET, OSE104-ET</td></tr>
<tr><td>5</td><td>Setting impossible</td><td>OHA25K-ET, OSA104-ET</td></tr>
<tr><td>6</td><td>Setting impossible</td><td>OSE105-ET, OSA105-ET</td></tr>
<tr><td>7</td><td>Setting impossible</td><td></td></tr>
<tr><td>8</td><td>Setting impossible</td><td>Relative position detection scale, MP type (Mitsubishi Heavy Industries)</td></tr>
<tr><td>9</td><td>Setting impossible</td><td>AT41 (Mitsutoyo), FME type, FLE type (Futaba)</td></tr>
<tr><td>A</td><td>Setting impossible</td><td>AT342 (Mitsutoyo)</td></tr>
<tr><td>B</td><td>Setting impossible</td><td></td></tr>
<tr><td>C</td><td>C (Current synchroni-zation)</td><td>The setting of the slave axis in the speed/current synchronization control.
When the master axis is the semi-closed control.</td></tr>
<tr><td>D</td><td>Setting impossible</td><td></td></tr>
<tr><td>E</td><td>Setting impossible</td><td></td></tr>
<tr><td>F</td><td>Setting impossible</td><td></td></tr>
</table>
</td></tr>
<tr><td>C
D
E
F</td><td>pen</td></tr>
</table>
</td><td></td></tr>
<tr><td>16 0026</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>
</table>

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>16 0027</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</td><td rowspan="2">afse</td><td colspan="2">00: Adoptive filter sensitivity standard</td></tr>
<tr><td>D</td><td colspan="2">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>16 0028</td><td>SV028</td><td></td><td>Not used. Set to “0”.</td><td>0</td></tr>
<tr><td>16 0029</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
16 0030	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
16 0031	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
16 0032	SV032 TOF	Torque offset	Set the unbalance torque of vertical axis and inclined axis.	-100 to 100 (Stall [rated] current %)
16 0033	SV033 SSF2	Servo function selection 2		

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	nfd1	Set the filter depth for Notch filter 1 (SV038).	
2			
3			
4	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	
5			
6			
7			
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	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	
D			
E			
F			

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
16 0034	SV034 SSF3	Servo function selection 3		

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
16 0035	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	tdt	Td creation time setting Set to “0”. (For machine tool builder adjustment)	
1			
2			
3			
4			
5			
6	iup	Set to “1” in the case of any motors from HC152 to HC702 and from HC153 to HC453.	
7			
8	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%	
9			
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	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.	
D			
E			
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
16 0036 (PR)	SV036 PTYP	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 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
16 0037	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 (%)
16 0038	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)
16 0039	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)
16 0040	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
16 0041	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 %)
16 0042	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 %)
16 0043	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)
16 0044	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 (%)
16 0045	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

No.	Items		Details	Setting range
16 0046	SV046		Not used. Set to "0".	0
16 0047	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 (%)
16 0048	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)
16 0049	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)
16 0050	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)
16 0051	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)
16 0052	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)
16 0053	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)
16 0054	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)
16 0055	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)

No.	Items		Details	Setting range
16 0056	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)
16 0057	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)
16 0058	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)
16 0059	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
16 0060	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 %)
16 0061	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
16 0062	SV062 DA2NO	D/A output channel 2 data No.		
16 0063	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)
16 0064	SV064 DA2MPY	D/A output channel 2 output scale		
16 0065	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	10240	10240	10240	10240	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

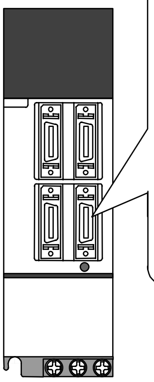
3.8.4 Supplement

3.8.4.1 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	Recutangular 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

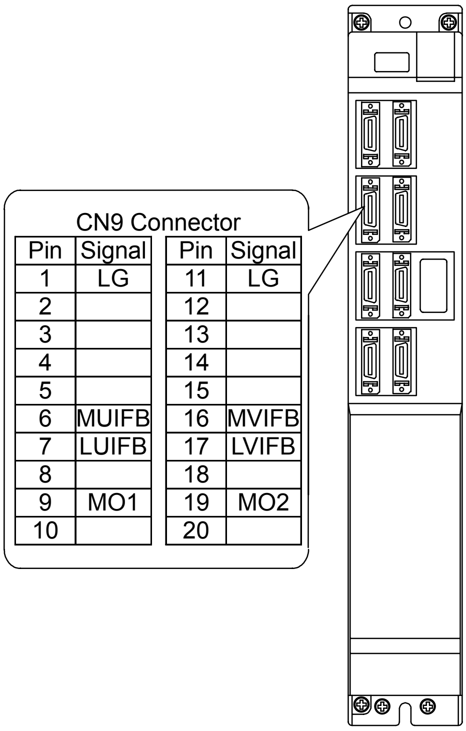
(Example 1) When SV061 = 5, SV063 = 2560
The V-phase current value will be output with 1 A/V unit to D/A output ch.1.

(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) / comminucation 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.

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

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

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

3.8.4.2 ELECTRONIC GEARS

By setting the ball screw lead, deceleration ratio (or acceleration ratio), and detector resolution correctly with parameters, the command movement amount and machine end movement amount can be matched.
The following parameters are related to these electronic gears, and directly affect the machine operation. Take care to set these correctly.

Parameters related to electronic gears

SV001 (PC1), SV002 (PC2), SV003 (PGN1)(SV049(PGN1sp)), SV018 (PIT), SV019 (RNG1), SV020 (RNG2)

PC1 and PC2 setting range

As a principle, the setting range of SV001 (PC1) and SV002 (PC2) is 1 to 30. However, if the following conditions are satisfied, a value higher than 30 can be set. Note that the following conditions must be satisfied even when setting a value between 1 and 30.

For semi-closed loop:

$$\frac{\text{RNG1 x PC2}}{\text{PIT x PC1 x IUNIT}}$$

PC1 " < 32767 / PIT" / IUNIT"
PC2''' < 32767 / RNG1'''

For closed loop:

$$\frac{\text{PGN1 x RNG2 x PC2}}{\text{30 x RNG1 x PC1}}$$

PC1''' < 32767 / RNG1''' / C30"
PC2''' < 32767 / RNG2''' / PGN1'

Meaning of symbols

PC1'''	Value obtained by dividing PC1.
PC2"	Value obtained by dividing PC2.
PIT(')	Value obtained by dividing PIT once (twice).
RNG1'(')	Value obtained by dividing RNG1 once (twice).
RNG2'(')	Value obtained by dividing RNG2 once (twice).
PGN1'	Value obtained by dividing PGN1 once (twice).
IUNIT'(')	Value obtained by dividing CNC interpolation unit once (twice).
C30'(')	Value obtained by dividing a number “30” once (twice).

Example of calculating PC1 and PC2 setting range

To use a ball screw lead of 10mm, interpolation unit of 0.5μm and OSE104 or OSA104 motor end detector with semi-closed loop.

The following parameters are determined by the above conditions.
SV018 (PIT) = 10, SV019 (RNG1) = 100, SV020 (RNG2) = 100, IUNIT = 2

Divide the denominator and numerator.
PIT' = 1, RGN1' = 10 (Greatest common divisor = 10)
IUNIT' = 1, RGN1" = 5 (Greatest common divisor = 2)

Obtain the maximum value of PC1 and PC2 with the calculation expression for the semi-closed loop.
PC1' < 32767 / 1 / 1 < 32767
PC2' < 32767 / 5 < 6553

With the above calculations, the setting range for PC1 is 1 to 32767 and for PC2 is 1 to 6553.

To use a rotation table, interpolation unit of 0.5μm and OSE104 or OSA104 motor end detector with semi-closed loop.

The following parameters are determined by the above conditions.
SV018 (PIT) = 360, SV019 (RNG1) = 100, SV020 (RNG2) = 100, IUNIT = 2

Divide the denominator and numerator.
PIT' = 18, RGN1' = 5 (Greatest common divisor = 20)

Obtain the maximum value of PC1 and PC2 with the calculation expression for the closed loop.
PC1' < 32767 / 18 / 2 < 910
PC2' < 32767 / 5 < 6553

With the above calculations, the setting range for PC1 is 1 to 910 and for PC2 is 1 to 6553.

To use a ball screw lead of 10mm, interpolation unit of 0.5μm, position loop gain of 33, OSE104 or OSA104 motor end detector with closed loop, and 1μm scale machine end detector.

The following parameters are determined by the above conditions.

SV018 (PIT) = 10, SV019 (RNG1) = 10, SV020 (RNG2) = 100, IUNIT = 2, PGN1 = 33

Divide the denominator and numerator.
RNG1' = 1, RNG2' = 10 (Greatest common divisor = 10)
C30' = 3, RNG2" = 1 (Greatest common divisor = 10)
C30" = 1, PGN1' = 11 (Greatest common divisor = 3)

Obtain the maximum value of PC1 and PC2 with the calculation expression for the closed loop.
PC1' < 32767 / 1 / 1 < 32767
PC2' < 32767 / 1 / 11 < 2978

With the above calculations, the setting range for PC1 is 1 to 32767 and for PC2 is 1 to 2978.

To use a ball screw lead of 10mm, interpolation unit of 0.5μm, position loop gain of 33, OSE105 or OSA105 motor end detector with closed loop, and 1μm scale machine end detector.

The following parameters are determined by the above conditions.
SV018 (PIT) = 12, SV019 (RNG1) = 12, SV020 (RNG2) = 1000, IUNIT = 2, PGN1 = 33

Divide the denominator and numerator.
RNG1' = 3, RNG2' = 250 (Greatest common divisor = 4)
C30' = 3, RNG2" = 25 (Greatest common divisor = 10)
C30" = 1, PGN1' = 11 (Greatest common divisor = 3)

Obtain the maximum value of PC1 and PC2 with the calculation expression for the closed loop.
PC1' < 32767 / 3 / 1 < 10922
PC2' < 32767 / 25 / 11 < 119

With the above calculations, the setting range for PC1 is 1 to 10922 and for PC2 is 1 to 199.

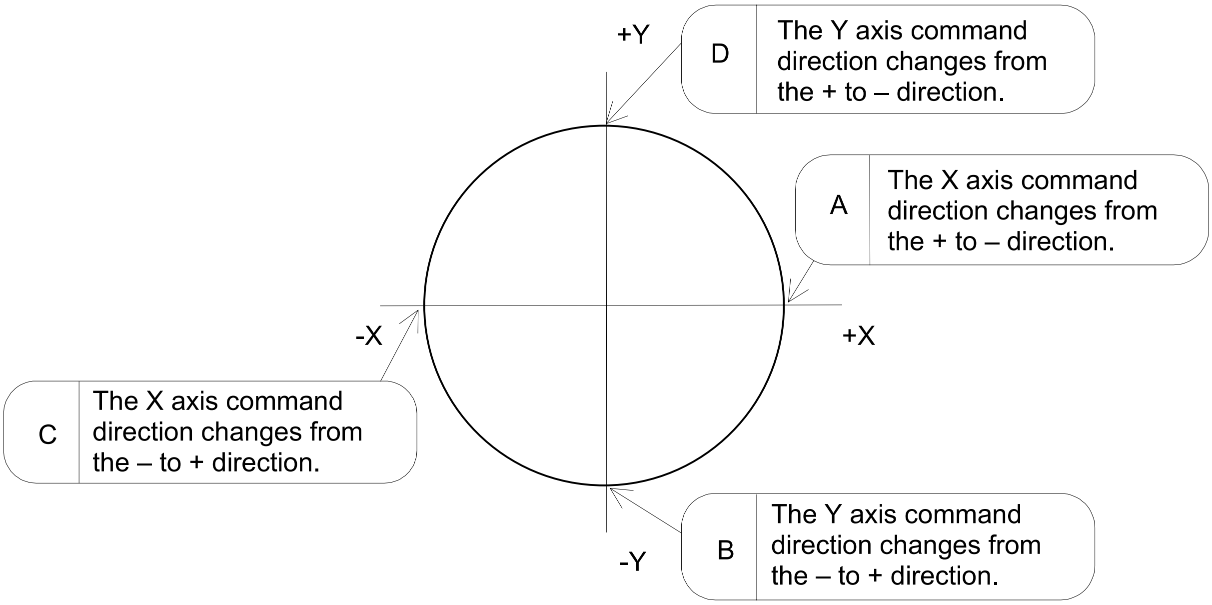
3.8.4.3 LOST MOTION COMPENSATION

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

3.9 Machine Error Compensation Parameters

For parameters indicated with an "*" in the table, turn the NC power OFF after setting. The setting is validated after the power is turned ON again.
In the bit explanation below, set all bits not used, including empty bits, to "0".

No.	Name		Details	Setting range	Standard setting
17 0001	Cmax [1]	Compensation set 1 basic axis	(1) For pitch error compensation Set the coordinate axis to execute compensation with an axis name. (2) For relative position compensation Set the coordinate axis used as the reference when measuring the relative error of two intersecting axes with an axis name.	1 to maximum number of control axes	
17 0002	Drcax [1]	Compensation set 1 compensation axis	(1) For pitch error compensation Set the same coordinate axis as "170001 Cmax [1]" with an axis name. (2) For relative position compensation Set the name of the coordinate axis to be used as a reference when measuring the relative error of two axis that intersect with "170001 Cmax [1]".	1 to maximum number of control axes	
17 0003	Rdvno [1]	Compensation set 1 reference point position division number	Set the division compensation number of the basic axis reference point position. In actual use, this is the reference point so there is no division point. However, the division point compensation number one point to the minus side is set.	0 to 128 × (Number of NC axes) When the relative posi-tion com-pensation is added: 0 to 256 × number of axes	
17 0004	Mdvno [1]	Compensation set 1 number of division points at far minus position	Set the division point compensation number at the most minus position from the basic axis' reference point.		
17 0005	Pdvno [1]	Compensation set 1 number of division points at far plus position	Set the division point compensation number at the most plus position from the basic axis' reference point.		
17 0006	Sc [1]	Compensation set 1 compensation magnification	Set the magnification of the compensation amount set in the compensation number (compensation amount table). When the compensation magnification is set to "1", the compensation amount unit is the same as the output unit. Compensation amount unit = output unit × compensation magnification	0 to 99	

No.	Name		Details	Setting range	Standard setting
17 0007	Spcdv [1]	Compensation set 1 division interval	Set the interval between the division points when the basic axis is divided into equal intervals. Operation will take place with a μm unit regardless of the control unit. **(Note)** If the division interval setting value is "0", compensation will not be carried out. There is no limit to the minimum division interval value. However, set appropriate data allowing for the machine stroke, etc.	1 to 99999999 (μm)	
17 0101 to 0107		Compensation set 2 parameter	Same as compensation set 1.		
↓					
17 2701 to 2707		Compensation set 28 parameter	Same as compensation set 1.	0 to 500 (%)	

3.10 Machine Error Compensation Data

No.	Name		Details	Setting range	Standard setting
18 0001 to 3584		Compensation data 1 to n	Set the machine error compensation data.	–999999999 to 999999999	

3.11 Macro List

Designate when calling the user macro program and subprogram call with a specific code (G, M, S, T, 2nd miscellaneous code).

<table>
<tr><th>No.</th><th colspan="2">Name</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>19 0001</td><td>G[01]: Effective</td><td>G[01]: Valid</td><td>The macro program is called by the G code set in "190002 G[01]: Code".</td><td>0: The set G code is invalid
1: The macro program is called with the set G code.</td><td></td></tr>
<tr><td>19 0002</td><td>G[01]:Code</td><td>G[01]: Code</td><td>Set up to 10 random G codes from G [01] to G [10] when calling the user macro program with the G command.
(Note that the G code used in the system cannot be set.)</td><td>0 to 9999</td><td></td></tr>
<tr><td>19 0003</td><td>G[01]:Type</td><td>G[01]: Type</td><td><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>Other</td><td>M98 P△△△△; and equivalent value call</td></tr></table></td><td>0 to 3</td><td></td></tr>
<tr><td>19 0004</td><td>G[01]: Program -No.</td><td>G[01]: Program No.</td><td><Program No.>
Set the user macro program No. to be called.</td><td>1 to 99999999</td><td></td></tr>
<tr><td>19 0011 to 0014</td><td></td><td>G[02] parameter</td><td>Same as G[01].</td><td></td><td></td></tr>
<tr><td>~</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>19 0091 to 0094</td><td></td><td>G[10] parameter</td><td>Same as G[01].</td><td></td><td></td></tr>
<tr><td>19 0201</td><td>M[01]: Effective</td><td>M[01]: Valid</td><td>The macro program is called by the M code set in "190202 M[01]: Code".</td><td>0: The set M code is invalid
1: The macro program is called with the set M code.</td><td></td></tr>
<tr><td>19 0202</td><td>M[01]:Code</td><td>M[01]: Code</td><td>Set up to 40 random M codes from M[01] to M[40] when calling the user macro program (sub-system program) with the M command.
(Note that M96 to M99 and the M codes used in the system cannot be set.)</td><td>0 to 9999</td><td></td></tr>
</table>

<table>
<tr><th>No.</th><th>Name</th><th></th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>19 0203</td><td>M[01]:Type</td><td>M[01]: Type</td><td>**<Type>**
<table>
<tr><td>0</td><td>M98 PΔΔΔΔ; and equivalent value call</td></tr>
<tr><td>1</td><td>G65 PΔΔΔΔ; and equivalent value call</td></tr>
<tr><td>2</td><td>G66 PΔΔΔΔ; and equivalent value call</td></tr>
<tr><td>3</td><td>G66.1 PΔΔΔΔ; and equivalent value call</td></tr>
<tr><td>Other</td><td>M98 PΔΔΔΔ; and equivalent value call</td></tr>
</table></td><td>0 to 3</td><td></td></tr>
<tr><td>19 0204</td><td>M[01]: Program -No.</td><td>M[01]: Program No.</td><td>**<Program No.>**
Set the user macro program No. to be called.</td><td>1 to 99999999</td><td></td></tr>
<tr><td>19 0211 to 0214</td><td></td><td>M[02] parameter</td><td>Same as M[01].</td><td></td><td></td></tr>
<tr><td>~</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>19 0291 to 0294</td><td></td><td>M[10] parameter</td><td>Same as M[01].</td><td></td><td></td></tr>
<tr><td>19 0401</td><td>M2mac: Type</td><td>M2mac: Type</td><td>Set when calling the user macro program with the 2nd miscellaneous function command (the address set in the basic specification parameter M2name).
(Note) The macro program set on this screen will be called when the 2nd miscellaneous code call macro (M2mac) of the basic specification parameter is valid.
<Type>
Same as the G call macro.</td><td>0 to 3</td><td></td></tr>
<tr><td>19 0402</td><td>M2mac: Program -No.</td><td>M2mac: Program No.</td><td>**<Program No.>**
Same as the G call macro.</td><td>1 to 99999999</td><td></td></tr>
<tr><td>19 0501</td><td>Smac:Type</td><td>Smac: Type</td><td>Set when calling the user macro program with an S command.
(Note) The macro program set on this screen will be called when the basic specification parameter S call macro (Smac) is valid.
<Type>
Same as the G call macro.</td><td>0 to 3</td><td></td></tr>
<tr><td>19 0502</td><td>Smac: Program -No.</td><td>Smac: Program No.</td><td>**<Program No.>**
Same as the G call macro.</td><td>1 to 99999999</td><td></td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Name</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>19 0601</td><td>Tmac:Type</td><td>Tmac: Type</td><td>Set when calling a user macro program with a T command.
(Note) The macro program set on this screen will be called when the basic specification parameter T call macro (Tmac) is valid.
<Type>
<table>
<tr><td>0</td><td>M98 PΔΔΔΔ; and equivalent value call</td></tr>
<tr><td>1</td><td>G65 PΔΔΔΔ; and equivalent value call</td></tr>
<tr><td>2</td><td>G66 PΔΔΔΔ; and equivalent value call</td></tr>
<tr><td>3</td><td>G66.1 PΔΔΔΔ ; and equivalent value call</td></tr>
<tr><td>Other</td><td>M98 PΔΔΔΔ; and equivalent value call</td></tr>
</table></td><td>0 to 3</td><td></td></tr>
<tr><td>19 0602</td><td>Tmac: Program -No.</td><td>Tmac: Program No.</td><td><Program No.>
Set the user macro program No. to be called.</td><td>1 to 99999999</td><td></td></tr>
</table>

3.12 MDS-B-SP/SPH,SPJ2 Spindle Parameters

The spindle parameter setting and display method will differ according to the CNC being used, so refer to the Instruction Manual for each CNC and the following spindles.
MELDAS AC Servo and Spindle MDS-A Series MDS-B Series Specifications Manual.....BNP-B3759

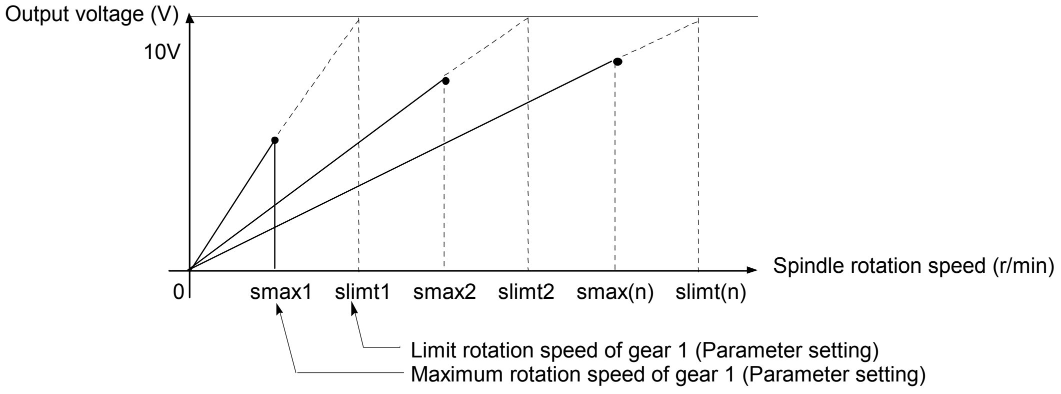
3.12.1 MDS-B-SP/SPH,SPJ2 Spindle Base Specifications Parameters

For parameters indicated with an "*" in the table, turn the NC power OFF after setting. The setting is validated after the power is turned ON again.
In the bit explanation below, set all the bits not used, including empty bits, to "0".

No.	Name		Details	Setting range	Standard setting
20 0001	Sp_axis_num*	Axis number	Set the control axis number of the spindle.	0 to maximum number of control axes	
20 0002	Slimit1	Limit speed Gear 00	Set the spindle speed for the maximum motor speed with gears 00, 01, 10, 11.	0 to 99999 (r/min)	
20 0003	Slimit2	Limit speed Gear 01			
20 0004	Slimit3	Limit speed Gear 10			
20 0005	Slimit4	Limit speed Gear 11			
20 0006	Smax1	Maximum speed Gear 00	Set the maximum spindle speed with gears 00, 01, 10, 11. Set to slimt ≥ smax.	0 to 99999 (r/min)	
20 0007	Smax2	Maximum speed Gear 01			
20 0008	Smax3	Maximum speed Gear 10			
20 0009	Smax4	Maximum speed Gear 11			
20 0010	Ssift1	Shift speed Gear 00	Set the spindle speed for gear shifting with gears 00, 01, 10, 11.	0 to 32767 (r/min)	
20 0011	Ssift2	Shift speed Gear 01			
20 0012	Ssift3	Shift speed Gear 10			
20 0013	Ssift4	Shift speed Gear 11			
20 0014	Stap1	Tap speed Gear 00	Set the maximum spindle speed during tap cycle with gears 00, 01, 10, 11.	0 to 99999 (r/min)	
20 0015	Stap2	Tap speed Gear 01			
20 0016	Stap3	Tap speed Gear 10			
20 0017	Stap4	Tap speed Gear 11			

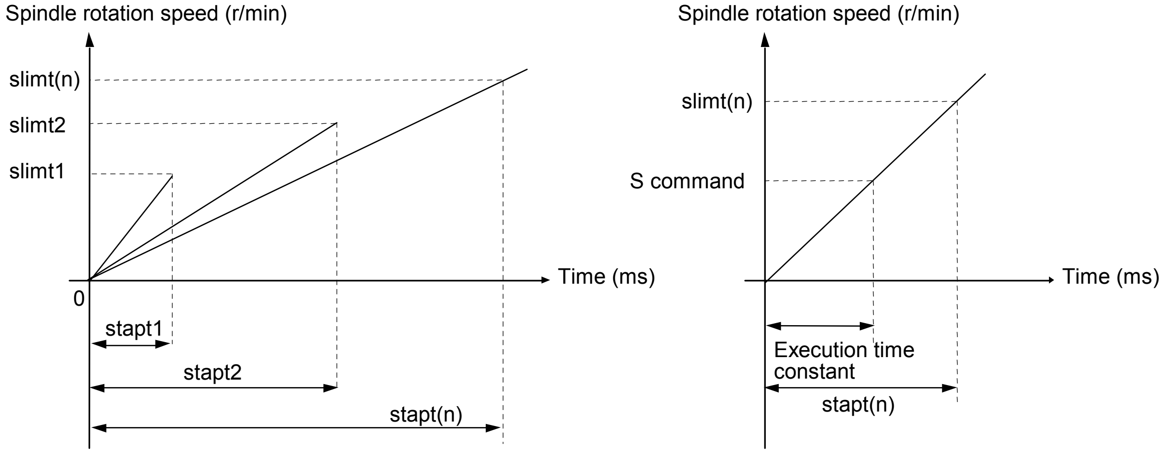
No.	Name		Details	Setting range	Standard setting
20 0018	Stapt1	Tap time constant Gear 00	Set time constants for constant inclination synchronous tap cycles for gears 00, 01, 10, 11 (linear acceleration/deceleration pattern).	0 to 5000 (ms)	
20 0019	Stapt2	Tap time constant Gear 01			
20 0020	Stapt3	Tap time constant Gear 10			
20 0021	Stapt4	Tap time constant Gear 11			

Relationship between spindle limit rotation speed and maximum spindle rotation speed



Set "0" for any unused gear.

Relation between the spindle limit rotation speed and the spindle tap time constant (for the constant inclination synchronous tap cycle)



No.	Name		Details	Setting range	Standard setting
20 0022	Sori	Orientation 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)	
20 0023	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	
20 0024	Smini	Minimum 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 by this parameter.	0 to 32767 (r/min)	
20 0025	Serr	Spindle speed arrival detection width	Set the spindle speed arrival detection width. Obtain the value from the command rotation speed and rate set with this parameter. If the actual rotation speed of the spindle exceeds the detection width, "Upper limit over/lower limit over" will be output to the PLC.	0: Not check 1 to 99 (%)	
20 0026	Senc_pno	Encoder port number	Set the port number of the card connecting the encoder.	1 to 7 : DIO 8 to 16: RIO 17 : IOC	
20 0027	Sana_pno		(Not used.)	0	
20 0028	Spflg	Spindle connection information	bit2 1: Direct connection to encoder 0: Via passing HDLC connection axis bit0, 1, and 3 to 7 are not used.	0 to FF	
20 0029	Sana_no		(Not used.)	0	

No.	Name		Details	Setting range	Standard setting
20 0030	Sana_ofs		(Not used.)	0	
20 0031	Sana_gin		(Not used.)	0	
20 0089	Stap11	Tap rotation speed gear 00	Set the maximum rotation speed for the first step of the synchronous tap cycle multi-step acceleration/ deceleration in gear 00, 01, 10 and 11. (Linear acceleration/deceleration pattern)	0 to 99999 (r/min)	
20 0090	Stap12	Tap rotation speed gear 01			
20 0091	Stap13	Tap rotation speed gear 10			
20 0092	Stap14	Tap rotation speed gear 11			
20 0093	Stapt11	Tap time constant gear 00	Set the time constant for the first step of the synchronous tap cycle multi-step acceleration/ deceleration in gear 00, 01, 10 and 11. (Linear acceleration/deceleration pattern)	0 to 5000 (ms)	
20 0094	Stapt12	Tap time constant gear 01			
20 0095	Stapt13	Tap time constant gear 10			
20 0096	Stapt14	Tap time constant gear 11			

No.	Name		Details	Setting range	Standard setting
20 0097	Stap21	Tap rotation speed gear 00	Set the maximum rotation speed for the second step of the synchronous tap cycle multi-step acceleration/ deceleration in gear 00, 01, 10 and 11. (Linear acceleration/deceleration pattern)	0 to 99999 (r/min)	
20 0098	Stap22	Tap rotation speed gear 01			
20 0099	Stap23	Tap rotation speed gear 10			
20 0100	Stap24	Tap rotation speed gear 11			
20 0101	Stapt21	Tap time constant gear 00	Set the time constant for the second step of the synchronous tap cycle multi-step acceleration/ deceleration in gear 00, 01, 10 and 11. (Linear acceleration/deceleration pattern)	0 to 5000 (ms)	
20 0102	Stapt22	Tap time constant gear 01			
20 0103	Stapt23	Tap time constant gear 10			
20 0104	Stapt24	Tap time constant gear 11			
20 0105	Stapt31	Tap time constant gear 00	Set the time constant for the third step of the synchronous tap cycle multi-step acceleration/ deceleration in gear 00, 01, 10 and 11. (Linear acceleration/deceleration pattern)	0 to 5000 (ms)	
20 0106	Stapt32	Tap time constant gear 01			
20 0107	Stapt33	Tap time constant gear 10			
20 0108	Stapt34	Tap time constant gear 11			
20 0109	Stmax1	Maximum retract rotation speed gear 00	Set the maximum retract rotation speed for synchronous tap cycle multi-step acceleration/ deceleration in gear 00, 01, 10 and 11. (Linear acceleration/deceleration pattern)	0 to 99999 (r/min)	
20 0110	Stmax2	Maximum retract rotation speed gear 01			
20 0111	Stmax3	Maximum retract rotation speed gear 10			
20 0112	Stmax4	Maximum retract rotation speed gear 11			

3.12.2 MDS-B-SP/SPH,SPJ2 Spindle Parameters

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.

○: Valid, △: Fixed value

Parameter	Corresponding model	
	MDS-B-SP/SPH	MDS-B-SPJ2
SP001	○	○
SP002	○	○
SP003	○	–
SP004	○	○
SP005	○	○
SP006	○	○
SP007	○	○
SP008	–	–
SP009	○	○
SP010	○	○
SP011	–	–
SP012	–	–
SP013	–	–
SP014	–	–
SP015	–	–
SP016	–	–
SP017	○	○
SP018	○	○
SP019	○	○
SP020	○	○
SP021	○	○
SP022	○	○
SP023	○	○
SP024	–	–
SP025	○	○
SP026	○	○
SP027	○	○
SP028	○	○
SP029	○	○
SP030	○	○
SP031	○	○
SP032	○	○
SP033	○	○
SP034	○	○
SP035	○	○
SP036	○	○
SP037	○	○
SP038	○	○
SP039	○	○
SP040	○	○
SP041	○	○
SP042	○	–

Parameter	Corresponding model	
	MDS-B-SP/SPH	MDS-B-SPJ2
SP043	○	–
SP044	○	○
SP045	○	–
SP046	○	○
SP047	○	○
SP048	○	○
SP049	○	○
SP050	○	○
SP051	○	○
SP052	○	○
SP053	○	○
SP054	○	○
SP055	○	○
SP056	○	○
SP057	△	△
SP058	○	–
SP059	○	–
SP060	○	–
SP061	○	–
SP062	–	–
SP063	○	○
SP064	○	○
SP065	○	○
SP066	○	○
SP067	○	○
SP068	○	○
SP069	○	○
SP070	○	–
SP071	△	–
SP072	△	–
SP073	△	–
SP074	△	–
SP075	△	–
SP076	○	–
SP077	△	△
SP078	△	△
SP079	△	△
SP080	–	–
SP081	△	–
SP082	△	–
SP083	–	–
SP084	–	–

○: Valid, △: Fixed value

Parameter	Corresponding model	
	MDS-B-SP/SPH	MDS-B-SPJ2
SP085	–	–
SP086	–	–
SP087	○	○
SP088	○	○
SP089	–	–
SP090	–	○
SP091	○	–
SP092	○	–
SP093	△	△
SP094	○	–
SP095	△	△
SP096	○	○
SP097	○	○
SP098	○	○
SP099	○	○
SP100	○	○
SP101	○	○
SP102	○	○
SP103	○	○
SP104	○	○
SP105	○	○
SP106	○	○
SP107	○	○
SP108	○	○
SP109	○	○
SP110	–	○
SP111	–	○
SP112	–	○
SP113	–	○
SP114	○	○
SP115	△	△
SP116	–	–
SP117	△	–
SP118	△	△
SP119	○	–
SP120	○	–
SP121	○	–
SP122	○	–
SP123	○	–
SP124	○	–
SP125	○	–
SP126	–	–
SP127	–	–
SP128	–	–
SP129	○	–
SP130	○	–
SP131	○	–

Parameter	Corresponding model	
	MDS-B-SP/SPH	MDS-B-SPJ2
SP132	○	–
SP133	○	–
SP134	○	–
SP135	○	–
SP136	○	–
SP137	○	–
SP138	○	–
SP139	○	–
SP140	○	–
SP141	○	–
SP142	○	–
SP143	○	–
SP144	○	–
SP145	○	–
SP146	○	–
SP147	○	–
SP148	○	–
SP149	○	–
SP150	○	–
SP151	○	–
SP152	○	–
SP153	○	–
SP154	○	–
SP155	○	–
SP156	△	–
SP157	–	–
SP158	–	–
SP159	○	–
SP160	○	–
SP161	○	–
SP162	○	–
SP163	○	–
SP164	○	–
SP165	○	–
SP166	○	–
SP167	○	–
SP168	○	–
SP169	○	–
SP170	○	–
SP171	–	–
SP172	–	–
SP173	–	–
SP174	–	–
SP175	–	–
SP176	–	–
SP177	○	○
SP178	○	○

○: Valid, △: Fixed value

Parameter	Corresponding model	
	MDS-B-SP/SPH	MDS-B-SPJ2
SP179	○	○
SP180	○	○
SP181	○	○
SP182	○	○
SP183	○	○
SP184	–	△
SP185	○	○
SP186	○	○
SP187	○	○
SP188	○	○
SP189	○	–
SP190	○	–
SP191	–	–
SP192	–	–
SP193	○	○
SP194	○	○
SP195	○	○
SP196	○	○
SP197	–	–
SP198	○	○
SP199	○	○
SP200	○	○
SP201	○	○
SP202	○	○
SP203	○	○
SP204	–	–
SP205	–	–
SP206	–	–
SP207	–	–
SP208	–	–
SP209	–	–
SP210	–	–
SP211	–	–
SP212	–	–
SP213	–	–
SP214	○	○
SP215	○	○
SP216	○	○
SP217	○	○
SP218	○	○
SP219	○	○
SP220	○	○
SP221	○	–
SP222	○	–
SP223	△	–
SP224	△	–
SP225	○	–
SP226	○	–
SP227	○	–
SP228	○	–
SP229	○	–
SP230	–	–
SP231	–	–
SP232	–	–
SP233	○	–
SP234	○	–
SP235	○	–
SP236	△	–
SP237	–	–
SP238	–	–
SP239	–	–
SP240	–	–
SP241	–	–
SP242	△	–
SP243	△	–
SP244	△	–
SP245	○	–
SP246	△	–
SP247	–	–
SP248	–	–
SP249	○	–
SP250	○	–
SP251	–	–
SP252	–	–
SP253	○	○
SP254	○	○
SP255	○	○
SP256	○	○
SP257	△	△
SP258	△	△
SP259	△	△
SP260	△	△
SP261	△	△
SP262	△	△
SP263	△	△
SP264	△	△
SP265	△	△
SP266	△	△
SP267	△	△
SP268	△	△
SP269	△	△
SP270	△	△
SP271	△	△
SP272	△	△

○: Valid, △: Fixed value

Parameter	Corresponding model	
	MDS-B-SP/SPH	MDS-B-SPJ2
SP273	△	△
SP274	△	△
SP275	△	△
SP276	△	△
SP277	△	△
SP278	△	△
SP279	△	△
SP280	△	△
SP281	△	△
SP282	△	△
SP283	△	△
SP284	△	△
SP285	△	△
SP286	△	△
SP287	△	△
SP288	△	△
SP289	△	△
SP290	△	△
SP291	△	△
SP292	△	△
SP293	△	△
SP294	○	–
SP295	○	–
SP296	△	–
SP297	△	–
SP298	△	–
SP299	△	–
SP300	△	–
SP301	△	–
SP302	△	–
SP303	△	–
SP304	△	–
SP305	△	–
SP306	△	–
SP307	△	–
SP308	△	–
SP309	△	–
SP310	△	–
SP311	△	–
SP312	△	–
SP313	△	–
SP314	△	△
SP315	△	△
SP316	△	△
SP317	△	△
SP318	△	△
SP319	△	△
SP320	△	△
SP321	△	–
SP322	△	–
SP323	△	–
SP324	△	–
SP325	△	–
SP326	△	–
SP327	△	–
SP328	△	–
SP329	△	–
SP330	△	–
SP331	△	–
SP332	△	–
SP333	△	–
SP334	△	–
SP335	△	–
SP336	△	–
SP337	△	–
SP338	△	–
SP339	△	–
SP340	△	–
SP341	△	–
SP342	△	–
SP343	△	–
SP344	△	–
SP345	△	–
SP346	△	–
SP347	△	–
SP348	△	–
SP349	△	–
SP350	△	–
SP351	△	–
SP352	△	–
SP353	△	–
SP354	△	–
SP355	△	–
SP356	△	–
SP357	△	–
SP358	○	–
SP359	○	–
SP360	△	–
SP361	△	–
SP362	△	–
SP363	△	–
SP364	△	–
SP365	△	–
SP366	△	–

○: Valid, △: Fixed value

Parameter	Corresponding model	
	MDS-B-SP/SPH	**MDS-B-SPJ2**
SP367	△	–
SP368	△	–
SP369	△	–
SP370	△	–
SP371	△	–
SP372	△	–
SP373	△	–
SP374	△	–
SP375	△	–

Parameter	Corresponding model	
	MDS-B-SP/SPH	**MDS-B-SPJ2**
SP376	△	–
SP377	△	–
SP378	△	–
SP379	△	–
SP380	△	–
SP381	△	–
SP382	△	–
SP383	△	–
SP384	△	–

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

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

No.	Items			Details	Setting range	Standard setting
21 0001	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
21 0002	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
21 0003	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
21 0004	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
21 0005 (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
21 0006	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
21 0007	SP007	OPST	In-position shift amount for orientation	**For MDS-B-SP/SPH** Set the stop position for orientation. (i) Motor built-in encoder, encoder: Set the value by dividing 360° by 4096. (ii) Magnetic detector: Divide –5° to +5° by 1024 and put 0° for 0.	(i) 0 to 4095 (ii) –512 to 512	0
				For others Set the stop position for orientation. Set the value by dividing 360° by 4096.	0 to 4095	0
21 0008	SP008			Not used. Set to "0".	0	0
21 0009	SP009	PGT	Synchronous tapping position loop gain	Set the spindle position loop gain in synchronous tapping mode.	1 to 100 (1/s)	15
21 0010	SP010	PGS	Spindle synchronous position loop gain	Set the spindle position loop gain in spindle synchronization mode.	1 to 100 (1/s)	15

No.	Items			Details	Setting range	Standard setting
21 0011	SP011	WCLP2	Turret indexing clamp speed 2	Set the turret indexing clamp speed for when the door interlock spindle speed clamp signal is ON. This parameter is used only with SPH. (Note) This is valid only when "SP097 (SPEC0)" bit8 is set to 1.	0 to 32767 (r/min)	
21 0012 to 21 0016	SP012 to SP016			Use not possible.	0	0
21 0017 (PR)	SP017	TSP	Maximum motor speed	Set the maximum motor speed of the spindle.	1 to 32767 (r/min)	6000
21 0018 (PR)	SP018	ZSP	Motor zero speed	Set the motor speed for which zero-speed output is performed.	1 to 1000 (r/min)	50
21 0019 (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
21 0020 (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
21 0021	SP021	TLM1	Torque limit 1	Set the torque limit rate for torque limit signal 001.	0 to 120 (%)	10
21 0022 (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
21 0023 (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
21 0024	SP024			Not used. Set to "0".	0	0
21 0025 (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
21 0026 (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
21 0027 (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
21 0028 (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
21 0029 (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
21 0030 (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
21 0031 (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
21 0032 (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

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>21 0033
(PR)</td><td>SP033</td><td>SFNC1</td><td>Spindle function 1</td><td>
Set the spindle function 1 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>poff</td><td>hzs</td><td></td><td>ront</td><td></td><td></td><td></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></td><td></td><td></td><td></td><td></td><td>sftk</td><td>dflt</td><td>1a2m</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>1a2m</td><td>1 amplifier
2 motor function: Invalid</td><td>1 amplifier
2 motor function: Valid</td></tr>
<tr><td>1</td><td>dflt</td><td>Default motor: Main</td><td>Default motor: Sub</td></tr>
<tr><td>2</td><td>sftk</td><td>SF-TK card invalid</td><td>SF-TK card 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 rowspan="5">This is a fixed control bit.</td><td rowspan="5"></td></tr>
<tr><td>C</td><td>ront</td></tr>
<tr><td>D</td><td></td></tr>
<tr><td>E</td><td>hzs</td></tr>
<tr><td>F</td><td>poff</td></tr>
</table>
</td><td>0000 to
FFFF
HEX setting</td><td>0000</td></tr>
<tr><td>21 0034
(PR)</td><td>SP034</td><td>SFNC2</td><td>Spindle function 2</td><td>
For MDS-B-SP/SPH
Set the spindle function 2 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></td><td></td><td></td><td></td><td></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></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>Winding switch function invalid</td><td>Winding switch function valid</td></tr>
<tr><td>3</td><td>mkc2</td><td>This is a fixed control bit.</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>
</table>

No.	Items			Details	Setting range	Standard setting
				For MDS-B-SPJ2		

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			

No.	Items			Details	Setting range	Standard setting
21 0035 (PR)	SP035	SFNC3	Spindle function 3	**For MDS-B-SP/SPH** 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
				lbsd	hbsd	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 wide-range constant output invalid	H-coil wide-range constant output valid
1	lwid	L-coil wide-range constant output invalid	L-coil wide-range constant output valid
2	hbsd	H-coil base slide invalid	H-coil base slide valid
3	lbsd	L-coil base slide invalid	L-coil base slide valid
4			
5			
6			
7			
8		(Used with SPJ.)	
9			
A			
B			
C			
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></td><td></td><td></td><td></td><td>

For MDS-B-SPJ2

Set the spindle function 3 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></td><td></td><td></td><td></td><td></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></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>21 0036
(PR)</td><td>SP036</td><td>SFNC4</td><td>Spindle function 4</td><td>

Set the spindle function 4 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></td><td></td><td></td><td></td><td>dslm</td><td>dssm</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>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>

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td rowspan="2">21 0037
(PR)</td><td rowspan="2">SP037</td><td rowspan="2">SFNC5</td><td rowspan="2">Spindle function 5</td><td>

For MDS-B-SP/SPH

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 detector orientation invalid</td><td>Magnetic detector 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>Fixed control bit</td><td></td></tr>
<tr><td>A</td><td>noplg</td><td>Fixed control bit</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>dplg</td><td>Fixed control bit</td><td></td></tr>
<tr><td>F</td><td>splg</td><td>Fixed control bit</td><td></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>
<tr><td>

For MDS-B-SPJ2

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></td><td></td><td></td><td></td><td></td><td></td><td></td><td>nstv</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></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></td><td></td><td></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>nstv</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></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>
</table>

No.	Items			Details	Setting range	Standard setting
21 0038 (PR)	SP038	SFNC6	Spindle function 6	**For MDS-B-SP/SPH** Set the spindle function 6 in bit units.	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.

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

For MDS-B-SPJ2

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 rowspan="2">21 0039
(PR)</td><td rowspan="2">SP039</td><td rowspan="2">ATYP</td><td rowspan="2">Amplifier type</td><td>

For MDS-B-SP/SPH

Set the amplifier type.
Set each amplifier type or "0".
This parameter corresponds to MDS-A-SP (version A2 or above) and MDS-B-SP.

<table>
<tr><th>Parameter setting</th><th>Amplifier type</th></tr>
<tr><td>0000</td><td>--</td></tr>
<tr><td>0001</td><td>SP-075</td></tr>
<tr><td>0002</td><td>SP-15</td></tr>
<tr><td>0003</td><td>SP-22</td></tr>
<tr><td>0004</td><td>SP-37</td></tr>
<tr><td>0005</td><td>SP-55</td></tr>
<tr><td>0006</td><td>SP-75</td></tr>
<tr><td>0007</td><td>SP-110</td></tr>
<tr><td>0008</td><td>SP-150</td></tr>
<tr><td>0009</td><td>SP-185</td></tr>
<tr><td>000A</td><td>SP-220</td></tr>
<tr><td>000B</td><td>SP-260</td></tr>
<tr><td>000C</td><td>SP-300</td></tr>
<tr><td>000D</td><td>CSP-370</td></tr>
<tr><td>000E</td><td>CSP-450</td></tr>
<tr><td>000F</td><td>SP-04</td></tr>
<tr><td>0010</td><td>SP-550</td></tr>
</table>

</td><td rowspan="2">0000 to
FFFF
HEX
setting</td><td rowspan="2">0000</td></tr>
<tr><td>

For MDS-B-SPJ2

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></tr>
</table>

No.	Items			Details	Setting range	Standard setting
21 0040 (PR)	SP040	MTYP	Motor type	**For MDS-B-SP/SPH** This parameter is valid when SP034 (SFNC2) bit0 is set to "0". Set the appropriate motor number from the standard motors listed below.	0000 to FFFF HEX setting	0000

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			

For MDS-B-SPJ2

This is valid when SP034 (SFNC2) bit 0 is set to 0.
Refer to the following standard motors, and set the applicable motor number.

Parameter setting	Motor type	Maximum speed	Corresponding amplifier
1000			
1001	SJ-P0.2A	10000 r/min	SPJ2-02
1002	SJ-P0.4A	10000 r/min	SPJ2-04
1003	SJ-P0.75A	10000 r/min	SPJ2-075
1004	SJ-P1.5A	10000 r/min	SPJ2-15
1005	SJ-P2.2A	8000 r/min	SPJ2-22
1006	SJ-P3.7A	8000 r/min	SPJ2-37
1007	SJ-PF5.5-01	8000 r/min	SPJ2-55
1008	SJ-PF7.5-01	8000 r/min	SPJ2-75
1009	SJ-PF11-01	6000 r/min	SPJ2-110/110C

No.	Items			Details	Setting range	Standard setting
21 0041 (PR)	SP041	PTYP	Power supply type	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.	0000 to FFFF HEX setting	0000

For MDS-B-SP/SPH

<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
1
2
3
4
5
6
7</td><td>ptyp</td><td colspan="2">Set the power supply type.
(Select the type from the following table and set.)
<table>
<tr><th>ptyp</th><th>Power supply type</th><th>ptyp</th><th>Power supply type</th></tr>
<tr><td>00</td><td>Not connected</td><td>81</td><td>CR-10</td></tr>
<tr><td>04</td><td>CV-37</td><td>82</td><td>CR-15</td></tr>
<tr><td>06</td><td>CV-55</td><td>83</td><td>CR-22</td></tr>
<tr><td>08</td><td>CV-75</td><td>84</td><td>CR-37</td></tr>
<tr><td>11</td><td>CV-110</td><td>86</td><td>CR-55</td></tr>
<tr><td>15</td><td>CV-150</td><td>88</td><td>CR-75</td></tr>
<tr><td>19</td><td>CV-185</td><td>89</td><td>CR-90</td></tr>
<tr><td>22</td><td>CV-220</td><td></td><td></td></tr>
<tr><td>26</td><td>CV-260</td><td></td><td></td></tr>
<tr><td>30</td><td>CV-300</td><td></td><td></td></tr>
<tr><td>37</td><td>CV-370</td><td></td><td></td></tr>
</table>
(Note 1) When using an external emergency stop in the MDS-B-CV, set a value of the above setting values with "40" added.
(Example) When using an external emergency stop in CV-260,
setting value = 0026 + 0040 = 0066</td></tr>
<tr><td>8
9
A
B</td><td>rtyp</td><td colspan="2">Set "0" if the power supply unit is a current regeneration type.
If the power supply unit is a resistance regeneration type, set the type of resistance being used.
(Select the type from the following table and set.)
<table>
<tr><th>rtyp</th><th>External regenerative resistance type</th><th>Resist-ance value (Ω)</th><th>Watts (W)</th></tr>
<tr><td>00</td><td>Not connected power supply</td><td>-</td><td>-</td></tr>
<tr><td>01</td><td>GZG200W260HMJ</td><td>26</td><td>80</td></tr>
<tr><td>02</td><td>GZG300W130HMJ∗2</td><td>26</td><td>150</td></tr>
<tr><td>03</td><td>MR-RB30</td><td>13</td><td>300</td></tr>
<tr><td>04</td><td>MR-RB50</td><td>13</td><td>500</td></tr>
<tr><td>05</td><td>GZG200W200HMJ∗3</td><td>6.7</td><td>350</td></tr>
<tr><td>06</td><td>GZG300W200HMJ∗3</td><td>6.7</td><td>500</td></tr>
<tr><td>07</td><td>R-UNIT-1</td><td>30</td><td>700</td></tr>
<tr><td>08</td><td>R-UNIT-2</td><td>15</td><td>700</td></tr>
<tr><td>09</td><td>R-UNIT-3</td><td>15</td><td>2.1K</td></tr>
</table></td></tr>
<tr><td>C
D
E
F</td><td>amp</td><td colspan="2">Set the driver model number.
0: MDS-A-V1/V2/SP, MDS-B-V1/V2/V3/SP
1: MDS-A-SVJ
2: MDS-A-SPJ</td></tr>
</table>

(Continued on the next page.)

For MDS-B-SPJ2 (Continued from the previous page.)

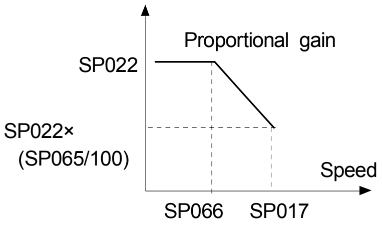
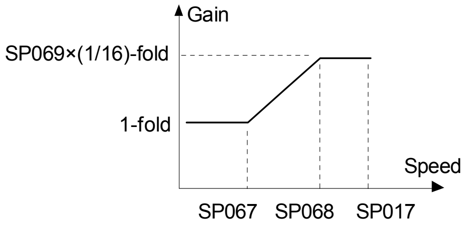
Select a value from the following table according to the regenerative resistance being used.

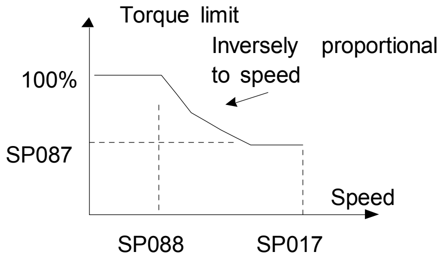
Setting value	Regenerative resistance type	Resistance value (Ω)	Capacity (W)
0000	–	–	–
2000	Not connected	–	–
2100	FCUA-RB04	200	60
2200	FCUA-RB075	100	80
2300	FCUA-RB15	60	120
2400	FCUA-RB22	40	155
2500	FCUA-RB37	25	185
2600	FCUA-RB55	20	340
2700	FCUA-RB75/2	30/15	340/680
2800	R–UNIT–1	30	700
2900	R–UNIT–2	15	700
2A00	R–UNIT–3	15	2100
2B00	R–UNIT–4	10	2100
2C00	R–UNIT–5	10	3100

(Note 1) This setting is used when using one FCUA-RB75/2 and when using two in parallel.

No.	Items			Details	Setting range	Standard setting
21 0042 (PR)	SP042	CRNG	C-axis detector range	This parameter is used to set the C-axis detector range. Set "0" for this parameter.	0 to 7	0
21 0043 (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
21 0044 (PR)	SP044	TRANS	NC communication frequency	Set a frequency of data communication with NC.	0 to 32767	Standard: 0 Special: 1028
21 0045	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
21 0046 (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
21 0047 (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
21 0048 (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

No.	Items			Details	Setting range	Standard setting
21 0049	SP049	TLM2	Torque limit 2	Set the torque limit rate for the torque limit signal 010.	1 to 120 (%)	20
21 0050	SP050	TLM3	Torque limit 3	Set the torque limit rate for the torque limit signal 011.	1 to 120 (%)	30
21 0051	SP051	TLM4	Torque limit 4	Set the torque limit rate for the torque limit signal 100.	1 to 120 (%)	40
21 0052	SP052	TLM5	Torque limit 5	Set the torque limit rate for the torque limit signal 101.	1 to 120 (%)	50
21 0053	SP053	TLM6	Torque limit 6	Set the torque limit rate for the torque limit signal 110.	1 to 120 (%)	60
21 0054	SP054	TLM7	Torque limit 7	Set the torque limit rate for the torque limit signal 111.	1 to 120 (%)	70
21 0055 (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
21 0056	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
21 0057 (PR)	SP057	STOD	Fixed control constant	Set by Mitsubishi. Set "0" unless designated in particular.	0	0
21 0058 (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.	0 to 32767 (r/min)	0
21 0059 (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 damaged with burning if the value of this parameter is too small.	50 to 10000 (ms)	150
21 0060 (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
21 0061 (PR)	SP061	MKIL	Current limit value after winding changeover	Set the current limit value for operation during a period defined in SP060 (MKT2) after completion of contactor switching at winding changeover.	0 to 120 (%)	75
21 0062	SP062			Not used. Set to "0".	0	0
21 0063 (PR)	SP063	OLT	Overload alarm detection time	Set the time constant for detection of the motor overload alarm.	0 to 1000 (s)	60
21 0064 (PR)	SP064	OLL	Overload alarm detection level	Set the detection level of the motor overload alarm.	0 to 120 (%)	110
21 0065 (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>21 0066
(PR)</td><td>SP066</td><td>VCSN1</td><td>Change starting speed of variable speed loop proportional gain</td><td>Set the speed for starting change of speed loop proportional gain.
 </td><td>0 to 32767
(r/min)</td><td>0</td></tr>
<tr><td>21 0067
(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>21 0068
(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>21 0069
(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>21 0070</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>21 0071
(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>21 0072
(PR)</td><td>SP072</td><td>VR2WB</td></tr>
<tr><td>21 0073
(PR)</td><td>SP073</td><td>VR2GN</td></tr>
<tr><td>21 0074
(PR)</td><td>SP074</td><td>IGDEC</td></tr>
<tr><td>21 0075</td><td>SP075</td><td>R2KWS</td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
21 0076	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
21 0077	SP077	TDSL	Fixed control constant	Set by Mitsubishi. Set "0" unless designated in particular.	0	0
21 0078 (PR)	SP078	FPWM				
21 0079 (PR)	SP079	ILMT				
21 0080	SP080					
21 0081	SP081	LMCA				
21 0082	SP082	LMCB				
21 0083 to 21 0086	SP083 to SP086			Not used. Set to "0".	0	0
21 0087 (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
21 0088 (PR)	SP088	DIQN	Speed for starting change of variable torque limit magnification at deceleration	Set the speed for starting change of torque limit value at deceleration.  	0 to 32767 (r/min)	3000
21 0089	SP089			Not used. Set to "0".	0	0
21 0090	SP090			Not used. Set to "0".	0	0
21 0091	SP091	OFSN	Motor PLG forward rotation offset compensation	Set the PLG offset value for the forward rotation. Normally set to "0".	–2048 to 2047 (–1mv)	0
21 0092	SP092	OFSI	Motor PLG reverse rotation offset compensation	Set the PLG offset value for the reverse rotation. Normally set to "0".	–2048 to 2047 (–1mv)	0
21 0093 (PR)	SP093	ORE	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>21 0094
(PR)</td><td>SP094</td><td>LMAV</td><td>Load meter output filter</td><td>Set the filter time constant of load meter output.
When "0" is set, a filter time constant is set to 100ms.</td><td>0 to 32767
(2ms)</td><td>0</td></tr>
<tr><td>21 0095
(PR)</td><td>SP095</td><td>VFAV</td><td>Fixed control constant</td><td>Set by Mitsubishi.
Set "0" unless designated in particular.</td><td>0</td><td>0</td></tr>
<tr><td>21 0096
(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>21 0097
(PR)</td><td>SP097</td><td>SPECO</td><td>Orientation specification</td><td>For MDS-B-SPJ2
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 rowspan="2" colspan="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>
(Continued on the next page.)</td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
</table>

For others (Continued from the previous page.)

Set the orientation specifications in bit units.

F	E	D	C	B	A	9	8
ostp	orze	ksft	gchg		ips2	zdir	

7	6	5	4	3	2	1	0
vg8x	mdir	fdir	osc1	pyfx	dmin	odi2	odi1

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

bit	Name	Meaning when set to 0	Meaning when set to 1
0	odi1	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)	
1	odi2		
2	dmin	Orientation in-position advance invalid	Orientation in-position advance valid
3	pyfx	Excitation min. (50%) during orientation servo lock invalid	Excitation min. (50%) during orientation servo lock valid
4	osc1	Fixed control bit	
5	fdir	Encoder detector polarity: +	Encoder detector polarity: –
6	mdir	Fixed control bit	
7	vg8x		
8			
9	zdir	Fixed control bit	
A	ips2	2nd in-position invalid	2nd in-position valid
B			
C	gchg	Fixed control bit	
D	ksft		
E	orze		
F	ostp		

		In-position advance (bit 2)	
		0 (invalid)	1 (valid)
Second position	0 (Invalid)	In-position signal in OINP width=1 Control output 4/ bit 4=1 Second in-position signal=0 Control output 4/ bit F=1	In-position signal in OINP width=1 Control output 4/ bit 4=1 Second in-position signal=0 Control output 4/ bit F=0
	1 (Valid)		In-position signal in OINP width=1 Control output 4/ bit 4=1 Second in-position signal=0 Control output 4/ bit F=0

No.	Items			Details	Setting range	Standard setting
21 0098 (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
21 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
21 0100 (PR)	SP100	VGOD	Orientation mode speed loop gain delay advance term	Set the a loop gain delay advance gain in orientation mode. When this parameter is set to "0", PI control is exercised.	0 to 1000 (0.1 1/s)	15

No.	Items			Details	Setting range	Standard setting
21 0101 (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
21 0102 (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
21 0103 (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
21 0104 (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
21 0105 (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
21 0106	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
21 0107	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
21 0108	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
21 0109 (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
21 0110 (PR)	SP110	WCML	Turret index command magnification	The integer magnification (gear ratio 1 : N) for the index position command (0 to 359) is set. This parameter is used only by SPH/SPJ2.	0 to 32767 (fold)	0
21 0111	SP111	WDEL	Turret index deceleration magnification	The magnification for the orientation deceleration rate is set using 256 as 1. This parameter is used only by SPH/SPJ2.	0 to 32767 (1/256 -fold)	0
21 0112	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". This parameter is used only by SPH/SPJ2.	0 to 32767 (r/min)	0

No.	Items			Details	Setting range	Standard setting
21 0113 (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
21 0114	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
21 0115	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
21 0116 to 21 0117	SP116 to SP117			Set by Mitsubishi. Set "0" unless designated in particular.	0	0
21 0118	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
21 0119	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
21 0120	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
21 0121	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

No.	Items			Details	Setting range	Standard setting
21 0122	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
21 0123	SP123	MGD0	Magnetic detector output peak value	This parameter is used for adjustment of orientation operation of the magnetic detector. Set the output peak value of the magnetic detector. If a gap between the detector 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
21 0124	SP124	MGD1	Magnetic detector linear zone width	This parameter is used for adjustment of orientation operation of the magnetic detector. Set the linear zone width of the magnetic detector. If the mounting radius of the 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
21 0125	SP125	MGD2	Magnetic detector switching point	This parameter is used for adjustment of orientation operation of the magnetic detector. Set the distance dimension from the target stop point at switching from position feedback to magnetic detector output. In common practices, assign a value that is approx. 1/2 of the value defined in SP124.	1 to 10000	Standard magnetizing element: 384 Small magnetizing element: 220
21 0126 to 21 0128	SP126 to SP128			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>21 0129
(PR)</td><td>SP129</td><td>SPECC</td><td>C-axis specifications</td><td>Set the C-axis 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>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><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></td><td>fdir</td><td></td><td></td><td></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></td><td></td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td>fdir</td><td>Position detector direction (positive)</td><td>Position detector direction (negative)</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>Fixed control bit</td><td></td></tr>
<tr><td>C</td><td>zrtd</td><td>Fixed control bit</td><td></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>21 0130</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>21 0131</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>

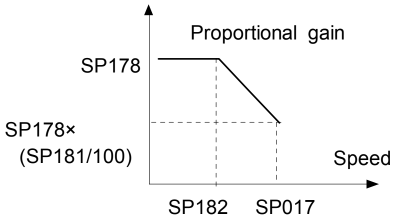
No.	Items			Details	Setting range	Standard setting
21 0132	SP132	PGC3	Third position loop gain for cutting on C-axis	Set the position loop gain when the third gain is selected for C-axis cutting.	1 to 100 (1/s)	15
21 0133	SP133	PGC4	Stop position loop gain for cutting on C-axis	Set the position loop gain for stopping when carrying out C-axis cutting.	1 to 100 (1/s)	15
21 0134 (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
21 0135 (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
21 0136 (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
21 0137 (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
21 0138 (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
21 0139 (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 exercised.	0 to 5000 (0.1 1/s)	15
21 0140 (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
21 0141 (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

No.	Items			Details	Setting range	Standard setting
21 0142 (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 exercised.	0 to 5000 (0.1 1/s)	15
21 0143 (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
21 0144 (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
21 0145 (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 exercised.	0 to 5000 (0.1 1/s)	15
21 0146 (PR)	SP146	VGCP4	Speed loop gain proportional 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
21 0147 (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
21 0148 (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 exercised.	0 to 5000 (0.1 1/s)	15
21 0149	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
21 0150	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
21 0151	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

No.	Items			Details	Setting range	Standard setting
21 0152	SP152	CPSTH	C-axis zero point return shift amount (high byte)			
21 0153	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
21 0154 (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
21 0155 (PR)	SP155	CODRH	Excessive error width on C-axis (high byte)			
21 0156 to 21 0158	SP156 to SP158			Not used. Set to "0".	0	0
21 0159	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
21 0160	SP160	CPY1	C-axis cutting variable excitation ratio	Set the minimum variable excitation ratio for cutting mode on the C-axis.	0 to 100 (%)	100
21 0161 (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
21 0162 (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
21 0163 (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
21 0164 (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
21 0165	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

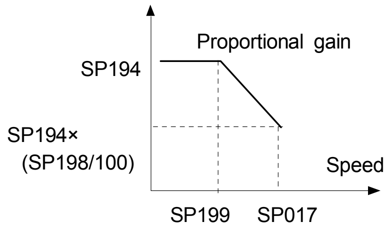
No.	Items			Details	Setting range	Standard setting
21 0166	SP166	PG3C	C-axis position loop gain 3	Set the third position loop gain when high-gain control is carried out for control of the C-axis. This parameter is applied to all the operation modes of C-axis control. When this function is not used, assign "0".	0 to 999 (1/s)	0
21 0167 (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
21 0168 (PR)	SP168	VPUG	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
21 0169 (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
21 0170 (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
21 0171 to 21 0176	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>21 0177
(PR)</td><td>SP177</td><td>SPECS</td><td>Spindle synchronous specifications</td><td>
For MDS-B-SPJ2
<p>Set the spindle synchronous specifications in bit units.</p>
<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></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></td><td></td><td>fclx</td></tr>
</table>
<p>(Note) Always set "0" for the empty bits.</p>
<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>
For others
<p>Set the spindle synchronous specifications in bit units.</p>
<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></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></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></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 colspan="2">(Used with SPJ)</td></tr>
</table>
</td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
21 0178 (PR)	SP178	VGSP	Spindle synchronous speed loop gain proportional term	Set the speed loop proportional gain in spindle synchronization mode.	0 to 1000 (1/s)	63
21 0179 (PR)	SP179	VGSI	Spindle synchronous speed loop gain integral term	Set the speed loop integral gain in spindle synchronization mode.	0 to 1000 (0.1 1/s)	60
21 0180 (PR)	SP180	VGSD	Spindle synchronous speed loop gain delay advance term	Set the speed loop delay advance gain in spindle synchronization mode. When this parameter is set to "0", PI control is exercised.	0 to 1000 (0.1 1/s)	15
21 0181 (PR)	SP181	VCGS	Target value of variable speed loop proportional gain at spindle synchronization	Set the magnification of speed loop proportional gain with respect to SP178 (VGSP) at the maximum speed defined in SP017 (TSP) at spindle synchronization.	0 to 100 (%)	100
21 0182 (PR)	SP182	VCSS	Change starting speed of variable speed loop proportional gain at spindle synchronization	Set the speed for starting change of speed loop proportional gain at spindle synchronization. 	0 to 32767 (r/min)	0
21 0183	SP183	SYNV	Sync matching speed at spindle synchronization	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
21 0184 (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
21 0185	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
21 0186 (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
21 0187 (PR)	SP187	IQGS	Current loop gain magnification1 at spindle synchronization	Set the magnification of current loop gain (torque component) at spindle synchronization.	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>21 0188
(PR)</td><td>SP188</td><td>IDGS</td><td>Current loop gain magnification 2 at spindle synchronization</td><td>Set the magnification of current loop gain (excitation component) at spindle synchronization.</td><td>1 to 1000
(%)</td><td>100</td></tr>
<tr><td>21 0189</td><td>SP189</td><td>PG2S</td><td>Position loop gain 2 at spindle synchronization</td><td>Set the second position loop gain when high-gain control is carried out at spindle synchronization.
When this parameter function is not used, assign "0".</td><td>0 to 999
(1/s)</td><td>0</td></tr>
<tr><td>21 0190</td><td>SP190</td><td>PG3S</td><td>Position loop gain 3 at spindle synchronization</td><td>Set the third position loop gain when high-gain control is carried out at spindle synchronization.
When this parameter function is not used, assign "0".</td><td>0 to 999
(1/s)</td><td>0</td></tr>
<tr><td>21 0191
to
21 0192</td><td>SP191
to
SP192</td><td></td><td></td><td>Not used. Set to "0".</td><td>0</td><td>0</td></tr>
<tr><td>21 0193
(PR)</td><td>SP193</td><td>SPECT</td><td>Synchronous tapping specifications</td><td>
For MDS-B-SPJ2
Set the synchronous 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></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></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>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></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>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>
(Continued on the next page.)
</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></td><td></td><td></td><td></td><td>
For others (Continued from the previous page.)
Set the synchronous 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>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>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>Synchronous tap 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></td><td></td></tr>
<tr><td>21 0194 (PR)</td><td>SP194</td><td>VGTP</td><td>Synchronous tapping speed loop gain proportional term</td><td>Set the speed loop proportional gain in synchronous tapping mode.</td><td>0 to 1000 (1/s)</td><td>63</td></tr>
<tr><td>21 0195 (PR)</td><td>SP195</td><td>VGTI</td><td>Synchronous tapping speed loop gain integral term</td><td>Set the speed loop integral gain in synchronous tapping mode.</td><td>0 to1000 (0.1 1/s)</td><td>60</td></tr>
<tr><td>21 0196 (PR)</td><td>SP196</td><td>VGTD</td><td>Synchronous tapping speed loop gain delay advance term</td><td>Set the speed loop delay advance gain in synchronous tapping mode.
When this parameter is set to "0", PI control is exercised.</td><td>0 to1000 (0.1 1/s)</td><td>15</td></tr>
<tr><td>21 0197</td><td>SP197</td><td></td><td></td><td>Not used. Set to "0".</td><td>0</td><td>0</td></tr>
<tr><td>21 0198 (PR)</td><td>SP198</td><td>VCGT</td><td>Target value of variable speed loop proportional gain at synchronous tapping</td><td>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.</td><td>0 to 100 (%)</td><td>100</td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
21 0199 (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
21 0200 (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
21 0201 (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
21 0202 (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
21 0203 (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
21 0204 to 21 0213	SP204 to SP213			Not used. Set to "0".	0	0
21 0214	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
21 0215	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
21 0216	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
21 0217	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

No.	Items			Details	Setting range	Standard setting
21 0218 (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
21 0219 (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
21 0220 (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
21 0221	SP221	PG2T	Position loop gain 2 at synchronous tapping	Set the second position loop gain when high-gain control is exercised during synchronous tapping. When this parameter is not used, set to "0".	0 to 999 (1/s)	0
21 0222	SP222	PG3T	Position loop gain 3 at synchronous tapping	Set the third position loop gain when high-gain control is exercised during synchronous tapping. When this parameter is not used, set to "0".	0 to 999 (1/s)	0
21 0223 to 21 0224	SP223 to SP224			Not used. Set to "0".	0	0
21 0225	SP225	OXKPH	Fixed control constant	Set by Mitsubishi. Set "0" unless designated in particular.	0	0
21 0226	SP226	OXKPL				
21 0227	SP227	OXVKP				
21 0228	SP228	OXVKI				
21 0229	SP229	OXSFT				
21 0230	SP230					
21 0231	SP231					
21 0232	SP232					
21 0233 (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
21 0234 (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
21 0235 (PR)	SP235	OBS2	Disturbance observer gain	Set the gain for the disturbance observer.	0 to 500 (%)	0

No.	Items			Details	Setting range	Standard setting
21 0236 to 21 0252	SP236 to SP252			Not used. Set to "0".	0	0
21 0253	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 "3.12.3 MDS-B-SP/SPH,SPJ2 Supplementary Explanation ".	–32768 to 32767	0
21 0254	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 "3.12.3 MDS-B-SP/SPH,SPJ2 Supplementary Explanation".	–32768 to 32767	0
21 0255	SP255	DA1MPY	DA output channel 1 magnification	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 "3.12.3 MDS-B-SP/SPH,SPJ2 Supplementary Explanation ".	–32768 to 32767 (1/256-fold)	0
21 0256	SP256	DA2MPY	DA output channel 2 magnification	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 "3.12.3 MDS-B-SP/SPH,SPJ2 Supplementary Explanation ".	–32768 to 32767 (1/256-fold)	0
21 0257 (PR) to 21 0320 (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

No.	Items			Details	Setting range	Standard setting
21 0321 (PR) to 21 0384 (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

3.12.3 MDS-B-SP/SPH,SPJ2 Supplementary Explanation (for D/A Output Functions)

(1) Outline

The D/A output function is mounted in the standard system in the MDS-A-SP/MDS-B-SP.
Using this D/A output function, the drive unit status and each data can be confirmed.

(2) Hardware specifications

- 2 channels
- 8 bit 0 to +10V
- Output pin CH 1: CN9-9 pin
  CH 2: CN9-19 pin
  GND: CN9-1.11 pin

(3) Parameters

Set the data No. and output magnification of each channel according to the parameters below.

Name	Details
SP253	D/A channel 1 data No.
SP254	D/A channel 2 data No.
SP255	D/A channel 1 output magnification
SP256	D/A channel 2 output magnification

(4) Output data No.

Set the No. of the data to be output in SP253 and SP254. A correlation of the output data and the data No. is shown below.

No. (setting value)	CH1		CH2	
	Output data	Units	Output data	Units
0	Speedometer output	Maximum speed at 10V	Load meter output	120% load at 10V
2	Current command	When actual data=4096, 100% conversion	Same as CH1	
3	Current feedback	When actual data=4096, 100% conversion		
4	Speed feedback	Actual data r/min		
6	Position droop low-order	Interpolation units (when actual data = 23040000, 360° conversion)		
7	Position droop high-order			
8	Position F△T low-order	Interpolation units/NC communication cycle		
9	Position F△T high-order			
10	Position command low-order	Interpolation units (when actual data = 23040000, 360° conversion)		
11	Position command high-order			
12	Feedback position low-order	Interpolation units (when actual data = 23040000, 360° conversion)		
13	Feedback position high-order			
80	Control input 1	Bit correspondence		
81	Control input 2			
82	Control input 3			
83	Control input 4			
84	Control output 1	Bit correspondence		
85	Control output 2			
86	Control output 3			
87	Control output 4			

(Note) The % of the current command and current feedback indicate 30min. rating = 100%.

(5) Setting the output magnification

Set the output magnification in SP255 and SP256.

$$\boxed{\text{Data} = \text{actual data} \times \frac{\text{SP255 or SP256}}{256}}$$

Using the expression above,

(a) Output data other than speedometer output and load meter output carries out the D/A output in Fig. 1.
(b) Speedometer output data and load meter output data carries out the D/A output in Fig. 2.

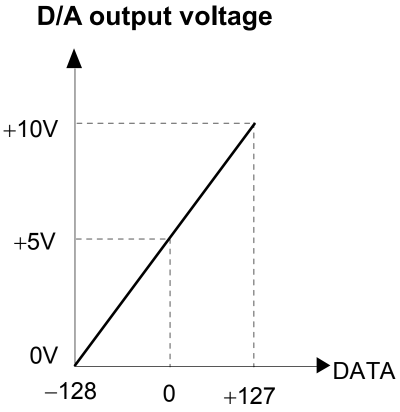


Fig. 1

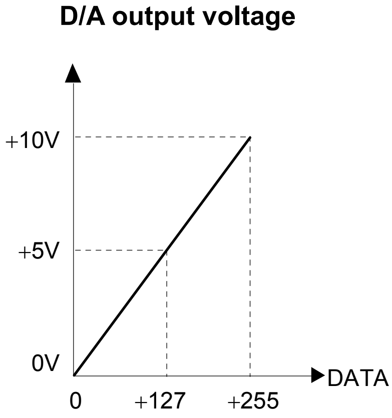


Fig. 2

(Example 1) Current command, current feedback
Data units are 100% converted when the actual data = 4096.
Therefore, for example, the actual data is output as shown below during +120% current feedback.

Actual data = 4096 × 1.2 = 4915

If "256" is set (magnification 1) in parameter SP255 (SP256), the D/A output voltage from Fig. 1 will be as shown below, exceeding the D/A output voltage maximum value.

5V + {4915 × 1 × (5V/128)} = 197V > 10V

Therefore, if (for example) "6" is set in parameter SP255 (SP256), the D/A output voltage will become as shown below, and data confirmation will be possible.

5V + {4915 × 6/256 × (5V/128)} = 9.5V < 10V

(Example 2) Speed feedback

Data units are r/min.

Therefore, at (for example) +2000r/min, the motor speed will be output as "2000".

If "256" is set (magnification 1) in parameter SP255 (SP256), the D/A output voltage from Fig. 1 will be as shown below, exceeding the D/A output voltage maximum value.

5V + {2000 x 1 x (5V/128)} = 83.125V > 10V

Therefore, if (for example) "16" is set in parameter SP255 (SP256), the D/A output voltage will become as shown below, and data confirmation will be possible.

5V + {2000 x 16/256 x (5V/128)} = 9.88V < 10V

(Example 3) Position droop

The data units are r/min. Data units are 100% converted when the actual data = 4096.

Therefore, for example, the actual data is output as shown below during the +0.1° position droop.

Actual data = 0.1 x 23040000/360 = 6400

If "256" is set (magnification 1) in parameter SP255 (SP256), the D/A output voltage from Fig. 1 will be as shown below, exceeding the D/A output voltage maximum value.

5V + {6400 x 1 x (5V/128)} = 255V > 10V

Therefore, if (for example) "5" is set in parameter SP255 (SP256), the D/A output voltage will become as shown below, and data confirmation will be possible.

5V + {2000 x 5/256 x (5V/128)} = 9.88V < 10V

(Example 4) Confirm the orientation complete signal (ORCF) in the control output 4L.

The data units are bit corresponding data.

Refer to the Instruction Manual for the meanings of the control output 4L bit corresponding signals.

The orientation complete signal (ORCF) corresponds to the control output 4L/bit 4.

Therefore, for example, the actual data is output as shown below when ORCF= ON.

bit 4 corresponding actual data = 2^4 = 16

If "256" is set (magnification 1) in parameter SP255 (SP256), the D/A output voltage from Fig. 1 will be as shown below, and data confirmation will be possible.

5V + {16 x 1 x (5V/128)} = 5.625V < 10V

Note that, if a bit other than bit4 is ON, the current of that bit will be added to the 6.25V shown above, and at the actual ORCF signal measurement will be as shown below, so confirm the changed voltage.

(5.625 V – 5V) = 0.625 V

3.13 MDS-C1-SP, SPM Spindle Parameters

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

MELDAS AC Servo and Spindle MDS-C1 Series Specifications Manual BNP-C3000

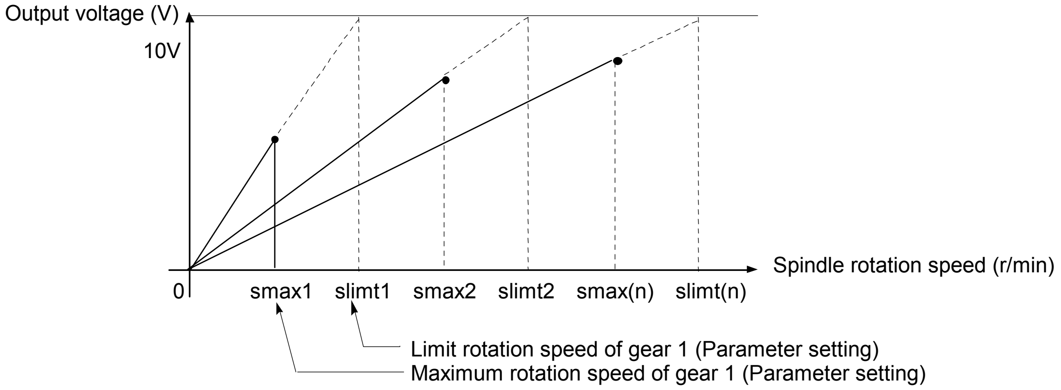
3.13.1 MDS-B-SP/SPH,SPJ2 Spindle Base Specifications Parameters

For parameters indicated with an "*" in the table, turn the NC power OFF after setting. The setting is validated after the power is turned ON again.
In the bit explanation below, set all the bits not used, including empty bits, to "0".

No.	Name		Details	Setting range	Standard setting
20 0001	Sp_axis_num*	Axis number	Set the control axis number of the spindle.	0 to maximum number of control axes	
20 0002	Slimit1	Limit speed Gear 00	Set the spindle speed for the maximum motor speed with gears 00, 01, 10, 11.	0 to 99999 (r/min)	
20 0003	Slimit2	Limit speed Gear 01			
20 0004	Slimit3	Limit speed Gear 10			
20 0005	Slimit4	Limit speed Gear 11			
20 0006	Smax1	Maximum speed Gear 00	Set the maximum spindle speed with gears 00, 01, 10, 11. Set to slimt ≥ smax.	0 to 99999 (r/min)	
20 0007	Smax2	Maximum speed Gear 01			
20 0008	Smax3	Maximum speed Gear 10			
20 0009	Smax4	Maximum speed Gear 11			
20 0010	Ssift1	Shift speed Gear 00	Set the spindle speed for gear shifting with gears 00, 01, 10, 11.	0 to 32767 (r/min)	
20 0011	Ssift2	Shift speed Gear 01			
20 0012	Ssift3	Shift speed Gear 10			
20 0013	Ssift4	Shift speed Gear 11			
20 0014	Stap1	Tap speed Gear 00	Set the maximum spindle speed during tap cycle with gears 00, 01, 10, 11.	0 to 99999 (r/min)	
20 0015	Stap2	Tap speed Gear 01			
20 0016	Stap3	Tap speed Gear 10			
20 0017	Stap4	Tap speed Gear 11			

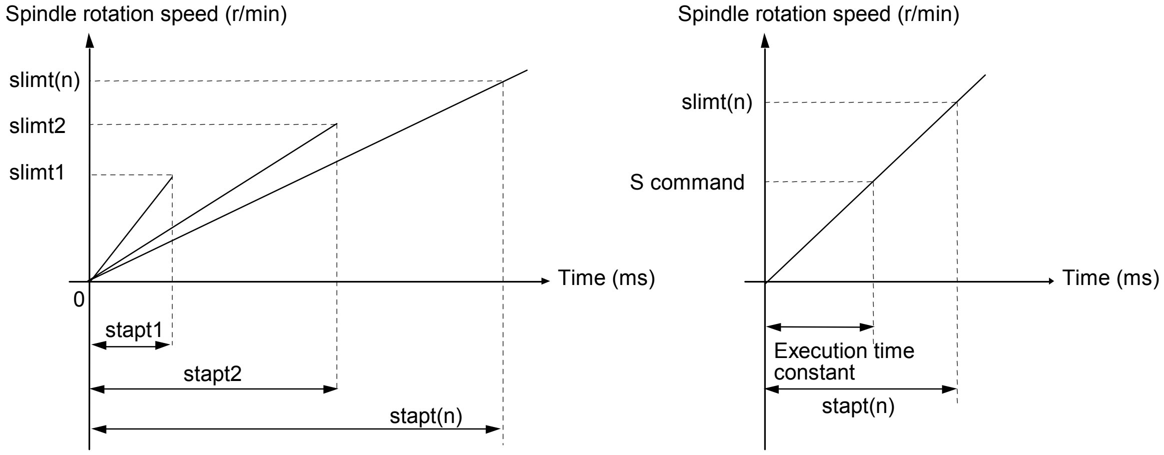
No.	Name		Details	Setting range	Standard setting
20 0018	Stapt1	Tap time constant Gear 00	Set time constants for constant inclination synchronous tap cycles for gears 00, 01, 10, 11 (linear acceleration/deceleration pattern).	0 to 5000 (ms)	
20 0019	Stapt2	Tap time constant Gear 01			
20 0020	Stapt3	Tap time constant Gear 10			
20 0021	Stapt4	Tap time constant Gear 11			

Relationship between spindle limit rotation speed and maximum spindle rotation speed



Set "0" for any unused gear.

Relation between the spindle limit rotation speed and the spindle tap time constant
(for the constant inclination synchronous tap cycle)



No.	Name		Details	Setting range	Standard setting
20 0022	Sori	Orientation 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)	
20 0023	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	
20 0024	Smini	Minimum 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 by this parameter.	0 to 32767 (r/min)	
20 0025	Serr	Spindle speed arrival detection width	Set the spindle speed arrival detection width. Obtain the value from the command rotation speed and rate set with this parameter. If the actual rotation speed of the spindle exceeds the detection width, "Upper limit over/lower limit over" will be output to the PLC.	0: Not check 1 to 99 (%)	
20 0026	Senc_pno	Encoder port number	Set the port number of the card connecting the encoder.	1 to 7 : DIO 8 to 16: RIO 17 : IOC	
20 0027	Sana_pno		(Not used.)	0	
20 0028	Spflg	Spindle connection information	bit2 1: Direct connection to encoder 0: Via passing HDLC connection axis bit0, 1, and 3 to 7 are not used.	0 to FF	
20 0029	Sana_no		(Not used.)	0	

No.	Name		Details	Setting range	Standard setting
20 0030	Sana_ofs		(Not used.)	0	
20 0031	Sana_gin		(Not used.)	0	
20 0089	Stap11	Tap rotation speed gear 00	Set the maximum rotation speed for the first step of the synchronous tap cycle multi-step acceleration/ deceleration in gear 00, 01, 10 and 11. (Linear acceleration/deceleration pattern)	0 to 99999 (r/min)	
20 0090	Stap12	Tap rotation speed gear 01			
20 0091	Stap13	Tap rotation speed gear 10			
20 0092	Stap14	Tap rotation speed gear 11			
20 0093	Stapt11	Tap time constant gear 00	Set the time constant for the first step of the synchronous tap cycle multi-step acceleration/ deceleration in gear 00, 01, 10 and 11. (Linear acceleration/deceleration pattern)	0 to 5000 (ms)	
20 0094	Stapt12	Tap time constant gear 01			
20 0095	Stapt13	Tap time constant gear 10			
20 0096	Stapt14	Tap time constant gear 11			

No.	Name		Details	Setting range	Standard setting
20 0097	Stap21	Tap rotation speed gear 00	Set the maximum rotation speed for the second step of the synchronous tap cycle multi-step acceleration/ deceleration in gear 00, 01, 10 and 11. (Linear acceleration/deceleration pattern)	0 to 99999 (r/min)	
20 0098	Stap22	Tap rotation speed gear 01			
20 0099	Stap23	Tap rotation speed gear 10			
20 0100	Stap24	Tap rotation speed gear 11			
20 0101	Stapt21	Tap time constant gear 00	Set the time constant for the second step of the synchronous tap cycle multi-step acceleration/ deceleration in gear 00, 01, 10 and 11. (Linear acceleration/deceleration pattern)	0 to 5000 (ms)	
20 0102	Stapt22	Tap time constant gear 01			
20 0103	Stapt23	Tap time constant gear 10			
20 0104	Stapt24	Tap time constant gear 11			
20 0105	Stapt31	Tap time constant gear 00	Set the time constant for the third step of the synchronous tap cycle multi-step acceleration/ deceleration in gear 00, 01, 10 and 11. (Linear acceleration/deceleration pattern)	0 to 5000 (ms)	
20 0106	Stapt32	Tap time constant gear 01			
20 0107	Stapt33	Tap time constant gear 10			
20 0108	Stapt34	Tap time constant gear 11			
20 0109	Stmax1	Maximum retract rotation speed gear 00	Set the maximum retract rotation speed for synchronous tap cycle multi-step acceleration/ deceleration in gear 00, 01, 10 and 11. (Linear acceleration/deceleration pattern)	0 to 99999 (r/min)	
20 0110	Stmax2	Maximum retract rotation speed gear 01			
20 0111	Stmax3	Maximum retract rotation speed gear 10			
20 0112	Stmax4	Maximum retract rotation speed gear 11			

3.13.2 MDS-C1-SP Spindle Parameters

For parameters marked with a (PR) in the tables, turn the CNC 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
21 0001	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
21 0002	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
21 0003	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
21 0004	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
21 0005 (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
21 0006	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
21 0007	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 to512	0
21 0008	SP008			Not used. Set to "0".	0	0
21 0009	SP009	PGT	Synchronized tapping Position loop gain	Set the spindle position loop gain in synchronized tapping mode.	1 to 100 (1/s)	15

No.	Items			Details	Setting range	Standard setting
21 0010	SP010	PGS	Spindle synchronous position loop gain	Set the spindle position loop gain in spindle synchronization mode.	1 to 100 (1/s)	15
21 0011 to 21 0016	SP011 to SP016			Use not possible.	0	0
21 0017 (PR)	SP017	TSP	Maximum motor speed	Set the maximum motor speed of the spindle.	1 to 32767 (r/min)	6000
21 0018 (PR)	SP018	ZSP	Motor zero speed	Set the motor speed for which zero-speed output is performed.	1 to 1000 (r/min)	50
21 0019 (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
21 0020 (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
21 0021	SP021	TLM1	Torque limit 1	Set the torque limit rate for torque limit signal 001.	0 to 120 (%)	10
21 0022 (PR)	SP022	VGNP 1	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
21 0023 (PR)	SP023	VGNI 1	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
21 0024	SP024			Use not possible.	0	0
21 0025 (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

No.	Items			Details	Setting range	Standard setting
21 0026 (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
21 0027 (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
21 0028 (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
21 0029 (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
21 0030 (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
21 0031 (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
21 0032 (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

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>21 0033
(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>hzs</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>sftk</td><td>dflt</td><td>1a2m</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>1a2m</td><td>1 amplifier 2 motor function: Invalid</td><td>1 amplifier 2 motor function: Valid</td></tr>
<tr><td>1</td><td>dflt</td><td>Default motor: Main</td><td>Default motor: Sub</td></tr>
<tr><td>2</td><td>sftk</td><td>SF-TK card invalid</td><td>SF-TK card 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>pyoff</td><td colspan="2" rowspan="3">This is used by Mitsubishi. Set to "0" unless particularly designated.</td></tr>
<tr><td>7</td><td>pyst</td></tr>
<tr><td>8</td><td>pychg</td></tr>
<tr><td>9</td><td>pycal</td><td>(Conventional specifications)</td><td>High-speed rate deceleration method valid for minimum excitation rate</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>hzs</td><td>Gate OFF by high-cycle zero speed invalid</td><td>Gate OFF by high-cycle zero speed valid</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>
(Note) When SPH is used, bit 0 and bit 1 will be invalid.</td><td>0000 to FFFF
HEX setting</td><td>0000</td></tr>
<tr><td>21 0034
(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>Winding switch function invalid</td><td>Winding switch function valid</td></tr>
<tr><td>3</td><td>mkc2</td><td>Coil changeover function 2 invalid</td><td>Coil changeover function 2 valid (Turns ON simultaneously with bit 2)</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>
(Note) bit3 mkc2 must be handled on the NC side.</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>21 0035
(PR)</td><td>SP035</td><td>SFNC3</td><td>Spindle function 3</td>
<td>Set the spindle function 3 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></td><td></td><td></td><td></td><td></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></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 rowspan="8">(Used with SPJ.)</td><td rowspan="8"></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>
<tr>
<td>21 0036
(PR)</td><td>SP036</td><td>SFNC4</td><td>Spindle function 4</td>
<td>Set the spindle function 4 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></td><td></td><td></td><td></td><td>dslm</td><td>dssm</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>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>
</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>21 0037
(PR)</td><td>SP037</td><td>SFNC5</td><td>Spindle function 5</td><td>Set the spindle function 5 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>splg</td><td>dplg</td><td></td><td></td><td></td><td>noplg</td><td>nsno</td><td>nosg</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></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>

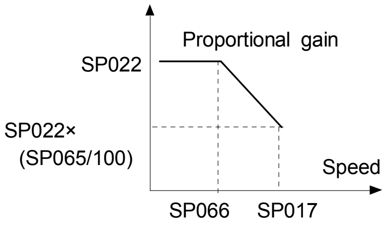
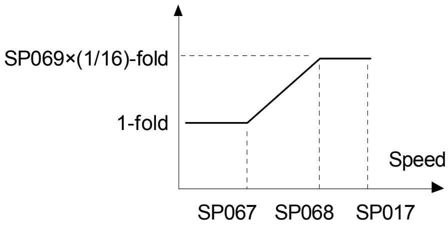
<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>21 0038
(PR)</td><td>SP038</td><td>SFNC6</td><td>Spindle function 6</td><td>Set the spindle function 6 in bit units.
<table>
<tr><th>F</th><th>E</th><th>D</th><th>C</th><th>B</th><th>A</th><th>9</th><th>8</th></tr>
<tr><td>oplp</td><td>lmx</td><td>iqsv</td><td>XFzs</td><td>dcsn</td><td>lmnp</td><td>pl80</td><td>sdt2</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>vfbs</td><td>orm</td><td>adin</td><td>tdn</td><td>plg2</td><td>pftm</td><td></td><td>alty</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>alty</td><td>Deceleration stop during special alarm invalid</td><td>Deceleration stop during special alarm valid</td></tr>
<tr><td>1</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>pftm</td><td>Encoder feedback serial communication invalid</td><td>Encoder feedback serial communication valid</td></tr>
<tr><td>3</td><td>plg2</td><td>Semi-closed pulse output signal ×2 invalid</td><td>Semi-closed pulse output signal ×2 valid</td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td>adin</td><td>Interpolation during thread cutting invalid</td><td>Interpolation during thread cutting valid</td></tr>
<tr><td>6</td><td>orm</td><td>Orientation start memo invalid</td><td>Orientation start memo valid</td></tr>
<tr><td>7</td><td>vfbs</td><td colspan="2">This is used by Mitsubishi.
Set to "0" unless particularly designated.</td></tr>
<tr><td>8</td><td>sdt2</td><td>(Follows SFNC6-bitC setting)</td><td>Set output 2 to 2nd speed detection output</td></tr>
<tr><td>9</td><td>pl80</td><td>MHE90K detector's 180 wave PLG</td><td>180 wave PLG other than MHE90K</td></tr>
<tr><td>A</td><td>lmnp</td><td colspan="2">This is used by Mitsubishi.
Set to "0" unless particularly designated.</td></tr>
<tr><td>B</td><td>dcsn</td><td>Dual cushion during acceleration/ deceleration valid</td><td>Dual cushion during acceleration/ deceleration invalid</td></tr>
<tr><td>C</td><td>XFzs</td><td>Set output 2 to MP scale low (L) speed mode</td><td>Set output 2 to zero speed output</td></tr>
<tr><td>D</td><td>iqsv</td><td colspan="2" rowspan="2">This is used by Mitsubishi.
Set to "0" unless particularly designated</td></tr>
<tr><td>E</td><td>lmx</td></tr>
<tr><td>F</td><td>oplp</td><td>Open loop operation invalid</td><td>Open loop operation valid</td></tr>
</table></td><td>0000 to FFFF
HEX setting</td><td>0000</td></tr>
<tr><td>21 0039
(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>SP-075</td></tr>
<tr><td>0002</td><td>SP-15</td></tr>
<tr><td>0003</td><td>SP-22</td></tr>
<tr><td>0004</td><td>SP-37</td></tr>
<tr><td>0005</td><td>SP-55</td></tr>
<tr><td>0006</td><td>SP-75</td></tr>
<tr><td>0007</td><td>SP-110</td></tr>
<tr><td>0008</td><td>SP-150</td></tr>
<tr><td>0009</td><td>SP-185</td></tr>
<tr><td>000A</td><td>SP-220</td></tr>
<tr><td>000B</td><td>SP-260</td></tr>
<tr><td>000C</td><td>SP-300</td></tr>
<tr><td>000D</td><td>SP (H)-370</td></tr>
<tr><td>000E</td><td>SP (H)-450</td></tr>
<tr><td>000F</td><td>SP-04</td></tr>
<tr><td>0010</td><td>SP-550</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>21 0040
(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.
<table>
<tr><th>Parameter setting</th><th>Motor type</th><th>Maximum speed</th><th>Corre-sponding amplifier</th></tr>
<tr><td>0000</td><td></td><td></td><td></td></tr>
<tr><td>0001</td><td>SJ-2.2A</td><td>10000 r/min</td><td>SP-22</td></tr>
<tr><td>0002</td><td>SJ-3.7A</td><td>10000 r/min</td><td>SP-37</td></tr>
<tr><td>0003</td><td>SJ-5.5A</td><td>8000 r/min</td><td>SP-55</td></tr>
<tr><td>0004</td><td>SJ-7.5A</td><td>8000 r/min</td><td>SP-75</td></tr>
<tr><td>0005</td><td>SJ-11A</td><td>6000 r/min</td><td>SP-110</td></tr>
<tr><td>0006</td><td>SJ-15A</td><td>6000 r/min</td><td>SP-150</td></tr>
<tr><td>0007</td><td>SJ-18.5A</td><td>6000 r/min</td><td>SP-185</td></tr>
<tr><td>0008</td><td>SJ-22A</td><td>4500 r/min</td><td>SP-220</td></tr>
<tr><td>0009</td><td>SJ-26A</td><td>4500 r/min</td><td>SP-260</td></tr>
<tr><td>000A</td><td>SJ-30A</td><td>4500 r/min</td><td>SP-300</td></tr>
<tr><td>000B</td><td></td><td></td><td></td></tr>
<tr><td>000C</td><td></td><td></td><td></td></tr>
<tr><td>000D</td><td></td><td></td><td></td></tr>
<tr><td>000E</td><td></td><td></td><td></td></tr>
<tr><td>000F</td><td></td><td></td><td></td></tr>
<tr><td>0010</td><td></td><td></td><td></td></tr>
<tr><td>0011</td><td>SJ-N0.75A</td><td>10000 r/min</td><td>SP-075</td></tr>
<tr><td>0012</td><td>SJ-N1.5A</td><td>10000 r/min</td><td>SP-15</td></tr>
<tr><td>0013</td><td>SJ-N2.2A</td><td>10000 r/min</td><td>SP-22</td></tr>
<tr><td>0014</td><td>SJ-N3.7A</td><td>10000 r/min</td><td>SP-37</td></tr>
<tr><td>0015</td><td>SJ-N5.5A</td><td>8000 r/min</td><td>SP-55</td></tr>
<tr><td>0016</td><td>SJ-N7.5A</td><td>8000 r/min</td><td>SP-75</td></tr>
<tr><td>0017</td><td></td><td></td><td></td></tr>
<tr><td>0018</td><td></td><td></td><td></td></tr>
<tr><td>0019</td><td></td><td></td><td></td></tr>
<tr><td>001A</td><td></td><td></td><td></td></tr>
<tr><td>001B</td><td>SJ-J2.2A</td><td>10000 r/min</td><td>SP-22</td></tr>
<tr><td>001C</td><td>SJ-J3.7A</td><td>10000 r/min</td><td>SP-37</td></tr>
<tr><td>001D</td><td>SJ-J5.5A</td><td>8000 r/min</td><td>SP-55</td></tr>
<tr><td>001E</td><td>SJ-J7.5A</td><td>8000 r/min</td><td>SP-75</td></tr>
<tr><td>001F</td><td></td><td></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>21 0041
(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>
</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 colspan="8">ptyp</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>ptyp</td><td colspan="2">Set the power supply type.
(Refer to "3.13.4 (2) Power supply type" for details.)

When using CV of 22kW or more with a spindle of large capacity (37kW or more), also turn the bit 8 ON.
(Example) Setting value = CV370 + SP370 = 0137</td></tr>
<tr><td>1</td><td></td><td colspan="2"></td></tr>
<tr><td>2</td><td></td><td colspan="2"></td></tr>
<tr><td>3</td><td></td><td colspan="2"></td></tr>
<tr><td>4</td><td></td><td colspan="2"></td></tr>
<tr><td>5</td><td></td><td colspan="2"></td></tr>
<tr><td>6</td><td></td><td colspan="2">Set "1" if the power supply external emergency stop is valid.
(CV rotary switch is 4 or 5)</td></tr>
<tr><td>7</td><td></td><td colspan="2">Set "1" if the power supply unit is a resistance regeneration type.</td></tr>
<tr><td>8</td><td>rtyp</td><td colspan="2">Set "0" if the power supply unit is a current regeneration type.
If the power supply unit is a resistance regeneration type, set the type of resistance being used.
(Refer to "3.13.4 (3) Regenerative resistance type" for details.)</td></tr>
<tr><td>9</td><td></td><td colspan="2"></td></tr>
<tr><td>A</td><td></td><td colspan="2"></td></tr>
<tr><td>B</td><td></td><td colspan="2"></td></tr>
<tr><td>C</td><td>amp</td><td colspan="2">Set the driver model number.
0: MDS-C1-V1/V2/SP, MDS-B-V1/V2/SP,MDS-A-V1/V2/SP
1: MDS-B-SVJ2, MDS-A-SVJ
2: MDS-B-SPJ2, MDS-A-SPJ</td></tr>
<tr><td>D</td><td></td><td colspan="2"></td></tr>
<tr><td>E</td><td></td><td colspan="2"></td></tr>
<tr><td>F</td><td></td><td colspan="2"></td></tr>
</table></td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
<tr><td>21 0042
(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>
<tr><td>21 0043
(PR)</td><td>SP043</td><td>TRNG</td><td>Synchronous tapping, spindle synchronous detector range</td><td>This parameter is used to set the synchronous tapping or spindle synchronous detector range.
Set "0" for this parameter.</td><td>0 to 7</td><td>0</td></tr>
<tr><td>21 0044
(PR)</td><td>SP044</td><td>TRANS</td><td>NC communication 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>21 0045</td><td>SP045</td><td>CSNT</td><td>Dual cushion timer</td><td>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.</td><td>0 to 1000 (ms)</td><td>0</td></tr>
<tr><td>21 0046
(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>
</table>

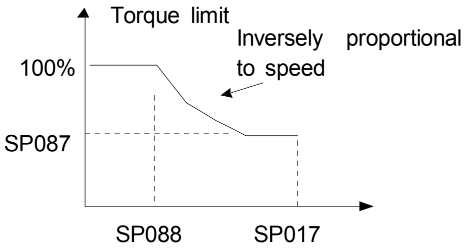
No.	Items			Details	Setting range	Standard setting
21 0047 (PR)	SP047	SDTR	Speed detection reset value	Set the reset hysteresis width for a speed detection set value defined in SP020 (SDTS).	0 to 1000 (r/min)	30
21 0047 (PR)	SP047	SDTR	Speed detection reset value	Set the reset hysteresis width for a speed detection set value defined in SP020 (SDTS).	0 to 1000 (r/min)	30
21 0048 (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
21 0049	SP049	TLM2	Torque limit 2	Set the torque limit rate for the torque limit signal 010.	1 to 120 (%)	20
21 0050	SP050	TLM3	Torque limit 3	Set the torque limit rate for the torque limit signal 011.	1 to 120 (%)	30
21 0051	SP051	TLM4	Torque limit 4	Set the torque limit rate for the torque limit signal 100.	1 to 120 (%)	40
21 0052	SP052	TLM5	Torque limit 5	Set the torque limit rate for the torque limit signal 101.	1 to 120 (%)	50
21 0053	SP053	TLM6	Torque limit 6	Set the torque limit rate for the torque limit signal 110.	1 to 120 (%)	60
21 0054	SP054	TLM7	Torque limit 7	Set the torque limit rate for the torque limit signal 111.	1 to 120 (%)	70
21 0055 (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
21 0056	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
21 0057 (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
21 0058 (PR)	SP058	SDT2	Fixed control constant	Set by Mitsubishi. Set "0" unless designated in particular.	0	0
21 0059 (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
21 0060 (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
21 0061 (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
21 0062	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>21 0063
(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>21 0064
(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>21 0065
(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>21 0066
(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>21 0067
(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>21 0068
(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>21 0069
(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>21 0070</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>21 0071 (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>21 0072 (PR)</td><td>SP072</td><td>VR2WB</td></tr>
<tr><td>21 0073 (PR)</td><td>SP073</td><td>VR2GN</td></tr>
<tr><td>21 0074 (PR)</td><td>SP074</td><td>IGDEC</td></tr>
<tr><td>21 0075</td><td>SP075</td><td>R2KWS</td><td></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>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><td></td><td></td></tr>
<tr><td>21 0076</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>21 0077 (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>21 0078 (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>21 0079 (PR)</td><td>SP079</td><td>ILMT</td></tr>
<tr><td>21 0080</td><td>SP080</td><td></td><td></td><td>Use not possible.</td><td>0</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>21 0081</td><td>SP081</td><td>LMCA</td><td rowspan="3">Fixed control constant</td><td rowspan="3">This is used by Mitsubishi.
Set to "0" unless particularly designated.</td><td rowspan="3">0</td><td rowspan="3">0</td></tr>
<tr><td>21 0082</td><td>SP082</td><td>LMCB</td></tr>
<tr><td>21 0083</td><td>SP083</td><td></td></tr>
<tr><td>21 0084
to
21 0086</td><td>SP084
to
SP086</td><td></td><td></td><td>Use not possible.</td><td>0</td><td>0</td></tr>
<tr><td>21 0087
(PR)</td><td>SP087</td><td>DIQM</td><td>Target value of variable torque limit magnification at deceleration</td><td>Set the minimum value of variable torque limit at deceleration.</td><td>0 to 150
(%)</td><td>75</td></tr>
<tr><td>21 0088
(PR)</td><td>SP088</td><td>DIQN</td><td>Speed for starting change of variable torque limit magnification at deceleration</td><td>Set the speed where the torque limit value at deceleration starts to change.
 </td><td>0 to 32767
(r/min)</td><td>3000</td></tr>
<tr><td>21 0089</td><td>SP089</td><td></td><td></td><td>Use not possible.</td><td>0</td><td>0</td></tr>
<tr><td>21 0090</td><td>SP090</td><td></td><td></td><td>Use not possible.</td><td>0</td><td>0</td></tr>
<tr><td>21 0091</td><td>SP091</td><td>OFSN</td><td>Motor PLG forward rotation offset compensation</td><td>Set the PLG offset value for the forward rotation.
Normally set to "0".</td><td>–2048 to 2047
(–1mv)</td><td>0</td></tr>
<tr><td>21 0092</td><td>SP092</td><td>OFSI</td><td>Motor PLG reverse rotation offset compensation</td><td>Set the PLG offset value for the reverse rotation.
Normally set to "0".</td><td>–2048 to 2047
(–1mv)</td><td>0</td></tr>
<tr><td>21 0093
(PR)</td><td>SP093</td><td>ORE</td><td>Tolerable pulse check error</td><td>Set this when detecting the pulse detector's pulse mistakes.
(Valid only for full close control.)</td><td>0 to 32767</td><td>0</td></tr>
<tr><td>21 0094
(PR)</td><td>SP094</td><td>LMAV</td><td>Load meter output filter</td><td>Set the filter time constant of load meter output.
When "0" is set, a filter time constant is set to 100ms.</td><td>0 to 32767
(2ms)</td><td>0</td></tr>
<tr><td>21 0095
(PR)</td><td>SP095</td><td>VFAV</td><td>Fixed control constant</td><td>Set by Mitsubishi.
Set "0" unless designated in particular.</td><td>0</td><td>0</td></tr>
<tr><td>21 0096
(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>
</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>21 0097
(PR)</td><td>SP097</td><td>SPECO</td><td>Orientation specification</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>zdir</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>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>
<tr><td>21 0098
(PR)</td><td>SP098</td><td>VGOP</td><td>Speed loop gain proportional 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>63</td></tr>
<tr><td>21 0099
(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>21 0100
(PR)</td><td>SP100</td><td>VGOD</td><td>Orientation mode speed loop gain delay advance term</td><td>Set a loop gain delay advance gain in orientation 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>
</table>

No.	Items			Details	Setting range	Standard setting
21 0101 (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
21 0102 (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
21 0103 (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
21 0104 (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
21 0105 (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
21 0106 (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
21 0107	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
21 0108	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
21 0109	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
21 0110	SP110			Use not possible.		0
21 0111	SP111			Use not possible.		0
21 0112	SP112			Use not possible.		0
21 0113	SP113			Use not possible.		0

No.	Items			Details	Setting range	Standard setting
21 0114	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
21 0115	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
21 0116	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
21 0117	SP117	ORUT		This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
21 0118	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
21 0119	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
21 0120	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
21 0121	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

No.	Items			Details	Setting range	Standard setting
21 0122	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
21 0123	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
21 0124	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
21 0125	SP125	MGD2	Magnetic sensor switching point	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.	1 to 10000	Standard magnetizing element: 384 Small magnetizing element: 220
21 0126 to 21 0128	SP126 to SP128			Use not possible.	0	0

No.	Items			Details	Setting range	Standard setting
21 0129 (PR)	SP129	SPECC	C-axis specifica-tions	Set the C-axis specifications in bit units.		0000

F	E	D	C	B	A	9	8
zrtn	ptyp	fb9x	zrtd	zrn2		zdir	ztyp

7	6	5	4	3	2	1	0
vg8x		fdir		phos	rtrn	adin	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 (Gear 1 : 1 only)
1	adin	Interpolation A/D compensation invalid	Interpolation A/D compensation valid
2	rtrn	Position monitor during ready OFF invalid	Position monitor during ready OFF valid
3	phos	Normal (no compensation)	Vx4 synchronization compensation valid
4			
5	fdir	Position detector polarity (+)	Position detector polarity (–)
6			
7	vg8x	Speed gain × 1/8 during torque limit valid	Speed gain × 1/8 during torque limit invalid
8	ztyp	Z-phase type: Normal start up	Z-phase type: Start up only
9	zdir	Z-phase rising polarity (+)	Z-phase rising polarity (–)
A			
B	zrn2	This is used by Mitsubishi. Set to "0" unless particularly designated.	
C	zrtd		
D	fb9x	Speed feedback Standard (PLG)	Speed feedback 90,000 pulse detector
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

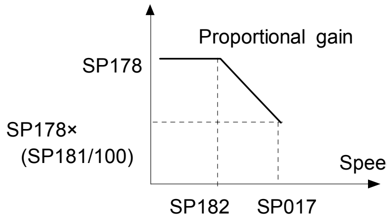
No.	Items			Details	Setting range	Standard setting
21 0130	SP130	PGC1	First position loop gain for cutting on C-axis	Set the position loop gain when the first gain is selected for C axis cutting.	1 to 100 (1/s)	15
21 0131	SP131	PGC2	Second position loop gain for cutting on C-axis	Set the position loop gain when the second gain is selected for C axis cutting.	1 to 100 (1/s)	15
21 0132	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
21 0133	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
21 0134 (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
21 0135 (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
21 0136 (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
21 0137 (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
21 0138 (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
21 0139 (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
21 0140 (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
21 0141 (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
21 0142 (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
21 0143 (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
21 0144 (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
21 0145 (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
21 0146 (PR)	SP146	VGCP4	Speed loop gain proportional 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
21 0147 (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
21 0148 (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
21 0149	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
21 0150	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

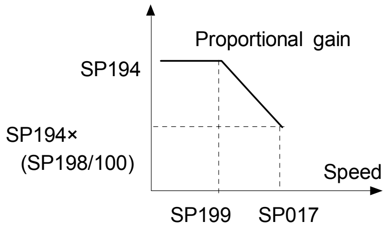
No.	Items			Details	Setting range	Standard setting
21 0151	SP151	CPSTL	C-axis zero point return shift amount (low byte)	This parameter is valid when SPECC (SP129) bitE is set to "0". Set the C-axis zero point position.	HEX setting 00000000 to FFFFFFFF (1/1000°)	H: 0000 L: 0000
21 0152	SP152	CPSTH	C-axis zero point return shift amount (high byte)			
21 0153	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
21 0154 (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
21 0155 (PR)	SP155	CODRH	Excessive error width on C-axis (high byte)			
21 0156	SP156	OVSH	C-axis overshoot compensation	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
21 0157 to 21 0158	SP157 to SP158			Not used. Set to "0".	0	0
21 0159	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
21 0160	SP160	CPY1	C-axis cutting variable excitation ratio	Set the minimum variable excitation ratio for cutting on the C-axis.	0 to 100 (%)	100
21 0161 (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
21 0162 (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
21 0163 (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

No.	Items			Details	Setting range	Standard setting
21 0164 (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
21 0165	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
21 0166	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
21 0167 (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
21 0168 (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
21 0169 (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
21 0170 (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
21 0171 to 21 0176	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>21 0177
(PR)</td><td>SP177</td><td>SPECS</td><td>Spindle synchronous specifications</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>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 direction (positive direction)</td><td>Position detector direction (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>21 0178
(PR)</td><td>SP178</td><td>VGSP</td><td>Spindle synchronous speed loop gain proportional 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>21 0179
(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>
<tr><td>21 0180
(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>21 0181
(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
21 0182 (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
21 0183	SP183	SYNV	Spindle synchronousSync 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
21 0184 (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
21 0185	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
21 0186 (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
21 0187 (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
21 0188 (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
21 0189	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
21 0190	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
21 0191	SP191			Use not possible.	0	0
21 0192	SP192			Not used. Set to "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>21 0193
(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>
<tr><td>21 0194
(PR)</td><td>SP194</td><td>VGTP</td><td>Synchronized tapping speed loop gain proportional term</td><td>Set the speed loop proportional gain in synchronized tapping mode.</td><td>0 to 1000
(1/s)</td><td>63</td></tr>
<tr><td>21 0195
(PR)</td><td>SP195</td><td>VGTI</td><td>Synchronized tapping speed loop gain integral term</td><td>Set the speed loop integral gain in synchronized tapping mode.</td><td>0 to1000
(0.1 1/s)</td><td>60</td></tr>
<tr><td>21 0196
(PR)</td><td>SP196</td><td>VGTD</td><td>Synchronized tapping speed loop gain delay advance term</td><td>Set the speed loop delay advance gain in synchronized tapping 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>21 0197</td><td>SP197</td><td></td><td></td><td>This is used by Mitsubishi.
Set to "0" unless particularly designated.</td><td>0</td><td>0</td></tr>
<tr><td>21 0198
(PR)</td><td>SP198</td><td>VCGT</td><td>Synchronized tapping target value of variable speed loop proportional gain</td><td>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.</td><td>0 to 100
(%)</td><td>100</td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
21 0199 (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
21 0200 (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
21 0201 (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
21 0202 (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
21 0203 (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
21 0204 to 21 0213	SP204 to SP213			Not used. Set to "0".	0	0
21 0214	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
21 0215	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
21 0216	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
21 0217	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

No.	Items			Details	Setting range	Standard setting
21 0218 (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
21 0219 (PR)	SP219	IQGT	Synchronized tapping current loop gain magnification 1	Set the magnification of current loop gain (torque component) during synchronized tapping.	1 to 1000 (%)	100
21 0220 (PR)	SP220	IDGT	Synchronized tapping current loop gain magnification 2	Set the magnification of current loop gain (excitation component) during synchronized tapping.	1 to 1000 (%)	100
21 0221	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
21 0222	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
21 0223	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
21 0224	SP224	SPDF	Speed monitor time	Set the time (continuous) to detect alarms. (Detected instantly when 0 is set.)	0 to 2813 (3.5ms)	0
21 0225	SP225	OXKPH	Position loop gain magnification 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
21 0226	SP226	OXKPL	Position loop gain magnification after orientation gain changeover (L coil)		0 to 2560 (1/256-fold)	0
21 0227	SP227	OXVKP	Speed loop proportional gain magnification after orientation gain changeover		0 to 2560 (1/256-fold)	0

No.	Items			Details	Setting range	Standard setting
21 0228	SP228	OXVKI	Speed loop cumulative gain magnification 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
21 0229	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
21 0230	SP230			Use not possible.		
21 0231	SP231					
21 0232	SP232					
21 0233 (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
21 0234 (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
21 0235 (PR)	SP235	OBS2	Disturbance observer gain	Set the gain for the disturbance observer.	0 to 500 (%)	0
21 0236	SP236	OBS3		This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
21 0237	SP237			Not used. Set to "0".	0	0
21 0238 to 21 0239	SP238 to SP239			Use not possible.	0	0
21 0240	SP240			Use not possible.	0	0
21 0241	SP241			Use not possible.	0	0
21 0242	SP242	Vavx		This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
21 0243	SP243	UTTM			0	0
21 0244	SP244	OPLP			0	0
21 0245	SP245	PGHS			0	0
21 0246	SP246	TEST			0	0
21 0247 to 21 0248	SP247 to SP248			Use not possible.	0	0
21 0249	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

No.	Items			Details	Setting range	Standard setting
21 0250	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
21 0251 to 21 0252	SP251 to SP252			Use not possible.	0	0
21 0253	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 "3.13.4 (1) For D/A output functions".	–32768 to 32767	0
21 0254	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 "3.13.4 (1) For D/A output functions".	–32768 to 32767	0
21 0255	SP255	DA1MPY	DA output channel 1 magnification	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 "3.13.4 (1) For D/A output functions".	–32768 to 32767 (1/256-fold)	0
21 0256	SP256	DA2MPY	DA output channel 2 magnification	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 "3.13.4 (1) For D/A output functions".	–32768 to 32767 (1/256-fold)	0
21 0257 (PR) to 21 0320 (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

No.	Items			Details	Setting range	Standard setting
21 0321 (PR) to 21 0384 (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

3.13.3 MDS-C1- SPM Spindle Parameters

For parameters marked with a (PR) in the tables, turn the CNC 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
21 0001	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
21 0002	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
21 0003	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
21 0004	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
21 0005 (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
21 0006	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
21 0007	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
21 0008	SP008			Not used. Set to "0".	0	0
21 0009	SP009	PGT	Synchronized tapping Position loop gain	Set the spindle position loop gain in synchronized tapping mode.	1 to 200 (1/s)	15

No.	Items			Details	Setting range	Standard setting
21 0010	SP010	PGS	Spindle synchronous position loop gain	Set the spindle position loop gain in spindle synchronization mode.	1 to 200 (1/s)	15
21 0011 to 21 0016	SP011 to SP016			Use not possible.	0	0
21 0017 (PR)	SP017	TSP	Maximum motor speed	Set the maximum motor speed of the spindle.	1 to 32767 (r/min)	6000
21 0018 (PR)	SP018	ZSP	Motor zero speed	Set the motor speed for which zero-speed output is performed.	1 to 1000 (r/min)	50
21 0019 (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
21 0020 (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
21 0021	SP021	TLM1	Torque limit 1	Set the torque limit rate for torque limit signal 001.	0 to 120 (%)	10
21 0022 (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
21 0023 (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
21 0024	SP024			Use not possible.	0	0
21 0025 (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
21 0026 (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
21 0027 (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
21 0028 (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
21 0029 (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
21 0030 (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
21 0031 (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
21 0032 (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

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr>
<td>21 0033
(PR)</td><td>SP033</td><td>SFNC1</td><td>Spindle function 1</td>
<td>Set the spindle function 1 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>poff</td><td></td><td></td><td>ront</td><td></td><td></td><td>pycal</td><td>pychg</td></tr>
<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>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>
<tr>
<td>21 0034
(PR)</td><td>SP034</td><td>SFNC2</td><td>Spindle function 2</td>
<td>Set the spindle function 2 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></td><td></td><td></td><td></td><td></td><td></td></tr>
<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></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>Winding switch function invalid</td><td>Winding switch function valid</td></tr>
<tr><td>3</td><td>mkc2</td><td>Coil changeover function 2 invalid</td><td>Coil changeover function 2 valid
(Turns ON simultaneously with bit 2)</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>
(Note) bit3 mkc2 must be handled on the NC side.
</td>
<td>0000 to FFFF
HEX setting</td><td>0000</td>
</tr>
</table>

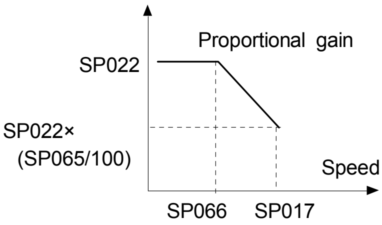
<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>21 0035
(PR)</td><td>SP035</td><td>SFNC3</td><td>Spindle function 3</td><td>Set the spindle function 3 in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</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></td><td>mwid</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 output characteristics change invalid</td><td>H coil output characteristics change valid</td></tr>
<tr><td>1</td><td>lwid</td><td>L coil output characteristics change invalid</td><td>L coil output characteristics change valid</td></tr>
<tr><td>2</td><td>mwid</td><td>M coil output characteristics change invalid</td><td>M coil output characteristics change 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 rowspan="8">(Used with SPJ.)</td><td rowspan="8"></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>
<tr><td>21 0036</td><td>SP036</td><td></td><td></td><td>Not used. Set to "0".</td><td></td><td></td></tr>
</table>

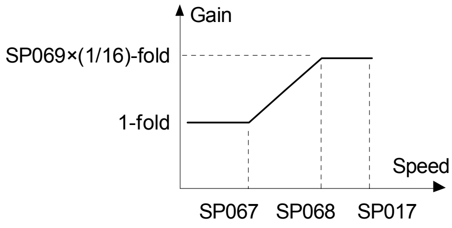
<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr>
<td>21 0037
(PR)</td><td>SP037</td><td>SFNC5</td><td>Spindle function 5</td>
<td>
Set the spindle function 5 in bit units.
<table>
<tr><th>F</th><th>E</th><th>D</th><th>C</th><th>B</th><th>A</th><th>9</th><th>8</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>nsno</td><td>nosg</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></td><td></td><td></td><td>plgo</td><td></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></td><td></td><td></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></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) 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>
<tr>
<td>21 0038
(PR)</td><td>SP038</td><td>SFNC6</td><td>Spindle function 6</td>
<td>
Set the spindle function 6 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></td><td>XFzs</td><td></td><td></td><td>pl80</td><td>sdt2</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>hzrn</td><td>orm</td><td></td><td>tdn</td><td>plg2</td><td>pftm</td><td></td><td>alty</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>alty</td><td>Deceleration stop during special alarm invalid</td><td>Deceleration stop during special alarm valid</td></tr>
<tr><td>1</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>pftm</td><td>Encoder feedback serial communication invalid</td><td>Encoder feedback serial communication valid</td></tr>
<tr><td>3</td><td>plg2</td><td>Semi-closed pulse output signal ×2 invalid</td><td>Semi-closed pulse output signal ×2 valid</td></tr>
<tr><td>4</td><td>tdn</td><td>Fixed control bit</td><td></td></tr>
<tr><td>5</td><td></td><td></td><td></td></tr>
<tr><td>6</td><td>orm</td><td>Orientation start memo invalid</td><td>Orientation start memo valid</td></tr>
<tr><td>7</td><td>hzrn</td><td rowspan="3">Fixed control bit</td><td rowspan="3"></td></tr>
<tr><td>8</td><td>sdt2</td></tr>
<tr><td>9</td><td>pl80</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>XFzs</td><td>Fixed control bit</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>
</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>21 0039
(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>21 0040
(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>motr</td><td>Set the motor type.
Set "0" when using a special motor.</td></tr>
<tr><td>1</td><td></td><td></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></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>

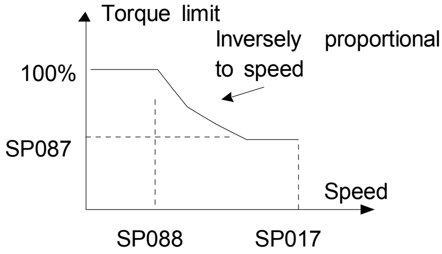
<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>21 0041
(PR)</td><td>SP041</td><td>PTYP</td><td>Power supply type</td><td>Power supply type
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><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>bit</th><th>Name</th><th>Details</th></tr>
<tr><td>0</td><td rowspan="8">ptyp</td><td rowspan="6">Set the power supply type.
(Refer to "3.13.4 (2) Power supply type" for details.)
When using CV of 22kW or more with a spindle of large capacity (37kW or more), also turn the bit 8 ON.
(Example) Setting value = CV370 + SPM370 = 137H</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></tr>
<tr><td>6</td><td>Set "1" if the power supply external emergency stop is valid.
(CV rotary switch is 4 or 5)</td></tr>
<tr><td>7</td><td>Set "1" if the power supply unit is a resistance regeneration type.</td></tr>
<tr><td>8</td><td rowspan="4">rtyp</td><td rowspan="4">Set "0" if the power supply unit is a current regeneration type.
If the power supply unit is a resistance regeneration type, set the type of resistance being used.
(Refer to "3.13.4 (3) Regenerative resistance type" for details.)</td></tr>
<tr><td>9</td></tr>
<tr><td>A</td></tr>
<tr><td>B</td></tr>
<tr><td>C</td><td rowspan="4">amp</td><td rowspan="4">Set the driver model number.
0: MDS-C1-V1/V2/SP, MDS-B-V1/V2/SP,MDS-A-V1/V2/SP
1: MDS-B-SVJ2, MDS-A-SVJ
2: MDS-B-SPJ2, MDS-A-SPJ</td></tr>
<tr><td>D</td></tr>
<tr><td>E</td></tr>
<tr><td>F</td></tr>
</table></td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
<tr><td>21 0042
(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>
<tr><td>21 0043
(PR)</td><td>SP043</td><td>TRNG</td><td>Synchronous tapping, spindle synchronous detector range</td><td>This parameter is used to set the synchronous tapping or spindle synchronous detector range.
Set "0" for this parameter.</td><td>0 to 7</td><td>0</td></tr>
<tr><td>21 0044
(PR)</td><td>SP044</td><td>TRANS</td><td>NC communication 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>21 0045</td><td>SP045</td><td>CSNT</td><td>Dual cushion timer</td><td>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.</td><td>0 to 1000
(ms)</td><td>0</td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
21 0046 (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
21 0047 (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
21 0048 (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
21 0049	SP049	TLM2	Torque limit 2	Set the torque limit rate for the torque limit signal 010.	1 to 120 (%)	20
21 0050	SP050	TLM3	Torque limit 3	Set the torque limit rate for the torque limit signal 011.	1 to 120 (%)	30
21 0051	SP051	TLM4	Torque limit 4	Set the torque limit rate for the torque limit signal 100.	1 to 120 (%)	40
21 0052	SP052	TLM5	Torque limit 5	Set the torque limit rate for the torque limit signal 101.	1 to 120 (%)	50
21 0053	SP053	TLM6	Torque limit 6	Set the torque limit rate for the torque limit signal 110.	1 to 120 (%)	60
21 0054	SP054	TLM7	Torque limit 7	Set the torque limit rate for the torque limit signal 111.	1 to 120 (%)	70
21 0055 (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
21 0056	SP056			Use not possible.	0	0
21 0057 (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
21 0058 (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

No.	Items			Details	Setting range	Standard setting
21 0059 (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
21 0060 (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
21 0061 (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
21 0062	SP062			Not used. Set to "0".	0	0
21 0063 (PR)	SP063	OLT	Overload alarm detection time	Set the time constant for detection of the motor overload alarm.	0 to 1000 (s)	60
21 0064 (PR)	SP064	OLL	Overload alarm detection level	Set the detection level of the motor overload alarm.	0 to 180 (%)	110
21 0065 (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
21 0066 (PR)	SP066	VCSN1	Change starting speed of variable speed loop proportional gain	Set the speed when the speed loop proportional gain change starts.  	0 to 32767 (r/min)	0
21 0067 (PR)	SP067	VIGWA	Change starting speed of variable current loop gain	Set the speed where the current loop gain change starts.	0 to 32767 (r/min)	0
21 0068 (PR)	SP068	VIGWB	Change ending speed of variable current loop gain	Set the speed where the current loop gain change ends.	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>21 0069
(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>21 0070</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>21 0071</td><td>SP071</td><td></td><td rowspan="2"></td><td rowspan="2">Use not possible.</td><td rowspan="2">0</td><td rowspan="2">0</td></tr>
<tr><td>21 0072</td><td>SP072</td><td></td></tr>
<tr><td>21 0073</td><td>SP073</td><td></td><td rowspan="3"></td><td rowspan="3">Use not possible.</td><td rowspan="3">0</td><td rowspan="3">0</td></tr>
<tr><td>21 0074</td><td>SP074</td><td></td></tr>
<tr><td>21 0075</td><td>SP075</td><td></td></tr>
<tr><td>21 0076</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>21 0077
(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>21 0078
(PR)</td><td>SP078</td><td>FPWM</td><td>Fixed control constant</td><td>Set by Mitsubishi.
Set "1" unless designated in particular.</td><td>1</td><td>1</td></tr>
<tr><td>21 0079</td><td>SP079</td><td></td><td></td><td>Use not possible.</td><td>0</td><td>0</td></tr>
<tr><td>21 0080</td><td>SP080</td><td>SWTD</td><td>Fixed control constant</td><td>Set by Mitsubishi.
Set "0" unless designated in particular.</td><td>0</td><td>0</td></tr>
<tr><td>21 0081</td><td>SP081</td><td></td><td rowspan="2"></td><td rowspan="2">Use not possible.</td><td rowspan="2">0</td><td rowspan="2">0</td></tr>
<tr><td>21 0082</td><td>SP082</td><td></td></tr>
<tr><td>21 0083
to
21 0086</td><td>SP083
to
SP086</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
21 0087 (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
21 0088 (PR)	SP088	DIQN	Speed for starting change of variable torque limit magnification at deceleration	Set the speed where the torque limit value at deceleration starts to change.  	0 to 32767 (r/min)	3000
21 0089	SP089			Use not possible.	0	0
21 0090	SP090			Use not possible.	0	0
21 0091	SP091			Use not possible.	0	0
21 0092	SP092			Use not possible.	0	0
21 0093 (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
21 0094 (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

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>21 0095
(PR)</td><td>SP095</td><td>VFAV</td><td>Fixed control constant</td><td>Set by Mitsubishi.
Set "0" unless designated in particular.</td><td>0</td><td>0</td></tr>
<tr><td>21 0096
(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>21 0097
(PR)</td><td>SP097</td><td>SPECO</td><td>Orientation specification</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></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></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></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><th></th><th></th><th colspan="2">In-position advance (bit 2)</th></tr>
<tr><th></th><th></th><th>0 (invalid)</th><th>1 (valid)</th></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
21 0098 (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
21 0099 (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
21 0100 (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
21 0101 (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
21 0102 (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
21 0103 (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
21 0104 (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
21 0105 (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
21 0106 (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
21 0107	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
21 0108	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
21 0109	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
21 0110	SP110			Use not possible.		0

No.	Items			Details	Setting range	Standard setting
21 0111	SP111			Use not possible.		0
21 0112	SP112			Use not possible.		0
21 0113	SP113			Use not possible.		0
21 0114	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
21 0115	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
21 0116	SP116			Use not possible.	0	0
21 0117	SP117	ORUT		Set by Mitsubishi. Set "0" unless designated in particular.	0	0
21 0118	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
21 0119	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
21 0120	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
21 0121	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
21 0122	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
21 0123	SP123			Use not possible.	0	0
21 0124	SP124			Use not possible.	0	0
21 0125	SP125			Use not possible.	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>21 0126</td><td>SP126</td><td>MPGH</td><td>Orientation position gain M coil compensation</td><td>Set this to set the orientation position loop gain for the coil changeover motor to the M coil's unique value.</td><td>0 to 2560
(1/256-fold)</td><td>0</td></tr>
<tr><td>21 0127</td><td>SP127</td><td>MPCSM</td><td>Orientation deceleration rate M coil compensation</td><td>Set this to set the orientation deceleration rate for the coil motor to the M coil's unique value.</td><td>0 to 2560
(1/256-fold)</td><td>0</td></tr>
<tr><td>21 0128</td><td>SP128</td><td>OXKPM</td><td>Position loop gain magnification after orientation gain changeover (M coil)</td><td>Set the M coil gain magnification to be used after in-position when gain changeover is valid (SP097: SPEC0-bitC=1) during orientation.</td><td>0 to 2560
(1/256-fold)</td><td>0</td></tr>
<tr><td>21 0129
(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>21 0130</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>

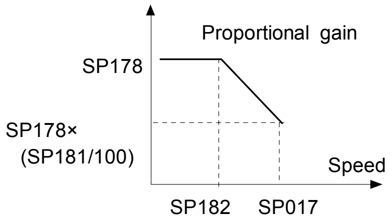
No.	Items			Details	Setting range	Standard setting
21 0131	SP131	PGC2	Second position loop gain for cutting on C-axis	Set the position loop gain when the second gain is selected for C axis cutting.	1 to 200 (1/s)	15
21 0132	SP132	PGC3	Third position loop gain for cutting on C-axis	Set the position loop gain when the third gain is selected for C-axis cutting.	1 to 200 (1/s)	15
21 0133	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
21 0134 (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
21 0135 (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
21 0136 (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
21 0137 (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
21 0138 (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
21 0139 (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
21 0140 (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
21 0141 (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

No.	Items			Details	Setting range	Standard setting
21 0142 (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
21 0143 (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
21 0144 (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
21 0145 (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
21 0146 (PR)	SP146	VGCP4	Speed loop gain proportional 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
21 0147 (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
21 0148 (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
21 0149	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
21 0150	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

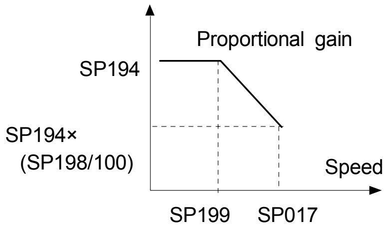
No.	Items			Details	Setting range	Standard setting
21 0151	SP151	CPSTL	C-axis zero point return shift amount (low byte)	This parameter is valid when SPECC (SP129) bitE is set to "0". Set the C-axis zero point position.	HEX setting 00000000 to FFFFFFFF (1/1000°)	H: 0000 L: 0000
21 0152	SP152	CPSTH	C-axis zero point return shift amount (high byte)			
21 0153	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
21 0154 (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
21 0155 (PR)	SP155	CODRH	Excessive error width on C-axis (high byte)			
21 0156	SP156	OVSH	C-axis overshoot compensation	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
21 0157 to 21 0158	SP157 to SP158			Not used. Set to "0".	0	0
21 0159	SP159			Use not possible.	0	0
21 0160	SP160			Use not possible.	0	0
21 0161 (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
21 0162 (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
21 0163 (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
21 0164 (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

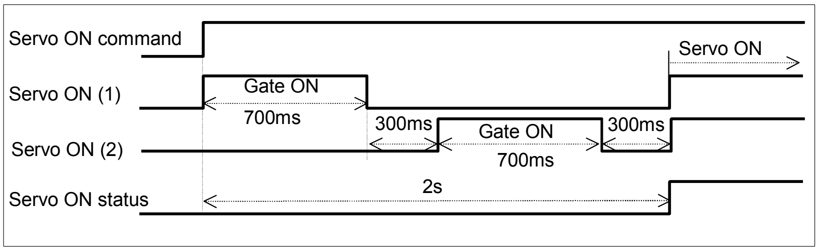
No.	Items			Details	Setting range	Standard setting
21 0165	SP165	PG2C	C-axis position loop gain 2	Set the second position loop gain when high-gain control is carried out for control of the C-axis. This parameter is applied to all the operation modes of C-axis control. When this function is not used, assign "0".	0 to 999 (1/s)	0
21 0166	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
21 0167 (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
21 0168 (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
21 0169 (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
21 0170 (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
21 0171 to 21 0176	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>21 0177
(PR)</td><td>SP177</td><td>SPECS</td><td>Spindle synchronous specifications</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 direction (positive direction)</td><td>Position detector direction (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>21 0178
(PR)</td><td>SP178</td><td>VGSP</td><td>Spindle synchronous speed loop gain proportional 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>21 0179
(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>21 0180
(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>21 0181
(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
21 0182 (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
21 0183	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
21 0184 (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
21 0185	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
21 0186 (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
21 0187 (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
21 0188 (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
21 0189	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
21 0190	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
21 0191	SP191			Use not possible.	0	0
21 0192	SP192			Not used. Set to "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>21 0193
(PR)</td><td>SP193</td><td>SPECT</td><td>Synchronized tapping specifications</td><td>Set the synchronized tapping 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>zrtn</td><td>ptyp</td><td>od8x</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>cdir</td><td>pyfx</td><td>rtrn</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
(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></td><td></td><td></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 command compensation
(for synchronization with high-gain servo)</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>
<tr><td>21 0194
(PR)</td><td>SP194</td><td>VGTP</td><td>Synchronized tapping speed loop gain proportional term</td><td>Set the speed loop proportional gain in synchronized tapping mode.</td><td>0 to 2000
(1/s)</td><td>63</td></tr>
<tr><td>21 0195
(PR)</td><td>SP195</td><td>VGTI</td><td>Synchronized tapping speed loop gain integral term</td><td>Set the speed loop integral gain in synchronized tapping mode.</td><td>0 to2000
(0.1 1/s)</td><td>60</td></tr>
<tr><td>21 0196
(PR)</td><td>SP196</td><td>VGTD</td><td>Synchronized tapping speed loop gain delay advance term</td><td>Set the speed loop delay advance gain in synchronized tapping 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>21 0197</td><td>SP197</td><td></td><td></td><td>Use not possible.</td><td>0</td><td>0</td></tr>
<tr><td>21 0198
(PR)</td><td>SP198</td><td>VCGT</td><td>Synchronized tapping target value of variable speed loop proportional gain</td><td>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.</td><td>0 to 100
(%)</td><td>100</td></tr>
</table>

No.	Items			Details	Setting range	Standard setting
21 0199 (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
21 0200 (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
21 0201 (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
21 0202 (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
21 0203 (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
21 0204	SP204		Fixed control constant	This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
21 0205	SP205					
21 0206	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
21 0207	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
21 0208	SP208	W2		This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
21 0209 to 21 0213	SP209 to SP213			Not used. Set to "0".	0	0
21 0214	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.		
21 0215	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
21 0216	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
21 0217	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

No.	Items			Details	Setting range	Standard setting
21 0218 (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
21 0219 (PR)	SP219	IQGT	Synchronized tapping current loop gain magnification 1	Set the magnification of current loop gain (torque component) during synchronized tapping.	1 to 1000 (%)	100
21 0220 (PR)	SP220	IDGT	Synchronized tapping current loop gain magnification 2	Set the magnification of current loop gain (excitation component) during synchronized tapping.	1 to 1000 (%)	100
21 0221	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
21 0222	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
21 0223	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
21 0224	SP224	SPDF	Speed monitor time	Set the time (continuous) to detect alarms. (Detected instantly when 0 is set.)	0 to 2813 (3.5ms)	0
21 0225	SP225	OXKPH	Position loop gain magnification 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
21 0226	SP226	OXKPL	Position loop gain magnification after orientation gain changeover (L coil)		0 to 2560 (1/256-fold)	0
21 0227	SP227	OXVKP	Speed loop proportional gain magnification after orientation gain changeover		0 to 2560 (1/256-fold)	0

No.	Items			Details	Setting range	Standard setting
21 0228	SP228	OXVKI	Speed loop cumulative gain magnification 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
21 0229	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
21 0230	SP230			Use not possible.		
21 0231	SP231					
21 0232	SP232					
21 0233 (PR)	SP233	JL	Disturbance observer general inertia scale	Set the ratio of the motor inertia + load inertia and motor inertia. 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
21 0234 (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
21 0235 (PR)	SP235	OBS2	Disturbance observer gain	Set the gain for the disturbance observer.	0 to 500 (%)	0
21 0236	SP236	OBS3	Fixed control constant	This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
21 0237	SP237	KSCP	Fixed control constant	This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
21 0238	SP238	SEZR				
21 0239	SP239	SEZT				
21 0240	SP240			Use not possible.	0	0
21 0241	SP241			Use not possible.	0	0
21 0242	SP242	Vavx		This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
21 0243	SP243	UTTM			0	0
21 0244	SP244	OPLP		Use not possible.	0	0
21 0245	SP245	PGHS		This is used by Mitsubishi. Set to "0" unless particularly designated.	0	0
21 0246	SP246	TEST			0	0
21 0247 to 21 0248	SP247 to SP248			Use not possible.	0	0

No.	Items			Details	Setting range	Standard setting
21 0249	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
21 0250	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
21 0251 to 21 0252	SP251 to SP252			Use not possible.	0	0
21 0253	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 "3.13.4 (1) For D/A output functions".	–32768 to 32767	0
21 0254	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 "3.13.4 (1) For D/A output functions".	–32768 to 32767	0
21 0255	SP255	DA1MPY	DA output channel 1 magnification	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 "3.13.4 (1) For D/A output functions".	–32768 to 32767 (1/256-fold)	0
21 0256	SP256	DA2MPY	DA output channel 2 magnification	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 "3.13.4 (1) For D/A output functions".	–32768 to 32767 (1/256-fold)	0

No.	Items			Details	Setting range	Standard setting
21 0257 (PR) to 21 0320 (PR)	SP257 to SP320	RPM BSD	Motor constant (H coil)	This parameter is valid only in the following two conditional cases: (c) 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. (d) 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
21 0321 (PR) to 21 0384 (PR)	SP321 to SP384	RPML BSDL	Motor constant (L coil)	This parameter is valid only in the following conditional case: (b) 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

3.13.4 MDS-C1- SP Supplementary Explanation

(1) For D/A output functions

(i) Outline
The D/A output function is mounted in the standard system in the MDS-C1-SP.
Using this D/A output function, the drive unit status and each data can be confirmed.

(ii) Hardware specifications

- 2 channels
- 8 bit 0 to +10V
- Output pin CH 1: CN9-9 pin
  CH 2: CN9-19 pin
  GND: CN9-1.11 pin

(iii) Parameters
Set the data No. and output magnification of each channel according to the parameters below.

Name	Details
SP253	D/A output channel 1 data No.
SP254	D/A output channel 2 data No.
SP255	D/A output channel 1 data magnification
SP256	D/A output channel 2 data magnification

(iv) Output data No.
Set the No. of the data to be output in SP253 and SP254. A correlation of the output data and the data No. is shown below.

No. (setting value)	CH1		CH2	
	Output data	Units	Output data	Units
0	Speedometer output	Maximum speed at 10V	Load meter output	120% load at 10V
2	Current command	When the actual data is 4096, the current command data is regarded as 100%.	Same as CH1	
3	Current feedback	When the actual data is 4096, the current feedback data is regarded as 100%.		
4	Speed feedback	Actual data r/min		
6	Position droop low-order	Interpolation units when the actual data is 23040000, the position droop data is regarded as 360°.		
7	Position droop high-order			
8	Position F△T low-order	Interpolation units/NC communication cycle		
9	Position F△T high-order			
10	Position command low-order	Interpolation units when the actual data is 23040000, the position command data is regarded as 360°.		
11	Position command high-order			
12	Feedback position low-order	Interpolation units when the actual data is 23040000, the feedback position data is regarded as 360°.		
13	Feedback position high-order			
80	Control input 1	Bit correspondence		
81	Control input 2			
82	Control input 3			
83	Control input 4			
84	Control output 1	Bit correspondence		
85	Control output 2			
86	Control output 3			
87	Control output 4			

(Note) The % of the current command and current feedback indicate 30min. rating = 100%.

(v) Setting the output magnification

Set the output magnification in SP255 and SP256.

$$\text{Data} = \text{actual data} \times \frac{\text{SP255 or SP256}}{256}$$

Using the expression above,

(a) Output data other than speedometer output and load meter output carries out the D/A output in Fig. 1.

(b) Speedometer output data and load meter output data carries out the D/A output in Fig. 2.

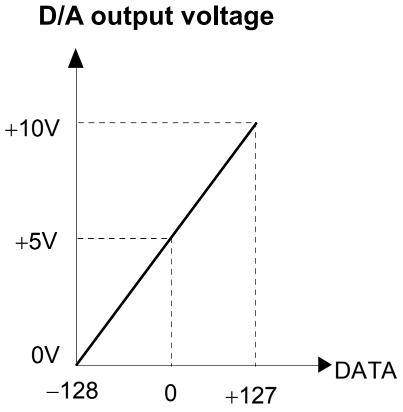


Fig. 1

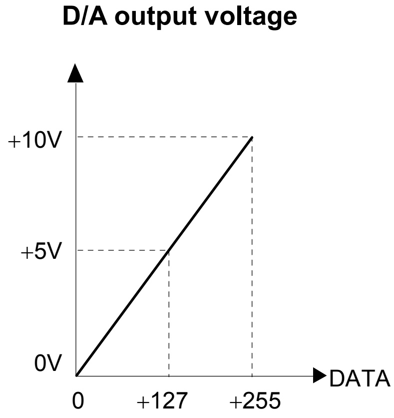


Fig. 2

(Example 1) Current command, current feedback

The data is regarded as 100% when the actual data = 4096.

Therefore, for example, the actual data is output as shown below during +120% current feedback.

Actual data = 4096 × 1.2 = 4915

If "256" is set (magnification 1) in parameter SP255 (SP256), from Fig.1, the D/A output voltage will be as shown below, exceeding the D/A output voltage maximum value.

5V + {4915 × 1 × (5V/128)} = 197V > 10V

Therefore, if (for example) "6" is set in parameter SP255 (SP256), the D/A output voltage will become as shown below, and data confirmation will be possible.

5V + {4915 × 6/256 × (5V/128)} = 9.5V < 10V

(Example 2) Speed feedback

Data unit is r/min.
Therefore, at (for example) +2000r/min, the motor speed will be output as "2000".
If "256" is set (magnification 1) in parameter SP255 (SP256), from Fig.1, the D/A output voltage will be as shown below, exceeding the D/A output voltage maximum value.

5V + {2000 x 1 x (5V/128)} = 83.125V > 10V

Therefore, if (for example) "16" is set in parameter SP255 (SP256), the D/A output voltage will become as shown below, and data confirmation will be possible.

5V + {2000 x 16/256 x (5V/128)} = 9.88V < 10V

(Example 3) Position droop

The data unit is r/min. Data is regarded as 100% when the actual data = 4096.
Therefore, for example, the actual data is output as shown below during the +0.1° position droop.

Actual data = 0.1 x 23040000/360 = 6400

If "256" is set (magnification 1) in parameter SP255 (SP256), from Fig.1, the D/A output voltage will be as shown below, exceeding the D/A output voltage maximum value.

5V + {6400 x 1 x (5V/128)} = 255V > 10V

Therefore, if (for example) "5" is set in parameter SP255 (SP256), the D/A output voltage will become as shown below, and data confirmation will be possible.

5V + {2000 x 5/256 x (5V/128)} = 9.88V < 10V

(Example 4) Confirm the orientation complete signal (ORCF) with the control output 4L.

The data unit is bit corresponding data.
Refer to the Instruction Manual for the meanings of the control output 4L bit corresponding signals.
The orientation complete signal (ORCF) corresponds to the control output 4L/bit 4.
Therefore, for example, the actual data is output as shown below when ORCF= ON.

bit 4 corresponding actual data = 2^4 = 16

If "256" is set (magnification 1) in parameter SP255 (SP256), from Fig.1, the D/A output voltage will be as shown below, and data confirmation will be possible.

5V + {16 x 1 x (5V/128)} = 5.625V < 10V

Note that, if a bit other than bit4 is ON, the current of that bit will be added to the 6.25V shown above, and at the actual ORCF signal measurement will be as shown below, so confirm the changed voltage.

(5.625 V – 5V) = 0.625 V

(2) Power supply type

Set "ptyp" of SP041 (PTYP) from the following table.

					When an external emergency stop is valid				Resistance regeneration
No.	0xkW 0x	1xkW 1x	2xkW 2x	3xkW 3x	4xkW 4x	5xkW 5x	6xkW 6x	7xkW 7x	8xkW 8x
				CV-300				CV-300	
1		CV-110				CV-110			CR-10
2			CV-220				CV-220		CR-15
3									CR-22
4	CV-37								CR-37
5		CV-150			CV-37	CV-150			
6			CV-260				CV-260		CR-55
7				CV-370				CV-370	
8	CV-75				CV-75				CR-75
9		CV-185				CV-185			CR-90
A									
B									
C									
D									
E									
F									

(3) Regenerative resistance type

Set "rtyp" of SP041 (PTYP) from the following table.

No.	Regenerative resistance type	Resistance value(Ω)	Watts(W)
0			
1	GZG200W260HMJ	26	80
2	GZG300W130HMJ x 2	26	150
3	MR-RB30	13	300
4	MR-RB50	13	500
5	GZG200W200HMJ x 3	6.7	350
6	GZG300W200HMJ x 3	6.7	500
7	R-UNIT-1	30	700
8	R-UNIT-2	15	700
9	R-UNIT-3	15	2100
A			
B			
C			
D			
E			
F			

3.13.5 MDS-C1- SPM Supplementary Explanation

(1) For D/A output functions

(i) Outline

The D/A output function is mounted in the standard system in the MDS-C1-SPM.
Using this D/A output function, the drive unit status and each data can be confirmed.

(ii) Hardware specifications

- 2 channels
- 8 bit 0 to +10V
- Output pin CH 1: CN9-9 pin
  CH 2: CN9-19 pin
  GND: CN9-1.11 pin

(iii) Parameters

Set the data No. and output magnification of each channel according to the parameters below.

Name	Details
SP253	D/A output channel 1 data No.
SP254	D/A output channel 2 data No.
SP255	D/A output channel 1 data magnification
SP256	D/A output channel 2 data magnification

(iv) Output data No.

Set the No. of the data to be output in SP253 and SP254. A correlation of the output data and the data No. is shown below.

No. (setting value)	CH1		CH2	
	Output data	Units	Output data	Units
0	Speedometer output	Maximum speed at 10V	Load meter output	120% load at 10V
2	Current command	When the actual data is 4096, the current command data is regarded as 100%.	Same as CH1	
3	Current feedback	When the actual data is 4096, the current feedback data is regarded as 100%.		
4	Speed feedback	Actual data r/min		
6	Position droop low-order	Interpolation units when the actual data is 23040000, the position droop data is regarded as 360°.		
7	Position droop high-order			
8	Position F△T low-order	Interpolation units/NC communication cycle		
9	Position F△T high-order			
10	Position command low-order	Interpolation units when the actual data is 23040000, the position command data is regarded as 360°.		
11	Position command high-order			
12	Feedback position low-order	Interpolation units when the actual data is 23040000, the feedback position data is regarded as 360°.		
13	Feedback position high-order			
80	Control input 1	Bit correspondence		
81	Control input 2			
82	Control input 3			
83	Control input 4			
84	Control output 1	Bit correspondence		
85	Control output 2			
86	Control output 3			
87	Control output 4			

(Note) The % of the current command and current feedback indicate 30min. rating = 100%.

(vi) Setting the output magnification

Set the output magnification in SP255 and SP256.

$$\boxed{\text{Data} = \text{actual data} \times \frac{\text{SP255 or SP256}}{256}}$$

Using the expression above,

(a) Output data other than speedometer output and load meter output carries out the D/A output in Fig. 1.

(b) Speedometer output data and load meter output data carries out the D/A output in Fig. 2.

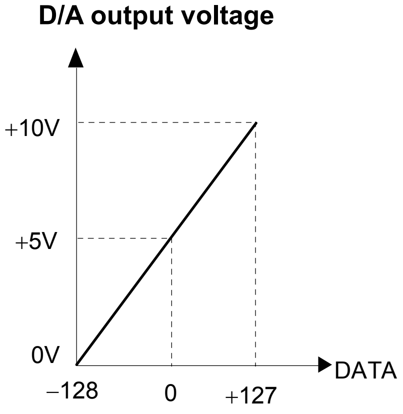


Fig. 1

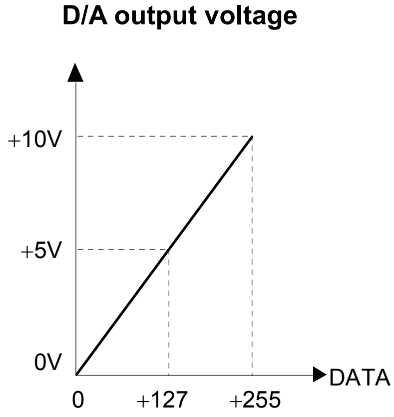


Fig. 2

(Example 1) Current command, current feedback
The data is regarded as 100% when the actual data = 4096.
Therefore, for example, the actual data is output as shown below during +120% current feedback.

Actual data = 4096 × 1.2 = 4915

If "256" is set (magnification 1) in parameter SP255 (SP256), from Fig.1, the D/A output voltage will be as shown below, exceeding the D/A output voltage maximum value.

5V + {4915 × 1 × (5V/128)} = 197V > 10V

Therefore, if (for example) "6" is set in parameter SP255 (SP256), the D/A output voltage will become as shown below, and data confirmation will be possible.

5V + {4915 × 6/256 × (5V/128)} = 9.5V < 10V

(Example 2) Speed feedback
Data unit is r/min.
Therefore, at (for example) +2000r/min, the motor speed will be output as "2000".
If "256" is set (magnification 1) in parameter SP255 (SP256), from Fig.1, the D/A output voltage will be as shown below, exceeding the D/A output voltage maximum value.

5V + {2000 x 1 x (5V/128)} = 83.125V > 10V

Therefore, if (for example) "16" is set in parameter SP255 (SP256), the D/A output voltage will become as shown below, and data confirmation will be possible.

5V + {2000 x 16/256 x (5V/128)} = 9.88V < 10V

(Example 3) Position droop
The data unit is r/min. Data is regarded as 100% when the actual data = 4096.
Therefore, for example, the actual data is output as shown below during the +0.1° position droop.

Actual data = 0.1 x 23040000/360 = 6400

If "256" is set (magnification 1) in parameter SP255 (SP256), from Fig.1, the D/A output voltage will be as shown below, exceeding the D/A output voltage maximum value.

5V + {6400 x 1 x (5V/128)} = 255V > 10V

Therefore, if (for example) "5" is set in parameter SP255 (SP256), the D/A output voltage will become as shown below, and data confirmation will be possible.

5V + {2000 x 5/256 x (5V/128)} = 9.88V < 10V

(Example 4) Confirm the orientation complete signal (ORCF) with the control output 4L.
The data unit is bit corresponding data.
Refer to the Instruction Manual for the meanings of the control output 4L bit corresponding signals.
The orientation complete signal (ORCF) corresponds to the control output 4L/bit 4.
Therefore, for example, the actual data is output as shown below when ORCF= ON.

bit 4 corresponding actual data = 2^4 = 16

If "256" is set (magnification 1) in parameter SP255 (SP256), from Fig.1, the D/A output voltage will be as shown below, and data confirmation will be possible.

5V + {16 x 1 x (5V/128)} = 5.625V < 10V

Note that, if a bit other than bit4 is ON, the current of that bit will be added to the 6.25V shown above, and at the actual ORCF signal measurement will be as shown below, so confirm the changed voltage.

(5.625 V – 5V) = 0.625 V

(2) Power supply type

Set "ptyp" of SP041 (PTYP) from the following table.

					When an external emergency stop is valid				Resistance regeneration
No.	0xkW 0x	1xkW 1x	2xkW 2x	3xkW 3x	4xkW 4x	5xkW 5x	6xkW 6x	7xkW 7x	8xkW 8x
0	PS not connected			CV-300				CV-300	
1		CV-110				CV-110			CR-10
2			CV-220				CV-220		CR-15
3									CR-22
4	CV-37				CV-37				CR-37
5		CV-150				CV-150			
6			CV-260				CV-260		CR-55
7				CV-370				CV-370	
8	CV-75				CV-75				CR-75
9		CV-185				CV-185			CR-90
A									
B									
C									
D									
E									
F									

(3) Regenerative resistance type

Set "rtyp" of SP041 (PTYP) from the following table.

No.	Regenerative resistance type	Resistance value(Ω)	Watts(W)
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			
A			
B			
C			
D			
E	Large capacity + ready ON high-speed sequence		
F	Ready ON high-speed sequence		

3.14 PLC Constants

The parameters used in the user PLC can be set on this screen.

No.	Name		Details	Setting range	Standard setting
22 0001 to 0048		PLC constant	There are PLC constants set by data type in the parameters that can be used in the user PLC. The set data is set and backed-up by the PLC R register. Conversely, when data is set in the R register corresponding to the PLC constant with the sequence program MOV command, etc., it is backed up. Note that the display will not change, so temporarily change to another screen, and then select the screen again. The No. of constants is 48, and the setting range is ±8 digits.	–99999999 to 99999999	

3.15 PLC Timer

The timer setting values used by the user PLC can be set on this screen.

No.	Name		Details	Setting range	Standard setting
23 0000 to 0015	10ms adding timer	10ms adding timer	This timer has a minimum setting unit of 0.01s. When the conditions for input are satisfied, it starts counting. When the count reaches setting value, the contact point turns ON. Count is reset to 0 if the conditions for input are aborted. 16 points (T0 to T15)	0 to 32767	
23 0056 to 0135	100ms adding timer	100ms adding timer	This timer has a minimum setting unit of 0.1s. Its functions are the same as those for 10ms timer. 80 points (T16 to T95)	0 to 32767	
23 0232 to 0239	100ms integ timer	100ms cumulative timer	This timer has a minimum setting unit of 0.1s. Once conditions for input are satisfied, it starts counting. When it reaches setting value, its contact point turns ON. Even if conditions for input are aborted, current value (count value) is held and contact status does not change. Count value is reset to 0 by RST command and contact point turns OFF. 8 points (T96 to T103)	0 to 32767	

3.16 PLC Counter

The counter setting value used by the user PLC can be set on this screen.

No.	Name		Details	Setting range	Standard setting
24 0000 to 0023		Counter 0	It detects rising edge of conditions for input and counts with incremental system. Count value is not cleared even if input conditions are aborted. Count value is reset to 0 by RST command. 24 points (C0 to C23)	0 to 32767	

3.17 Selecting the Bit

The bit parameter used in the user PLC can be set on this screen.

No.	Name		Details	Setting range	Standard setting
25 0001 to 0096		Bit selection 1	There are bit selection parameters set by bit type in the parameters that can be used in the user PLC. The set data is set and backed-up by the PLC R register. When bit operation is used in the sequence program, it is used after temporarily transferring the R register details to the memory (M) with a MOV command. Conversely, when data is set in the R register corresponding to the bit selection with the MOV command, etc., it is backed up.	0: OFF 1: ON	

(Note) Bit selection parameters #250049 to #250096 are used by the machine maker and Mitsubishi, so the details are fixed.

	Symbol name	7	6	5	4	3	2	1	0
0	#49 R5024 L	Control unit temperature warning valid				Counter C hold	Counter timer T hold	PLC counter program valid	PLC timer program valid
1	#50 R5024 H						Operator message valid	R method 1 F method 0	Alarm message valid
2	#51 R5025 L			GPP communication invalid	PLC high-speed priority valid				Onboard valid
3	#52 R5025 H								
4	#53 R5026 L								
5	#54 R5026 H								
6	#55 R5027 L								
7	#56 R5027 H								

	Symbol name	7	6	5	4	3	2	1	0
8	#57 R5028 L	High-speed input designation 1							
9	#58 R5028H	High-speed input designation 2							
A	#59 R5029 L	High-speed input designation 3							
B	#60 R5029 H	High-speed input designation 4							
C	#61 R5030 L	High-speed output designation 1							
D	#62 R5030 H	High-speed output designation 2							
E	#63 R5031 L	High-speed output designation 3							
F	#64 R5031 H	High-speed output designation 4							

3.18 Position Switches

The position switch (PSW) function sets a hypothetical dog switch by setting the coordinate values indicating the axis name and hypothetical dog position. This allows a signal to be output to the PLC interface when the machine reaches that position. This hypothetical dog switch is called the position switch.
This function is valid only for the axis which has been returned to the zero point after turning the power ON.

No.	Name		Details	Setting range	Standard setting
26 0011	Pos. switch <axis>	1st position switch <axis>	Set the axis for which the 1st position switch is to be provided.	0 to maximum number of control axes	
26 0012	Pos. switch <dog1>	1st position switch <dog1>	Set the coordinate position of the hypothetical dog position. When the machine position reaches this position, a signal is output to the corresponding PLC interface device.	-999999.999 to 999999.999 (mm)	
26 0013	Pos. switch <dog2>	1st position switch <dog2>			
26 0021	Pos. switch <axis>	2nd position switch <axis>	Same as the 1st position switch.	Same as the 1st position switch.	
26 0022	Pos. switch <dog1>	2nd position switch <dog1>			
26 0023	Pos. switch <dog2>	2nd position switch <dog2>			
:	:	:	:	:	:
26 0631	Pos. switch <axis>	63rd position switch <axis>	Same as the 1st position switch.	Same as the 1st position switch.	
26 0632	Pos. switch <dog1>	63rd position switch <dog1>			
26 0633	Pos. switch <dog2>	63rd position switch <dog2>			
26 0641	Pos. switch <axis>	64th position switch <axis>	Same as the 1st position switch.	Same as the 1st position switch.	
26 0642	Pos. switch <dog1>	64th position switch <dog1>			
26 0643	Pos. switch <dog2>	64th position switch <dog2>			

(Note) Parameters of 260091 and thereafter require the "position switch addition" option.

3.19 Release Parameters 1

No.	Details	Setting range	Standard setting
28 0001 to 0447	These are parameters that can be defined by the machine maker. (Integer type)		

3.20 Release Parameters 2

No.	Details	Setting range	Standard setting
29 0001 to 0047	These are parameters that can be defined by the machine maker. (Real value type)		

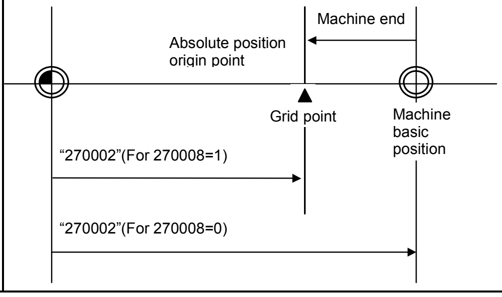
3.21 Backup Data

No.	Details	Setting range	Standard setting
30 0001 to 0009	This is the absolute position backup data. It cannot be set from the screen. This data is output with the other parameters when the machine parameters are output with the input/output function on the screen.		

3.22 Absolute Position Parameters

For parameters indicated with an "*" in the table, turn the NC power OFF after setting. The setting is validated after the power is turned ON again.

No.	Name	Details	Setting range	Standard setting
	Abs position set	ON : The zero point is initialized. The absolute position detection data can be changed on the screen. OFF : The zero point is not initialized. The absolute position detection data cannot be changed on the screen. This parameter turns OFF when the power is turned ON again.		
1	Ref position set	0: Setting zero point initialization parameter "270002 Ref position offset" is impossible. 1: Setting zero point initialization is possible. 2: Resetting the basic machine coordinate system is possible.	0 to 2 It turns "0" when the power is turned OFF.	
27 0002	Ref position offset	Set the distance from the basic machine coordinate system zero point to the 1st reference point. **(Note)** This cannot be set when the zero point initialization setting is disabled, or when an absolute position detection alarm is occurring.	–99999.999 to +999999.999 (mm)	
27 0003	Move amnt in pwr OFF	This checks the difference of the machine positions when the power is turned OFF and turned ON again. If excessive, this outputs the axis error "AX0022 Abs posn tolerance amnt over". This will be invalid when "0" is set. Set this to "0" when initializing the zero point, and set the tolerable value after turning the power ON again.	0 to 99999.999 (mm) 0: No check	
27 0004	G28 verify width	Not used.	0	
27 0005	No stopper	Select the method for initializing the zero point (press against the machine end stopper or set marked point without using machine end). Always select "0" (stopper method) when carrying out dogless reference point return.	0: Stopper method 1: Marked point method	
27 0006	Current lim stopper	Set the current limit value applied during initialization. The setting value is a percentage of the limit current in respect to the stall current. Calculation expression $(\text{Setting value}) = \frac{(\text{Limit current})}{(\text{Stall current [peak]})} \times 100$	0 to 500 (%)	
27 0007	Max error width	Set the excessive error detection width used when pressing while the absolute position is being set with the machine end stopper method.	0 to 32767 (mm)	

No.	Name	Details	Setting range	Standard setting
27 0008	Ref position type	Select whether to use a random point (machine end or marked point) or grid point for the absolute position origin point. When using the grid point, operation to move to the grid position is required. 	0: Random point 1: Grid point	

3.23 Auxiliary Axis Parameters

For parameters indicated with an "*" in the table, turn the NC power OFF after setting. The setting is 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>70 0001</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 (hexa-decimal)</td><td>0000</td></tr>
<tr><td>70 0002</td><td>RTY*</td><td>Regeneration option type</td><td>Set the regenerative resistor type. Do not set values without a description.
0 | 0 | 0 | 0 (Default setting value)
<table>
<tr><th>Setting value</th><th>Description</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 to F</td><td>Setting prohibited</td></tr>
</table></td><td>0000 to FFFF (hexa-decimal)</td><td>0000</td></tr>
<tr><td>70 0003</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>70 0004</td><td>PC2*</td><td>Machine side gear ratio (motor rotation ratio)</td><td>1 to 32767</td><td>1</td></tr>
<tr><td>70 0005</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>70 0006</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>70 0007</td><td>ATU</td><td>Auto-tuning</td><td>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>Description</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>Description</th></tr>
<tr><td>0</td><td>Standard</td></tr>
<tr><td>1</td><td>Large friction amount (set the position loop gain slightly lower)</td></tr>
</table>
<table>
<tr><th>Setting value</th><th>Description</th></tr>
<tr><td>0</td><td>Only auto-tuning PG2, VG2, VIC, and GD2.</td></tr>
<tr><td>1</td><td>Only 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><td>0000 to FFFF (hexa-decimal)</td><td>0102</td></tr>
<tr><td>70 0008</td><td>PG1</td><td>Position loop gain 1</td><td>Set the position loop gain of the model loop.</td><td>4 to 1000 (1/s)</td><td>70</td></tr>
<tr><td>70 0009</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>70 0010</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>70 0011</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>70 0012</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>70 0013</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>
<tr><td>70 0014</td><td>NCH</td><td>Notch filter No.</td><td>Set the frequency of the machine resonance suppression filter.
Do not set values without a description.
<table>
<tr><th>Setting value</th><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><th>Frequency (Hz)</th><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><td>0 to 9</td><td></td></tr>
</table>

No.	Name		Details	Setting range	Default value
70 0015			(Not used.)		0
70 0016	JIT	Jitter compensation	Set the No. of ignored jitter compensation pulses. Do not set values without a description. **Setting value**: 0 / 1 / 2 / 3 **No. of ignored pulses**: No start / 1 / 2 / 3	0 to 3	
70 0017			(Not used.)		0
70 0018			(Not used.)		0
70 0019	PG2	Position loop gain 2	Set the position loop gain of the actual loop. Determine the position responsiveness for external disturbance.	1 to 500 (1/s)	25
70 0020	VG1	Speed loop gain 1	Set the speed loop gain of the model loop. Determine the tracking ability regarding the speed commands.	20 to 5000 (1/s)	1200
70 0021	VG2	Speed loop gain 2	Set the speed loop gain of the actual loop. Determine the speed responsiveness for external disturbance.	20 to 8000 (1/s)	600
70 0022	VIC	Speed integral compensation	Determine the characteristics of the speed low-frequency region.	1 to 1000 (ms)	20
70 0023	VDC	Speed differential compensation	PI control normally results from a default value of 1000. Adjust the overshoot amount by lowering in increments of 20.	0 to 1000	1000
70 0024	GD2	Load inertia ratio	Set the load inertia ratio for the motor inertia.	0.0 to 50.0 (-fold)	2.0
70 0025			(Not used.)		0
70 0030	MTY*	Motor type	Set the motor type. This is automatically judged by the system when the default value (0000) is set.	0000 to FFFF (hexa-decimal)	0000

<table>
<tr><th>No.</th><th colspan="2">Name</th><th>Details</th><th>Setting range</th><th>Default value</th></tr>
<tr><td>70 0050</td><td>MD1</td><td>D/A output channel 1 data Nos.</td><td>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>No.</th><th>Description</th></tr>
<tr><td>0</td><td>Speed feedback (with sign)
Maximum rotation speed = 8V</td></tr>
<tr><td>1</td><td>Current feedback (with sign)
Maximum current (torque) = 8V</td></tr>
<tr><td>2</td><td>Speed feedback (without sign)
Maximum rotation speed = 8V</td></tr>
<tr><td>3</td><td>Current feedback (without sign)
Maximum current (torque) = 8V</td></tr>
<tr><td>4</td><td>Current command
Maximum current (torque) = 8V</td></tr>
<tr><td>5</td><td>Command FΔT
100000 [°/min] = 10V</td></tr>
<tr><td>6</td><td>Position droop 1 (1/1)
2048 [pulse] = 10V</td></tr>
<tr><td>7</td><td>Position droop 2 (1/4)
8192 [pulse] = 10V</td></tr>
<tr><td>8</td><td>Position droop 3 (1/16)
32768 [pulse] = 10V</td></tr>
<tr><td>9</td><td>Position droop 4 (1/32)
65536 [pulse] = 10V</td></tr>
<tr><td>A</td><td>Position droop 5 (1/64)
131072 [pulse] = 10V</td></tr>
</table></td><td>0000 to FFFF (hexa-decimal)</td><td>0000</td></tr>
<tr><td>70 0051</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>70 0052</td><td></td><td></td><td>(Not used.)</td><td></td><td></td></tr>
<tr><td>70 0053</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 "700050 MD1".</td><td>0000 to FFFF (hexa-decimal)</td><td>0000</td></tr>
<tr><td>70 0054</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>70 0055</td><td></td><td></td><td>(Not used.)</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>70 0100</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>
<tr><td>70 0101</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><th>bit</th><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><th>Default value</th><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>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>8</td><td>Reference point return direction (+)</td><td>Reference point return direction (–)</td></tr>
<tr><td>9</td><td>Rotation direction determined by DIR</td><td>Rotation direction in the shortcut direction</td></tr>
<tr><td>A</td><td>Machine basic position becomes the absolute position origin point</td><td>Electrical zero point becomes the absolute position origin point</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 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>0000 to FFFF (hexa-decimal)</td><td>0200</td></tr>
<tr><td>70 0102</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.
<table>
<tr><th>bit</th><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><th>Default value</th><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><td>0</td><td>0</td><td>1</td><td>1</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>1</td><td>Error not corrected at servo OFF</td><td>Error corrected at servo OFF</td></tr>
<tr><td>2</td><td>Linear axis</td><td>Rotation axis</td></tr>
<tr><td>3</td><td>Station assignment direction CW</td><td>Station assignment direction CCW</td></tr>
<tr><td>4</td><td>Uniform index</td><td>Non-uniform index</td></tr>
<tr><td>5</td><td>DO channel standard assignment</td><td>DO channel reverse assignment</td></tr>
<tr><td>7</td><td>Incremental detection</td><td>Absolute position detection</td></tr>
</table></td><td>0000 to FFFF (hexa-decimal)</td><td>0086</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>70 0103</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.
<table>
<tr><th>bit</th><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><th>Default value</th><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>0</td><td>0</td><td>1</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>External emergency stop valid</td><td>External emergency stop invalid (default value)</td></tr>
<tr><td>1</td><td>Dynamic brake stop at emergency stop</td><td>Deceleration control stop at emergency stop</td></tr>
<tr><td>2</td><td>NC bus emergency stop input valid</td><td>NC bus emergency stop input invalid</td></tr>
<tr><td>3</td><td>NC bus emergency stop output valid</td><td>NC bus emergency stop output invalid</td></tr>
</table></td><td>0000 to FFFF (hexa-decimal)</td><td>0001</td></tr>
<tr><td>70 0104</td><td>tleng*</td><td>Linear axis stroke length</td><td>Set the movement stroke length for linear axes. This is meaningless when setting non-uniform assignments or commanding random positions.</td><td>0.001 to 99999.999 (mm)</td><td>100.000</td></tr>
<tr><td>70 0110</td><td>ZRNspeed</td><td>Reference point return speed</td><td>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.</td><td>1 to 100000 (°/min or mm/min)</td><td>1000</td></tr>
<tr><td>70 0111</td><td>ZRNcreep</td><td>Reference point return creep speed</td><td>Set the approach speed to the reference point after dog detection during a reference point return.</td><td>1 to 65535 (°/min or mm/min)</td><td>200</td></tr>
<tr><td>70 0112</td><td>grid mask</td><td>Grid mask</td><td>Set the amount that the dog is artificially extended. Set 1/2 the grid spacing as a standard.</td><td>0 to 65536 (1/1000 ° or µm)</td><td>0</td></tr>
<tr><td>70 0113</td><td>grspc*</td><td>Grid spacing</td><td>Divide the grid spacing that is the conventional motor rotation movement amount into 2, 4, 8, or 16 divisions.</td><td>0 to 4 ($1/2^n$ division)</td><td>0</td></tr>
<tr><td>70 0114</td><td>ZRNshift</td><td>Reference point shift amount</td><td>Set the shift amount in a dog-type reference point return from the electric zero point determined on the grid to the reference point.</td><td>0 to 65536 (1/1000 ° or µm)</td><td>0</td></tr>
<tr><td>70 0115</td><td>ST.offset</td><td>Station offset</td><td>Set the distance (offset) from the reference point to station 1.</td><td>–99999.999 to 99999.999 (° or mm)</td><td>0.000</td></tr>
<tr><td>70 0116</td><td>ABS base*</td><td>Absolute position zero point</td><td>When movement of the machine coordinate zero point from the base point is required during absolute position initializing, set that movement amount.</td><td>–99999.999 to 99999.999 (° or mm)</td><td>0.000</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>70 0117</td><td>Limit (+)</td><td>Soft limit (+)</td><td>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.</td><td>–99999.999 to 99999.999 (mm)</td><td>1.000</td></tr>
<tr><td>70 0118</td><td>Limit (–)</td><td>Soft limit (–)</td><td>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.</td><td>–99999.999 to 99999.999 (mm)</td><td>1.000</td></tr>
<tr><td>70 0120</td><td>ABS type</td><td>Absolute position detection parameter</td><td>This is a HEX setting parameter. Set bits without a description to their default values.
<table>
<tr><th>bit</th><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><th>Default value</th><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>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>Marked point alignment method initialiizing</td></tr>
<tr><td>3</td><td>Electrical zero point direction (+)</td><td>Electrical zero point direction (–)</td></tr>
</table></td><td>0000 to FFFF (hexa-decimal)</td><td>0004</td></tr>
<tr><td>70 0123</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 while the power is 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>70 0130</td><td>backlash</td><td>Backlash compensation amount</td><td>Set the backlash compensation amount.</td><td>0 to 9999 (1/1000 ° or µm)</td><td>0</td></tr>
<tr><td>70 0132</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>70 0133</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>70 0134</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>70 0135</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
</table>

No.	Name		Details	Setting range	Default value
70 0150	Aspeed1	Operation parameter group 1 Automatic operation speed	Set the feedrate during automatic operation when operation parameter group 1 is selected. This parameter functions 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 "700158 Aspeed2" to "700174 Aspeed4" parameters.	1 to 100000 (°/min or mm/min)	5000
70 0151	Mspeed1	Operation parameter group 1 Manual operation speed	Set the feedrate during manual operation and JOG operation when operation parameter group 1 is selected.	1 to 100000 (° /min or mm/min)	2000
70 0152	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-character 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
70 0153	time1.2	Operation parameter group 1 Acceleration/ deceleration time constant 2	Set this parameter when carrying out S-character acceleration/deceleration. When S-character 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. For the handle feed operation mode, this becomes the linear acceleration/deceleration that is the acceleration/deceleration time constant.	1 to 999 (ms)	1
70 0154	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 limiting 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
70 0155	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.	0 to 32767 (° or mm)	100
70 0156	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 exceeding this value.	0.000 to 99999.999 (° or mm)	0.500

No.	Name		Details	Setting range	Default value
70 0157	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 values at which these signals are output when operation parameter group 1 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
70 0158	Aspeed2	Operation parameter group 2	Same as operation parameter group 1.	Same as operation parameter group 1.	
70 0159	Mspeed2				
70 0160	time2.1 **(Note 1)**				
70 0161	time2.2				
70 0162	TL2				
70 0163	OD2				
70 0164	just2				
70 0165	near2				
70 0166	Aspeed3	Operation parameter group 3	Same as operation parameter group 1.	Same as operation parameter group 1.	
70 0167	Mspeed3				
70 0168	time3.1 **(Note 1)**				
70 0169	time3.2				
70 0170	TL3				
70 0171	OD3				
70 0172	just3				
70 0173	near3				
70 0174	Aspeed4	Operation parameter group 4	Same as operation parameter group 1.	Same as operation parameter group 1.	
70 0175	Mspeed4				
70 0176	time4.1 **(Note 1)**				
70 0177	time4.2				
70 0178	TL4				
70 0179	OD4				
70 0180	just4				
70 0181	near4				

(Note 1) Set the linear acceleration/deceleration time constant for the automatic operation speed (clamp speed) of operation parameter group 1 in "700160 time2.1". This also applies for "700168 time3.1" and "700176 time4.1".

<table>
<tr><th>No.</th><th>Name</th><th></th><th>Details</th><th>Setting range</th><th>Default value</th></tr>
<tr><td>70 0190</td><td>stpos2</td><td>Station 2 coordinate value</td><td>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).</td><td>–99999.999 to 99999.999 (° or mm)</td><td>0.000</td></tr>
<tr><td>70 0191</td><td>stpos3</td><td>Station 3 coordinate value</td><td></td><td></td><td></td></tr>
<tr><td>70 0192</td><td>stpos4</td><td>Station 4 coordinate value</td><td></td><td></td><td></td></tr>
<tr><td>70 0193</td><td>stpos5</td><td>Station 5 coordinate value</td><td></td><td></td><td></td></tr>
<tr><td>70 0194</td><td>stpos6</td><td>Station 6 coordinate value</td><td></td><td></td><td></td></tr>
<tr><td>70 0195</td><td>stpos7</td><td>Station 7 coordinate value</td><td></td><td></td><td></td></tr>
<tr><td>70 0196</td><td>stpos8</td><td>Station 8 coordinate value</td><td></td><td></td><td></td></tr>
<tr><td>70 0197</td><td>stpos9</td><td>Station 9 coordinate value</td><td></td><td></td><td></td></tr>
<tr><td>70 0200</td><td>PSWcheck</td><td>PSW detection method</td><td>This is a HEX setting parameter. Set bits without a description to their default values.
<table>
<tr><th>bit</th><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><th>Default value</th><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>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 rowspan="9">The position switch output is judged by the machine position of the command system.</td><td rowspan="9">The position switch output is judged by the machine FB position (actual position).</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></tr>
<tr><td>6</td></tr>
<tr><td>7</td></tr>
<tr><td>8</td></tr>
</table>
</td><td>0000 to FFFF (hexa-decimal)</td><td>0000</td></tr>
</table>

No.	Name		Details	Setting range	Default value
70 0201	PSW1dog1	PSW1 region setting 1	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 not including 0.000 °.	–99999.999 to 99999.999 (° or mm)	0.000
70 0202	PSW1dog2	PSW1 region setting 2			
70 0203	PSW2dog1	PSW2 region setting 1			
70 0204	PSW2dog2	PSW2 region setting 2			
70 0205	PSW3dog1	PSW3 region setting 1			
70 0206	PSW3dog2	PSW3 region setting 2			
70 0207	PSW4dog1	PSW4 region setting 1			
70 0208	PSW4dog2	PSW4 region setting 2			
70 0209	PSW5dog1	PSW5 region setting 1			
70 0210	PSW5dog2	PSW5 region setting 2			
70 0211	PSW6dog1	PSW6 region setting 1			
70 0212	PSW6dog2	PSW6 region setting 2			
70 0213	PSW7dog1	PSW7 region setting 1			
70 0214	PSW7dog2	PSW7 region setting 2			
70 0215	PSW8dog1	PSW8 region setting 1			
70 0216	PSW8dog2	PSW8 region setting 2			
70 0220	push	Stopper amount	Set the command stroke of the stopper operation during stopper positioning operations.	0.000 to 359.999 (° or mm)	0.000
70 0221	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
70 0222	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
70 0223	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

4. Other Parameters

4.1 Utilities

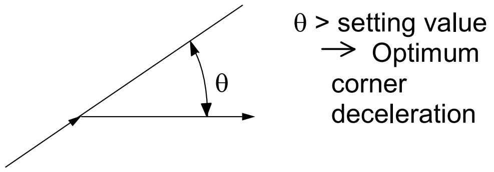
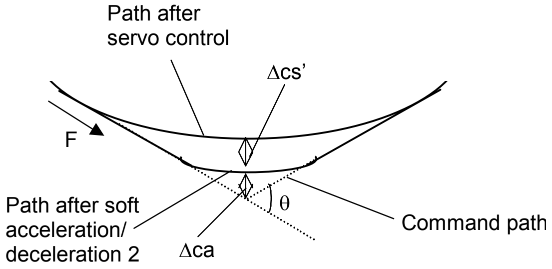
The parameters related to specific purposes, such as high-precision control, etc., are grouped together on the Utility param screen.
The parameters for each function can be adjusted easily using this screen.
Both user parameters and machine parameters are provided on this screen.
These can be set, but a password must be input before the machine parameters can be set.
Refer to the Instruction Manual for details on using the screen.

- **Sub-menus for Utility param**

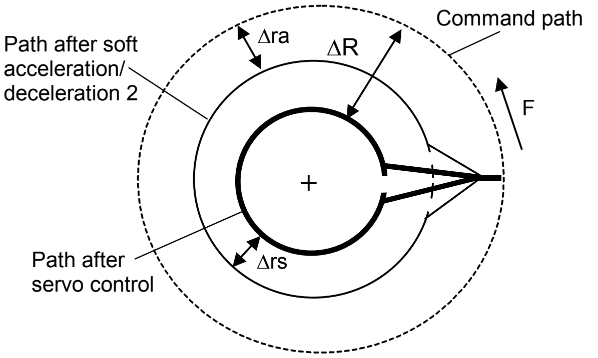
Menu	Details	Remarks
Psswd input	When a password is input, data attributed to the machining parameters can be set.	–
Next axis	This can be selected when there are more or five display axes in the selected system. When axes displayed can be switched from the 1st to 4th axis and the 5th to 8th axis. These are used on the parameter screen that has a layout for each axis.	–
Hi-prec common	The high-precision common parameter screen will open. **(Note)** The machine parameters can be referred to even if a password is not input, but the parameters cannot be set.	4.2 High-precision Common Parameters
Hi-prec axis	The high-precision axis parameter screen will open. **(Note)** The machine parameters can be referred to even if a password is not input, but the parameters cannot be set.	4.3 High-precision Axis Parameters

4.2 High-precision Common Parameters

If a parameter related to a calculation expression is changed, the display-only data will be recalculated and displayed.
For the theoretical corner roundness amount, theoretical right angle corner roundness amount and theoretical radius decrease error amount, the value converted into inches will be displayed when the control parameter 310001 initial inch is set to ON.

No.	Name	Details	Setting range (units)
33 0038	Precision coefficien	This sets the compensation coefficient of the control error during the high-accuracy mode. The compensation coefficient is set when further reducing the control error of the roundness and arc radius reduction amount at the corner. Theoretically, the accuracy error becomes smaller as the setting value becomes larger, but because the speed and arc clamp speed at the corner become lower, the cycle time becomes longer.	–1000 to 100 (%) (Standard value: 0)
33 0039	Corner slow angle	In the high-accuracy mode, this automatically judges the corner, and realizes a smooth, curved line or a sharp corner. In the high-accuracy control mode, when the angle (exterior angle) between blocks is larger than the setting value, it is judged as a corner. The machine will decelerate to make the edge. Consequently, set the minimum value to be recognized as an angle (exterior angle). 	0 to 90 (°) 0: Interpreted as 5°
	Theor Cor dull amt	The corner roundness amount Δ c (mm)in respect to the angle (outer angle) θ (°) corner is displayed as the value obtained by totaling the error Δ ca (mm) in soft acceleration/deceleration 2 and the error Δ cs (mm) in the servo system. $\Delta c = \Delta ca + \Delta cs$ This data is calculated using the following parameters. 330039 Corner slow angle (°) 120082 Prec soft time const 2 (ms) 160003 Position loop gain 1st axis (1/s) 130021 Feed forward gain 1st axis (%)  **Theoretical roundness amount at corner**	(Display-only) (mm)

No.	Name	Details	Setting range (units)
	Corner dclr speed	The value calculated with the following data is displayed as the corner deceleration speed Fc (mm/min) for the angle (outer angle) θ (°) corner. This data is calculated using the following parameters. 330039 Corner slow angle (°) 120037 Acc/dclr std feed (mm/min) 120038 Acc/dclr std time (ms) 330038 Precision coefficien (%)	(Display-only) (mm/min)
	Theor 90deg dull amt	The corner droop amount for a 90° angle (outer angle) is displayed. θ is calculated as 90.	(Display-only) (mm)
	90deg Cor dec speed	The corner deceleration speed for a 90° angle (outer angle) is displayed. θ is calculated as 90.	(Display-only) (mm/min)
33 0078	Prec coef (curve) vald	This selects whether a precision coefficient or precision coefficient for curves is used as the compensation coefficient to further reduce the radius reduction amount of a curve (arc, spline, NURBS curve) during the high-accuracy control mode. When "0" is set, the precision coefficient is applied, and when "1" is set, the precision coefficient for curves is applied.	0: Precision coefficient 1: Precision coefficient for curves (Standard value: 0)
33 0079	Prec coef (curve)	This sets the compensation coefficient to further reduce the radius reduction amount of a curve (arc, spline, NURBS curve) during the high-accuracy control mode.	–1000 to 99 (%) (Standard value: 0)

No.	Name	Details	Setting range (units)
	Theor R decrease	The value calculated with the following data is displayed for the theoretical radius reduction error amount ΔR (mm). ΔR is the value when the high-accuracy control mode is valid and SHG is valid. This data is calculated using the following parameters. 160003 Position loop gain 1st axis (1/s) 130021 Feed forward gain 1st axis (%) 120082 Prec soft time cnst 2 (ms) 330038 Precision coefficien (%) (When 330078 Prec coef (curve) vald is set to 0) 330079 Prec coef (curve) (%) (When 330078 Prec coef (curve) vald is set to 1)  **Theoretical radius reduction amount at arc center**	(Display-only) (mm)
	R5mm arc dclr speed	The value calculated with the following data is displayed for the arc deceleration speed Fci (mm/min) for the radius 5 (mm) arc. This data is calculated using the following parameters. 120037 Acc/dclr std feed (mm/min) 120038 Acc/dclr std time (ms) 330038 Precision coefficien (%) (When 330078 Prec coef (curve) vald is set to 0) 330079 Prec coef (curve) (%) (When 330078 Prec coef (curve) vald is set to 1)	(Display-only) (mm/min)

No.	Name	Details	Setting range (units)
	R1mm arc dclr speed	The value calculated with the following data is displayed for the arc deceleration speed Fci (mm/min) for the radius 1 (mm) arc. This data is calculated using the following parameters. 120037 Acc/dclr std feed (mm/min) 120038 Acc/dclr std time (ms) 330038 Precision coefficien (%) (When 330078 Prec coef (curve) vald is set to 0) 330079 Prec coef (curve) (%) (When 330078 Prec coef (curve) vald is set to 1)	(Display-only) (mm/min)
33 0040	Arc speed ctrl valid	During high-accuracy control, this sets whether the speed control is valid or invalid at the arc entrance and exit.	0: Speed control invalid 1: Speed control valid
33 0041	Arc slowdown speed	During high-accuracy control, this sets the deceleration speed when the speed control is valid at the arc entrance and exit.	0 to 480000 (mm/min)
33 0107	SS ctrl std length	Adjust the maximum value of the pre-read range for recognition with SS control. To avoid the effect of steps or errors, etc., set a large value. To decelerate sufficiently, set a small value. SS control will be invalid when "0.000" is set.	0.000 to 100.000 (mm) (Standard value: 1.000)
33 0108	SS ctrl clamp coef	Set the degree of applying speed clamp on a corner less than the corner deceleration angle. The clamp speed will decrease as a larger value is set. SS control speed clamp will be invalid when "0" is set.	0 to 99 (%) (Standard value: 0)
33 0053	Spline cancel angle	If the angle created by two continuing blocks exceeds this setting value, the high-accuracy spline function will be temporarily canceled. Set the angle for creating an edge.	0 to 90 (°) (Standard value: 60)
33 0054	Minute line length	This is valid during the high-accuracy spline control. Curve interpolation will be carried out on linear blocks of which the length of one block is less than this setting value.	0 to 10 (mm) 0: 1 (mm) (Standard value: 0)
33 0055	Tolrnc (inflctn)	This corrects the curve shape so that the spline curve's helical difference is within this setting value for blocks containing an inflection point.	0 to 100 (mm) (Standard value: 0.01)
33 0056	Tolrnc (smooth)	This corrects the curve shape so that the spline curve's helical difference is within this setting value for blocks not containing an inflection point.	0 to 100 (mm) (Standard value: 0.01)
33 0057	Tolrnc (thin out)	This thins out blocks of which the block length does not satisfy this setting value.	0 to 10 (mm) (Standard value: 0.01)
		(The following parameters are machine parameters.)	
11 0092	Fix prec ss coef	The pre-read range recognized with SS control is fixed.	0, 1 (Standard value: 0)

No.	Name	Details	Setting range (units)
12 0037	Acc/dclr std feed	Set the cutting feedrate for acceleration/ deceleration before interpolation.	1 to 999999mm/min
12 0038	Acc/dclr std time	Set the linear control time constant used in the cutting feed acceleration during acceleration/ deceleration before interpolation.	1 to 500ms
	Acc of cutting feed	The value calculated with the following data is displayed for the cutting feed acceleration (G). This data is calculated using the following parameters. 120037 Acc/dclr std feed (mm/min) 120038 Acc/dclr std time (ms) Standard gravity acceleration 9.80665 (m/s^2)	(Display-only) (G) The number of digits displayed after the decimal point is fixed to three digits.
12 0071	Prec soft time cnst	The pattern acceleration/deceleration before interpolation is made smooth.	0 to 200 (16/9ms)
	Notch frequency Hz	The value calculated with the following expression is displayed for the notch frequency fn (Hz) in respect to the S-pattern filter for the 120071 soft acceleration/deceleration time constant T (16/9 ms). fn = 1000 / (T × dt) (dt is 16/9 (ms))	(Display-only) (Hz) The number of digits displayed after the decimal point is fixed to three digits.
12 0082	Prec soft time cnst 2	Set this to smooth the speed pattern of each axis during acceleration/deceleration before interpolation. This will not activate when "0" or "1" is set.	0 to 50 (ms)
	Notch frequency Hz	The value calculated with the following expression is displayed for the notch frequency fn (Hz) in respect to the S-pattern filter for the 120082 soft acceleration/deceleration time constant 2 T (ms). fn = 1000 / T	(Display-only) (Hz) The number of digits displayed after the decimal point is fixed to three digits.
12 0039	Acc/dclr G0 valid	Designate whether to validate the acceleration/ deceleration before G0 interpolation. 0: The G0 acceleration/deceleration is always the acceleration/deceleration after interpolation. 1: Regardless of whether or not in the high-accuracy mode, the G0 acceleration/deceleration is the acceleration/deceleration before interpolation.	0, 1

4.3 High-precision Axis Parameters

If a parameter related to a calculation expression is changed, the display-only data will be recalculated and displayed.

No.	Name	Details	Setting range (units)
13 0120	Cor dclr speed coef	Set the adjustment coefficient of each axis in respect to the pre-interpolation acceleration/ deceleration tolerable acceleration rate. When "0" (%) is set, the operation will be the same as when "100" (%) is set.	0 to 200 (%) (Standard value: 0)
13 0021	Feed forward gain	Set the feed forward gain for acceleration/ deceleration before interpolation. The larger the setting value is, theoretically, the smaller the control error will be. However, if machine vibration occurs, the setting value must be lowered.	0 to 200 (%)
13 0003	Max. cutting feedrate	Define maximum cutting feedrate for each axis.	<1µm system> 1 to 480000 (mm/min) <0.1µm system> 1 to 100000 (mm/min)
13 0063	Clamp (higt prec mod)	Set the maximum cutting feedrate for each axis in the high-accuracy control mode. When "0" is set, "130003 Max. cutting feedrate" is used.	<1µm system> 1 to 480000 (mm/min) <0.1µm system> 1 to 100000 (mm/min)
13 0002	Rapid feedrate	Set rapid traverse rate for each axis. Maximum setting value depends on machine system and so care is required in this respect.	<1µm system> 1 to 480000 (mm/min) <0.1µm system> 1 to 100000 (mm/min)
13 0064	Rapid (higt prec mode)	Set the rapid traverse rate for each axis in the high-accuracy control mode. When "0" is set, "130002 Rapid feedrate" is used.	<1µm system> 1 to 480000 (mm/min) <0.1µm system> 1 to 100000 (mm/min)
16 0003	Position loop gain 1	Set the position loop gain in increments of "1". Set "33" for ordinary operation. For SHG control, set both SV004 (PGN2) and SV057 (SHGC). (When using MDS-B-SVJ2.)	1 to 200 (1/s)
16 0004	Position loop gain 2	For SHG control, set this parameter with SV003 (PGN1), SV057 (SHGC). (When using MDS-B-SVJ2.) Set "0" when it is not used.	0 to 999 (1/s)
16 0057	High gain ctrl const	Set this with SV050 (PGN2sp), SV003 (PGN1) and SV004 (PGN2) when carrying out SGH control. Set to "0" when not using this function.	0 to 999 (1/s)
16 0005	Vel. loop gain 1	Set the speed loop gain. The standard value is 150. When it is increased, response is improved but vibration and sound become larger.	1 to 999

No.	Name	Details	Setting range (units)
16 0027	Servo function 1	**For MDS-B-V1/V2** Select the servo functions.	0000 to FFFF HEX setting

F	E	D	C	B	A	9	8
aflt	zrn2	afrg	afse	ovs2	ovs1	lmc2	lmc1

7	6	5	4	3	2	1	0
		vfct2	vfct1		upc	vcnt2	vcnt1

bit	Name	Meaning when set to 0	Meaning when set to 1
0	vcnt1	This prevents overshooting and limited cycles, etc., during the closed loop. Use this in combination with SV007 (VIL). 00: Delay compensation changeover invalid 01: Delay compensation changeover type 1 10: Delay compensation changeover type 2 11: Reserved	
1	vcnt2		
2	upc	Starting torque compensation invalid	Starting torque compensation valid
3			
4	vfct1	00: Jitter compensation invalid 01: Jitter compensation 1 pulse 10: Jitter compensation 2 pulse 11: Jitter compensation 3 pulse	
5	vfct2		
6			
7			
8	lmc1	Set the compensation gain with SV016 (LMC1) and SV041 (LMC2). 00: Lost motion compensation invalid 01: Lost motion compensation type 1 10: Lost motion compensation type 2 11: Reserved	
9	lmc2		
A	ovs1	00: Overshoot compensation invalid 01: Overshoot compensation type 1 10: Overshoot compensation type 2 11: Overshoot compensation type 3	
B	ovs2		
C	afse	Set for normal use	Increases adaptive filter sensitivity **(Note 1)**
D	afrg	Set for normal use	Set this if the adaptive filter is effective in the speed range. **(Note 1)**
E	zrn2	Reference point return type 1	Reference point return type 2
F	aflt	Adaptive filter invalid	Adaptive filter valid If the machine vibrates, the resonance frequency is detected, and the filter is automatically set to eliminate the vibration. This is effective for resonance of 100Hz or more.

(Note 1) When setting afrg (bitD) to "1", also set afse (bitC) to "1".

(Continued on the next page.)

<table>
<tr><th>No.</th><th>Name</th><th>Details</th><th>Setting range (units)</th></tr>
<tr><td>16 0027</td><td>Servo function 1</td><td>
For MDS-B-SVJ2 (Continued from the previous page.)
Select the servo functions.
<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></td><td></td><td>ovs2</td><td>ovs1</td><td>lmc2</td><td>lmc1</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>vfct2</td><td>vfct1</td><td></td><td></td><td></td><td></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></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>vfct1</td><td colspan="2" rowspan="2">00: Jitter compensation invalid
01: Jitter compensation 1 pulse
10: Jitter compensation 2 pulse
11: Jitter compensation 3 pulse</td></tr>
<tr><td>5</td><td>vfct2</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>lmc1</td><td colspan="2" rowspan="2">Set the compensation gain with SV016 (LMC1) and SV041 (LMC2).
00: Lost motion compensation invalid
01: Lost motion compensation type 1
10: Lost motion compensation type 2
11: Reserved</td></tr>
<tr><td>9</td><td>lmc2</td></tr>
<tr><td>A</td><td>ovs1</td><td colspan="2" rowspan="2">00: Overshoot compensation invalid
01: Overshoot compensation type 1
10: Overshoot compensation type 2
11: Overshoot compensation type 3</td></tr>
<tr><td>B</td><td>ovs2</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>zrn2</td><td colspan="2">Set "1".</td></tr>
<tr><td>F</td><td>aflt</td><td>Adaptive filter stop</td><td>Adaptive filter start</td></tr>
</table>
(Note) Set "0" in bits with no particular description.
</td><td>0000 to FFFF
HEX setting</td></tr>
<tr><td></td><td>LMC type</td><td>The lost motion compensation type for 160027 servo function 1 bit 8 and 9 (1mc1, 1mc2) is displayed.</td><td>(Display-only)
(Blank): Compensation type invalid
TYPE1: Compensation type 1
TYPE2: Compensation type 2</td></tr>
<tr><td>13 0013</td><td>Backlash for G1</td><td>Set the backlash compensation amount with movement command in the cutting feed mode or with reverse direction in the manual mode.</td><td>–99999 to 99999
(Interpolation unit)</td></tr>
<tr><td>13 0012</td><td>Backlash for G0</td><td>Set the backlash compensation amount with movement command in rapid traverse mode or with reverse direction in manual mode.
Note that "G1back" is used for the movement in the handle mode.</td><td>–99999 to 99999
(Interpolation unit)</td></tr>
</table>

No.	Name	Details	Setting range (units)
16 0016	LMC gain 1	Set this parameter if the protrusion (caused by non-sensitive band from friction, torsion, backlash, etc.) is large when the arc quadrant is changed. This is valid only when lost motion compensation SV027 (lmc1, lmc2) is selected.	–1 to 200
		Type 1 SV027 (SSF1) 1mc1=1, 1mc2=0 In low-speed interpolation mode, compensation of this type eliminates bump. Setting "0" to this parameter indicates interpolation gain 0. Setting "100" causes 100% compensation.	0 to 200 (%)
		Type 2 SV027 (SSF1) 1mc1=0, 1mc2=1 Use type 2 when type 1 is not enough for compensation such as in high-speed, high-accuracy interpolation. Set data in percentage to stall rated current. Set "0" to prevent compensation. Set the double value the current percentage on the servo monitor screen for jog feeding (about F1000).	0 to 100 (Stall rated current %)
		To change the compensation gain (type 1) or compensation amount (type 2) according to the direction. To set a different value according to the command direction, set this with SV041 (LMC2). Set the value for changing the command speed from the – to + direction (during command direction CW) in SV016 (LMC1). Set the value for changing the command speed from the + to – direction (during command direction CW) in SV041 (LMC2). When "–1" is set, compensation will not be carried out when the command speed direction changes.	
16 0041	LMC gain 2	Normally set this to "0". Set this with SV016 (LMC1)only when setting the lost motion compensation's gain (type 1) or compensation amount (type 2) to different values according to the command direction. • Set the value for changing the command speed from the – to + direction (during command direction CW) in SV016 (LMC1). • Set the value for changing the command speed from the + to – direction (during command direction CW) in SV041 (LMC2). • When "–1" is set, compensation will not be carried out when the command speed direction changes. This is valid only when lost motion compensation (SV027: lmc1, lmc2) is selected.	–1 to 200 (Stall rated current %)
16 0039	LMC timing	Set when the lost motion compensation timing is not suitable. Adjust upwards in increments of "10".	0 to 2000 (ms)

No.	Name	Details	Setting range (units)
16 0040	LMC non-sensi band (low-order 8 bits)	The lost motion compensation dead zone can only be set during feed forward control. Set in the low-order 8 bits. When set to "0", 2µm will actually be set. Adjust upwards in increments of 1µm.	–32768 to 32767 **(Note)** The setting range of the low-order 8 bits is 0 to 100 (µm)
	Current bias (high-order 8 bits)	This is used in combination with high-order 8 bits of SV030 and SV045.	
	LMC non-sensi band	The value set for the low-order 8 bits of the 160040 lost motion parameter is displayed.	(Display-only) 0 to 100 (µm)

Revision History

Date of revision	Manual No.	Revision details
Nov. 1997	BNP-B2238*	First edition created.
Dec. 1997	BNP-B2238A	"1. Control Parameters" and "2. User Parameters" were added.
Apr. 1999	BNP-B2238B	New parameters are added. Miswrite is corrected. "2.6 Computer Link Parameters" was added.
Oct. 2000	BNP-B2238D	Because of revision of manual for Japanese, version number of English was updated. New parameters related to Auxiliary axis (J2-CT) ,etc. were added. Note that the contents for this version corresponds to Ver. D of Japanese.
Mar. 2001	BNP-B2238E	Contents changed and added to comply with system F0 version. Following sections added: "2.4 Anshin-net parameter 1" "3.3 Anshin-net parameter 2" "4. Other parameters" (Parameters Per Application)
Mar. 2002	BNP-B2238F	• Design of the cover and the back cover were changed. • MODEL, MODEL CODE, and Manual No. were added on the back cover. • The details of base common parameters were added. • The details of anshin-net parameter 2 were added. • The details of base system parameters were added.
Jun. 2003	BNP-B2238G	• The details of control parameter 2 were rewritten. • The details of base common parameters were rewritten. • The details of axis specification parameters were added. • All of servo parameters were changed. • All of spindle parameters were changed. • The details of high-precision axis parameters were added. • Miswrite is corrected.

Notice

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

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

Duplication Prohibited

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