Changes for the Better

MITSUBISHI ELECTRIC

CNC
MELDAS 60/60S Series

ALARM/PARAMETER MANUAL

BNP-B2201L(ENG)

PREFACE

This manual is the alarm/parameter guide required to use the MELDAS60/60S Series.
This manual is prepared on the assumption that your machine is provided with all of the MELDAS60/60S Series functions. Confirm the functions available for your NC before proceeding to operation by referring to the specification issued by the machine manufacturer.

* The "MELDAS60 Series" includes the M64A, M64, M65, M66 and M65V.
* The "MELDAS60S Series" includes the M64AS, M64S, M65S and M66S.

Notes on Reading This Manual

(1) This manual explains general parameters as viewed from the NC.
For information about each machine tool, refer to manuals issued from the machine manufacturer.
If the descriptions relating to “restrictions” and “allowable conditions” conflict between this manual and the machine manufacturer's instruction manual, the later has priority over the former.

(2) This manual is intended to contain as much descriptions as possible even about special operations. The operations to which no reference is made in this manual should be considered impossible.

(3) The “M64D system” explained in this manual includes the M64AS, M64S, M65S and M66S.

(4) The “special display unit” explained in this manual is the display unit incorporated by the machine manufacturer, and is not the MELDAS standard display unit.

⚠ Caution

⚠ **If the descriptions relating to the “restrictions” and “allowable conditions” conflict between this manual and the machine manufacturer’s instruction manual, the latter has priority over the former.**

⚠ **The operations to which no reference is made in this manual should be considered impossible.**

⚠ **This manual is complied on the assumption that your machine is provided with all optional functions. Confirm the functions available for your machine before proceeding to operation by referring to the specification issued by the machine manufacturer.**

⚠ **In some NC system versions, there may be cases that different pictures appear on the screen, the machine operates in a different way or some function is not activated.**

Precautions for Safety

Always read the specifications 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

⚠ If the descriptions relating to the “restrictions” and “allowable conditions” conflict between this manual and the machine manufacturer’s instruction manual, the latter has priority over the former.

⚠ The operations to which no reference is made in this manual should be considered impossible.

⚠ This manual is complied on the assumption that your machine is provided with all optional functions. Confirm the functions available for your machine before proceeding to operation by referring to the specification issued by the machine manufacturer.

⚠ In some NC system versions, there may be cases that different pictures appear on the screen, the machine operates in a different way on some function is not activated.

2. Items related to faults and abnormalities

❗ If the BATTERY LOW alarm is output, save the machining programs, tool data and parameters to an input/output device, and then replace the battery. If the BATTERY alarm occurs, the machining programs, tool data and parameters may be damaged. After replacing the battery, reload each data item.

[Continued on next page]

⚠ CAUTION [Continued]

3. Items related to maintenance

⚠ Do not replace the battery while the power is ON.

⚠ Do not short-circuit, charge, heat, incinerate or disassemble the battery.

⚠ Dispose of the spent battery according to local laws.

4. Items related to servo parameters and spindle parameters

⚠ With the MDS-C1 Series, only the serial encoder is compatible as the motor end detector. The OHE/OHA type detector cannot be used as the motor end detector.

⚠ Do not adjust or change the parameter settings greatly as operation could become unstable.

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

Disposal

(Note) This symbol mark is for EU countries only.
This symbol mark is according to the directive 2006/66/EC Article 20 Information for end-users and Annex II.

Your MITSUBISHI ELECTRIC product is designed and manufactured with high quality materials and components which can be recycled and/or reused.
This symbol means that batteries and accumulators, at their end-of-life, should be disposed of separately from your household waste.
If a chemical symbol is printed beneath the symbol shown above, this chemical symbol means that the battery or accumulator contains a heavy metal at a certain concentration. This will be indicated as follows:
Hg: mercury (0,0005%), Cd: cadmium (0,002%), Pb: lead (0,004%)
In the European Union there are separate collection systems for used batteries and accumulators.
Please, dispose of batteries and accumulators correctly at your local community waste collection/ recycling centre.

Please, help us to conserve the environment we live in!

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I EXPLANATION OF ALARMS

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I EXPLANATION OF ALARMS

1. List of Alarms

1.1 Operation Alarms

(The bold characters are the messages displayed on the screen.)

M01 OPERATION ERROR	Alarms occurring due to incorrect operation by the operator during NC operation and those by machine trouble are displayed.	
Error No.	Details	Remedy
0001	DOG OVERRUN (Dog overrun) When returning to the reference point, the near-point detection limit switch did not stop over the dog, but overran the dog.	• Increase the length of the near-point dog. • Reduce the reference point return speed.
0002	Z-AX NO CRSS One of the axes did not pass the Z-phase during the initial reference point return after the power was turned ON.	• Move the detector one rotation or more in the opposite direction of the reference point, and repeat reference point return.
0003	INVALID RET (Invalid return) When manually returning to the reference point, the return direction differs from the axis movement direction selected with the AXIS SELECTION key.	• The selection of the AXIS SELECTION key's +/– direction is incorrect. The error is canceled by feeding the axis in the correct direction.
0004	EXT INTRLK (External interlock) The external interlock function has activated (the input signal is "OFF") and one of the axes has entered the interlock state.	• As the interlock function has activated, release it before resuming operation. • Check the sequence on the machine side. • Check for broken wires in the interlock signal line.
0005	INTRL INTRLK (Internal interlock) The internal interlock state has been entered. The absolute position detector axis has been removed. A command for the manual/automatic simultaneous valid axis was issued from the automatic mode.	• The servo OFF function is valid, so release it first. • An axis that can be removed has been issued, so perform the correct operations. • The command is issued in the same direction as the direction where manual skip turned ON, so perform the correct operations. • During the manual/automatic simultaneous mode, the axis commanded in the automatic mode became the manual operation axis. Turn OFF the manual/automatic valid signal for the commanded axis. • Turn ON the power again, and perform absolute position initialization.

Error No.	Details	Remedy
0006	H/W STRK END (H/W stroke end) The stroke end function has activated (the input signal is "OFF") and one of the axes is in the stroke end status.	• Move the machine manually. • Check for broken wires in the stroke end signal wire. • Check for trouble in the limit switch.
0007	S/W STRK END (S/W stroke end) The stored stroke limit I, II, IIB or IB function has activated.	• Move it manually. • If the stored stroke limit in the parameter is incorrectly set, correct it.
0008	Chuck/tail-stock barrier stroke end axis found The chuck/tail-stock barrier function turned ON, and an axis entered the stroke end state.	• Reset the alarm with reset, and move the machine in the reverse direction.
0009	Reference point return number illegal Return to the No. 2 reference point was performed before return to the No. 1 reference point was completed.	• Execute No. 1 reference point return.
0019	Sensor signal illegal ON The sensor signal was already ON when the tool measurement mode (TLM) signal was validated. The sensor signal turned ON when there was no axis movement after the tool measurement mode (TLM) signal was validated. The sensor signal turned ON at a position within 100μm from the final entry start position.	• Turn the tool measurement mode signal input OFF, and move the axis in a safe direction. • The operation alarm will turn OFF even when the sensor signal is turned OFF. **Note)** When the tool measurement mode signal input is turned OFF, the axis can be moved in either direction. Pay attention to the movement direction.
0020	Reference point return illegal Return to the reference point was performed before the coordinates had not been established.	• Execute reference point return
0024	Zero point return disabled during absolute position detection alarm A zero point return signal was input during an absolute position detection alarm.	• Reset the absolute position detection alarm, and then perform zero point return.
0025	Zero point return disabled during zero point initialization A zero point return signal was input during zero point initialization of the absolute position detection system.	• Complete zero point initialization, and then perform zero point return.

Error No.	Details	Remedy
0050	Chopping axis zero point return incomplete The chopping axis has not completed zero point return before entering the chopping mode. All axes interlock will be applied.	• Reset or turn the chopping signal OFF, and then carry out zero point return.
0051	Synchronization error too large The synchronization error of the master and slave axes exceeded the allowable value under synchronous control. A deviation exceeding the synchronization error limit value was found with the synchronization deviation detection.	• Select the correction mode and move one of the axes in the direction in which the errors are reduced. • Increase the allowable value or reset it to 0 (check disabled). • When using simple C-axis synchronous control, set the contents of the R435 register to 0. • Check the parameter (#2024 synerr).
0101	NOT OP MODE (Not operation mode)	• Check for a broken wire in the input mode signal wire. • Check for trouble in the mode selector switch. • Check the sequence program.
0102	OVERRIDE ZERO (Override zero) “The cutting feed override” switch on the machine operation panel is set to zero.	• Set "the cutting feed override" switch to a value other than zero to release the error. • If "the cutting feed override" switch is set to a value other than zero, check for a short circuit in the signal wire. • Check the sequence program.
0103	EX F SPD ZRO (External feed speed zero) “The manual feed speed” switch on the machine operation panel is set to zero when the machine is in the jog mode or automatic dry run mode. The "Manual feedrate B speed" is set to zero during the jog mode when manual feedrate B is valid. The "each axis manual feedrate B speed" is set to zero during the jog mode when each axis manual feedrate B is valid.	• Set "the manual feed speed" switch to a value other than zero to release the error. • If “the manual feed speed” switch is set to a value other than zero, check for a short circuit in the signal wire. • Check the sequence program.
0104	F1 SPD ZRO (F1-digit speed zero) The F1-digit feedrate is set to zero when the F1-digit feed command is being executed.	• Set the F1-digit feedrate on the setup parameter screen.

Error No.	Details	Remedy
0105	SPINDLE STP (Spindle stop) The spindle stopped during the synchronous feed command.	• Rotate the spindle. • If the workpiece is not being cut, start dry run. • Check for a broken wire in the spindle encoder cable. • Check the connections for the spindle encoder connectors. • Check the spindle encoder pulse.
0106	HNDL FD NOW (Handle feed axis No. illegal) An axis not found in the specifications was designated for handle feed or the handle feed axis was not selected.	• Check for broken wires in the handle feed axis selection signal wire. • Check the sequence program. • Check the No. of axes listed in the specifications.
0107	SPDL RPM EXS (Spindle rotation speed excessive) The spindle rotation speed exceeded the axis clamp speed during the thread cutting command.	• Lower the commanded spindle rotation speed.
0108	Fixed point mode feed axis No. illegal: An axis not found in the specifications was designated for the fixed point mode feed or the fixed point mode feedrate is illegal.	• Check for broken wires in the fixed mode feed axis selection signal wire and fixed point mode feedrate wire. • Check the fixed point mode feed specifications.
0109	BLK ST INTLK (Block start interlock) An interlock signal that locks the start of the block has been input.	• Check the sequence program.
0110	CTBL ST INTLK (Cutting block start interlock) An interlock signal that locks the start of the cutting block has been input.	• Check the sequence program.
0111	Restart switch ON The restart switch was turned ON before the restart search was completed, and the manual mode was selected.	• Search the block to be restarted. • Turn OFF the restart switch.
0112	Program Check Mode The automatic start button was pressed during program check or in program check mode.	• Press the reset button to cancel the program check mode.
0113	Automatic start during buffer correction The automatic start button was pressed during buffer correction.	• Press the automatic start button after buffer correction is completed.

Error No.	Details	Remedy
0115	RESETTING The automatic start button was pressed during resetting or tape rewinding.	• When rewinding the tape, wait for the winding to end, or press the reset button to stop the winding, and then press the automatic start button. • During resetting, wait for resetting to end, and then press the automatic start button.
0117	PLAYBACK NOT POSSIBLE The playback switch was turned ON during editing or full-character mode (9-inch).	• During editing, cancel the function by pressing the input or previous screen key, and then turn ON the playback switch. • Set the edit screen (9-inch) to the half-character mode, and then turn ON the playback switch.
0118	Block joint turn stop during normal line control The turning angle at the block joint exceeded the limit during normal line control. Normal line control type I The normal line control axis turning speed (#1523 C_feed) has not been set. Normal line control type II When turning in the inside of the arc, the parameter "#8041 C-rot. R" setting value is larger than the arc radius.	• Check the program. • Set the normal line control axis turning speed. (Parameter "#1523 C_feed") • Set the C axis turning diameter smaller than the arc radius, or check the setting value of the C axis turning diameter. (Parameter "#8041 C rot. R")
0120	Synchronization correction mode ON The synchronous correction mode switch was pressed in a non-handle mode.	• Select the handle or manual feed mode. • Turn OFF the correction mode switch.
0121	No synchronous control option The synchronous control system (register R435) was set with no synchronous control option.	• Set 0 in register R435.
0123	Computer link B The cycle start was attempted before resetting was completed. The operation of the computer link B was attempted in the 2nd part system of the 2-part system.	• Perform the cycle start after resetting is completed. • Set 0 in #8109 HOST LINK, and then set 1 again before performing the cycle start. • The operation of the computer link B cannot be performed in the 2nd part system of the 2-part system.
0124	Simultaneous axis movement prohibited during inclined axis control valid The basic axis corresponding to the inclined axis was started simultaneously in the manual mode while the inclined axis control was valid.	• Turn the inclined axis and basic axis start OFF for both axes. (This also applied for manual/automatic simultaneous start.) • Invalidate the basic axis compensation, or command one axis at a time.

Error No.	Details	Remedy
0126	Program restart machine lock Machine lock was applied on the return axis while manually returning to the restart position.	• Release the machine lock before resuming operations.
0150	Chopping override zero	• Check the chopping override (R135). • Check the rapid traverse override (R134).
0151	Command axis chopping axis A chopping axis movement command was issued from the program during the chopping mode. (This alarm will not occur when the movement amount is commanded as 0.) (All axes interlock state will be applied.)	• Reset, or turn OFF the chopping signal. When the chopping signal is turned OFF, the axis will return to the reference position, and then the program movement command will be executed.
0153	Bottom dead center position zero The bottom dead center position is set to the same position as the upper dead center position.	• Correctly set the bottom dead center position.
0154	Chopping axis handle selection axis Chopping was started when the chopping axis was selected as the handle axis.	• Select an axis other than the chopping axis as the handle axis, or start chopping after changing the mode to another mode.
0160	Axis with no maximum speed set for the outside of the soft limit range Returned from the outside of the soft limit range for the axis with no maximum speed set for the outside of the soft limit range.	• Set the maximum speed for the outside of the soft limit range. (Parameter “#2021 out_f”) • Change the soft limit range. (Parameter “#2013 OT–” “#2014 OT+”)
1005	An attempt was made to execute G114.* during execution of G114.*. G51.2 was commanded when the G51.2 spindle-spindle polygon machining mode was already entered with a separate system.	• Issue G113 to cancel G114.*. • Issue the spindle synchronous cancel signal (Y2E8: SPSYC) to cancel G114.*. • Cancel with G50.2. • Cancel with the spindle-spindle polygon cancel signal (Y359).
1007	The spindle is being used in synchronized tapping.	• Cancel synchronized tapping.
1026	Spindle C axis and other position control were commanded simultaneously. C axis mode command was issued for polygon machining spindle. C axis mode command was issued for synchronized tapping spindle. Polygon command was issued for synchronized tapping spindle. Spindle is being used as spindle/C axis.	• Cancel the C axis command. • Cancel the polygon machining command. • Cancel the C axis with servo OFF.

Error No.	Details	Remedy
1030	Synchronization mismatch Different M codes were commanded in the two systems as the synchronization M codes. Synchronization with the "!" code was commanded in another system during M code synchronization. Synchronization with the M code was commanded in another system during synchronization with the "!" code.	• Correct the program so that the M codes match. • Correct the program so that the same synchronization codes are commanded.
1031	The C axis selection signal was changed when multiple C axes could not be selected. An axis that cannot be controlled as the multiple C axes selection was selected.	• Check and correct the parameters and program.
1032	Tap return spindle selection illegal during multi-spindle Tap return was executed when a different spindle was selected. Cutting feed will wait until synchronization is completed.	• Select the spindle for which tap cycle was halted before the tap return signal was turned ON.
1033	Spindle-spindle polygon (G51.2) cutting interlock Cutting feed will wait until synchronization is completed.	• Wait for synchronization to end.
1034	Cross machining command illegal Cross machining control exceeding the number of control axes was attempted. Cross machining control with duplicated axis addresses was attempted.	• Check the parameter settings for cross machining control.
1035	Cross machining control disable modal Cross machining control was commanded for a system in which cross machining control is disabled as shown below. • During nose R compensation mode • During pole coordinate interpolation mode • During cylindrical interpolation mode • During balance cut mode • During fixed cycle machining mode • During facing turret mirror image	• Check the program.

Error No.	Details	Remedy
1036	Synchronous control designation disable The synchronous control operation method selection (R435 register) was set when the mode was not the C axis mode. The synchronous control operation method selection (R435 register) was set in the zero point not set state. Mirror image disable state The external mirror image or parameter mirror image was commanded during facing turret mirror image.	• Set the R435 register to 0. • Check the program and parameters.
1037	Synchronous control was started or canceled when synchronous control could not be started or canceled.	• Check the program and parameters.
1038	A movement command was issued to a synchronous axis in synchronous control.	• Check the program.
1043	No spindle speed clamp The constant surface speed command (G96) was issued to the spindle which is not selected for the spindle speed clamp command (G92/G50) under Multiple spindle control II.	Press the reset key and carry out the remedy below. • Select the spindle before commanding G92/G50. (Applicable only to M65 V series and M64 C version series)
1106	Spindle synchronous phase calculation illegal The spindle synchronization phase alignment command was issued while the spindle synchronization phase calculation request signal was ON.	• Check the program. • Check the sequence program.

(The bold characters are the messages displayed on the screen.)

M90 PARAM SET MODE	M90 Messages output when the setup parameter lock function is enabled are displayed.

Error No.	Details	Remedy
—	Setup parameter lock released The setup parameter lock is released. Automatic start is disabled when setup parameters can be set.	• Refer to the manual issued by the machine manufacturer.

1.2 Stop Codes

These codes indicate a status that caused the controller to stop for some reason.
(The bold characters are the messages displayed on the screen.)

T01 CAN'T CYCLE ST	This indicates the state where automatic operation cannot be started when attempting to start it from the stop state.	
Error No.	Details	Remedy
0101	AX IN MOTION (axis in motion) Automatic start is not possible as one of the axes is moving.	• Try automatic start again after all axes have stopped.
0102	READY OFF Automatic start is not possible as the NC is not ready.	• Another alarm has occurred. Check the details and remedy.
0103	RESET ON Automatic start is not possible as the reset signal has been input.	• Turn OFF the reset input signal. • Check that the reset switch is not ON constantly due to trouble. • Check the sequence program.
0104	A-OP STP SGL (Automatic operation stop signal ON) The FEED HOLD switch on the machine operation panel is ON (valid).	• Check the FEED HOLD switch. • The feed hold switch is the B contact. • Check for broken wires in the feed hold signal wire. • Check the sequence program.
0105	H/W STRK END (H/W stroke end axis) Automatic start is not possible as one of the axes is at the stroke end.	• If one of the axis' ends is at the stroke end, move the axis manually. • Check for broken wire in the stroke end signal wire. • Check for trouble in the stroke end limit switch.
0106	S/W STRK END (S/W stroke end axis) Automatic start is not possible as one of the axes is at the stored stroke limit.	• Move the axis manually. • If an axis is not at the end, check the parameter details.
0107	NO OP MODE (NO operation mode) The operation mode has not been selected.	• Select the automatic operation mode. • Check for broken wires in the automatic operation mode (memory, tape, MDI) signal wire.

Error No.	Details	Remedy
0108	OP MODE DUPL (Operation mode duplicated) Two or more automatic operation modes are selected.	• Check for a short circuit in the mode selection signal wire (memory, tape, MDI). • Check for trouble in the switch. • Check the sequence program.
0109	OP MODE SHFT (Operation mode shift) The automatic operation mode changed to another automatic operation mode.	• Return to the original automatic operation mode, and start automatic start.
0110	Tape search execution Automatic start is not possible as tape search is being executed.	• Begin automatic start after the tape search is completed.
0112	Program restart position return incomplete Automatic start is not possible as the axis has not been returned to the restart position.	• Manually return to the restart position. • Turn the automatic restart valid parameter ON, and then execute automatic start.
0113	Thermal alarm Automatic start is not possible because a thermal alarm (Z53 TEMP. OVER) has occurred.	• The NC controller temperature has exceeded the specified temperature. • Take appropriate measures to cool the unit.
0115	In host communication Automatic start cannot be executed as the NC is communicating with the host computer.	• Execute automatic start after the communication with the host computer is completed.
0138	Disabled start during absolute position detection alarm A start signal was input during an absolute position detection alarm.	• Reset the absolute position detection alarm, and then input the start signal.
0139	Disabled start during zero point initialization A start signal was input while initializing the absolute position detector's zero point.	• Complete zero point initialization before inputting the start signal.
0190	Automatic start disabled Automatic start is disabled because setup parameters can be set.	• Refer to the manual issued by the machine manufacturer.
0191	Automatic start disabled Automatic start was caused during file deletion or writing.	• Cause automatic start after file deletion or writing is completed.

T02 FEED HOLD	The feed hold state been entered due to a condition in the automatic operation.	
Error No.	Details	Remedy
0201	H/W STRK END (H/W stroke end axis) An axis is at the stroke end.	• Manually move the axis away from the stroke end limit switch. • The machining program must be corrected.
0202	S/W STRK END (S/W stroke end axis) An axis is at the stored stroke limit.	• Manually move the axis. • The machining program must be corrected.
0203	RESET SIGNAL ON (Reset signal on) The reset signal has been input.	• The program execution position has returned to the start of the program. Execute automatic operation from the start of the machining program.
0204	AUTO OP STOP (Automatic operation stop) The FEED HOLD switch is ON.	• Resume automatic operation by pressing the “CYCLE START” switch.
0205	AUTO MD CHING (Automatic mode change) The operation mode changed to another mode during automatic operation.	• Return to the original automatic operation mode, and resume automatic operation by pressing the “CYCLE START” switch.
0206	Acceleration and deceleration time constants too large The acceleration and deceleration time constants are too large. (This problem occurs at the same time as system alarm Z59.)	• Increase the set value of the parameter “#1206 G1bF”. • Decrease the set value of the parameter “#1207 G1btL”. • Lower the cutting speed.
0215	Absolute position detection alarm stop An absolute position detection alarm occurred.	• Reset the absolute position detection alarm.

T03 BLOCK STOP	This indicates that automatic operation stopped after executing one block of the program.

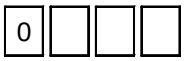
Error No.	Details	Remedy
0301	SNGL BLK ON (Single block on) The SINGLE BLOCK switch on the machine operation panel is ON. The single block or machine lock switch changed.	• Automatic operation can be resumed by turning the CYCLE START switch ON.
0302	User macro stop The block stop command was issued in the user macro program.	• Automatic operation can be resumed by turning the CYCLE START switch ON.
0303	Mode change The automatic mode changed to another automatic mode.	• Return to the original automatic operation mode, and resume automatic operation by turning the CYCLE START switch ON.
0304	MDI completion The last block of MDI was completed.	• Set MDI again, and turn the CYCLE START switch ON to resume MDI operation.
0305	Block start interlock The interlock signal that locks the block start is entered.	• Check the sequence program.
0306	Block cutting start interlock The interlock signal that locks the block cutting start is entered.	• Check the sequence program.
0310	Offset change of inclined Z-axis during program operation Whether to validate the offset of the inclined Z-axis switched during program operation.	• Automatic operation can be restarted by turning ON the cycle start switch.

T04 COLLATION STOP	Collation stop was applied during automatic operation.

Error No.	Details	Remedy
0401	Collation stop occurred.	• Automatic operation can be restarted with automatic start.

T10 FIN WAIT	This indicates the operation state when an alarm did not occur during automatic operation, and nothing seems to have happened.

Error No.	Details
0□□□	The error number is displayed while each of the completion wait modes listed in the table below is ON. It disappears when the mode is canceled.



Alarm No.	Unclamp signal wait Note 2)	In dwell execu-tion
0		
1		×
8	×	
9	×	×

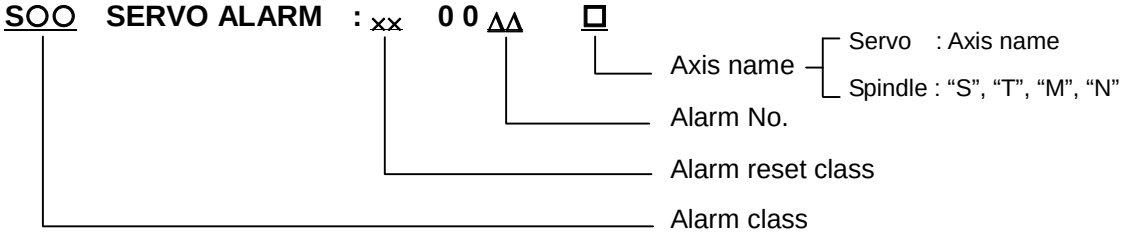
Alarm No.	Door open Note 1)	Waiting for spindle position to be looped
0		
1		×
8	×	
9	×	×

Alarm No.	Waiting for spindle orienta-tion to complete	Waiting for cutting speed decelera-tion	Waiting for rapid traverse decelera-tion	Waiting for MSTB comp-letion
0				
1				×
2			×	
3			×	×
4		×		
5		×		×
6		×	×	
7		×	×	×
8	×			
9	×			×
A	×		×	
B	×		×	×
C	×	×		
D	×	×		×
E	×	×	×	
F	×	×	×	×

Note 1: This mode is enabled by the door interlock function.
Note 2: The system is waiting for the index table indexing unclamp signal to turn ON or OFF

1.3 Servo/Spindle Alarms

This section describes alarms occurred by the errors in the servo system such as the drive unit, motor and encoder, etc. The alarm message, alarm No. and axis name will display on the alarm message screen. The axis where the alarm occurred and the alarm No. will also display on the servo monitor screen and the spindle monitor screen respectively. If several alarms have occurred, up to two errors per axis will display on the servo monitor screen and the spindle monitor screen respectively.
(The bold characters are the messages displayed on the screen.)



(Note 1) The alarm class and alarm reset class combinations are preset.
(Refer to the separate table for S02, S51 and S52.)

Alarm class	Alarm reset class	Resetting methods
S01	PR	After removing the cause of the alarm, reset the alarm by turning the NC power ON again.
S03	NR	After removing the cause of the alarm, reset the alarm by inputting the NC RESET key.
S04	AR	After removing the cause of the alarm, reset the alarm by turning the drive unit power ON again.

(Note 2) The resetting method may change according to the alarm class.
For example, even if "S03 SERVO ALARM: NR" is displayed, it may be necessary to turn the NC power ON again.

Alarm No.	Name	Meaning
10	Insufficient voltage	Insufficient PN bus voltage was detected in main circuit.
11	Axis selection error	Setting of the axis No. selection switch is incorrect.
12	Memory error 1	A CPU error or an internal memory error was detected during the power ON self-check.
13	Software processing error 1	Software processing has not finished within the specified time.
14	Software processing error 2	Software processing has not finished within the specified time.
15	Memory error 2	A CPU error or an internal memory error was detected during the power ON self-check.
16	Magnetic pole position detection error	Initial magnetic pole for motor control has not been formed yet.
17	A/D converter error	An error was detected in the A/D converter for detecting current FB.
18	Motor side detector: Initial communication error	Initial communication with the motor end detector failed.
19	Detector communication error in synchronous control	Initial communication with the motor end detector on master axis failed when setting closed-loop current synchronous control. Or the communication was interrupted.

Alarm No.	Name	Meaning
1A	Machine side detector: Initial communication error	Initial communication with the linear scale or the ball screw end detector failed.
1B	Machine side detector: CPU error 1	CPU initial error was detected in the linear scale or in the ball screw end detector.
1C	Machine side detector: EEPROM/LED error	An error was detected in the stored data of the linear scale memory. Or the LED deterioration was detected in the ball screw end detector.
1D	Machine side detector: Data error	An error data was detected in the linear scale or in the ball screw end detector.
1E	Machine side detector: Memory error	An internal memory error was detected in the linear scale.
1F	Machine side detector: Communication error	An error was detected in communication data with the linear scale or the ball screw end detector. Or the communication was interrupted.
20	Motor side detector: No signal	No signals were detected in A,B,Z-phase or U,V,W-phase of the pulse motor end detector in a servo system, or in Z-phase of PLG in a spindle system.
21	Machine side detector: No signal	No signals were detected in A,B,Z-phase of the pulse linear scale or the ball screw end detector in a servo system. Or no encoder signals were detected in a spindle system.
22	LSI error	LSI operation error was detected in the drive unit.
23	Excessive speed error 1	A difference between the speed command and speed feedback was continuously exceeding 50 r/min for longer than the setting time.
24	Grounding	The motor power cable is in contact with FG (Frame Ground).
25	Absolute position data lost	The absolute position was lost, as the backup battery voltage dropped in the absolute position detector.
26	Unused axis error	A power module error occurred in the axis whose axis No. selection switch was set to "F"(free axis).
27	Machine side detector: CPU error 2	A CPU error was detected in the linear scale.
28	Machine side detector: Overspeed	The specified max. speed was detected in the linear scale.
29	Machine side detector: Absolute position data error	An error was detected in the absolute position detection circuit of the linear scale.
2A	Machine side detector: Relative position data error	An error was detected in the relative position detection circuit of the linear scale.
2B	Motor side detector: CPU error 1	A CPU initial error was detected in the motor end detector or in the linear scale of a linear servo system.
2C	Motor side detector: EEPROM/LED error	The LED deterioration was detected in the motor end detector. Or an error was detected in the stored data of the linear scale memory of a linear servo system.

Alarm No.	Name	Meaning
2D	Motor side detector: Data error	A data error was detected in the motor end detector or in the linear scale of a linear servo system.
2E	Motor side detector: Memory error	An internal memory error was detected in the linear scale of a linear servo system.
2F	Motor side detector: Communication error	An error was detected in communication data with the motor end detector or with the linear scale of a linear servo system. Or the communication was interrupted.
30	Over regeneration	Over-regeneration detection level became over 100%. The regenerative resistor is overloaded.
31	Overspeed	The motor was detected to rotate at a speed exceeding the allowable speed.
32	Power module overcurrent	Overcurrent protection function in the power module has started its operation.
33	Overvoltage	PN bus voltage in main circuit exceeded the allowable value.
34	NC-DRV communication: CRC error	An error was detected in the data received from the CNC.
35	NC command error	The travel command data that was received from the CNC was excessive.
36	NC-DRV communication: Communication error	The communication with the CNC was interrupted.
37	Initial parameter error	An incorrect parameter was detected among the parameters received from the CNC at the power ON.
38	NC-DRV communication: Protocol error 1	An error was detected in the communication frames received from the CNC.
39	NC-DRV communication: Protocol error 2	An error was detected in the axis information data received from the CNC.
3A	Overcurrent	Excessive current was detected in the motor drive current.
3B	Power module overheat	Thermal protection function in the power module has started its operation.
3C	Regeneration circuit error	An error was detected in the regenerative transistor or in the regenerative resistor.
3D	Spindle speed blocked	The spindle motor failed to rotate faster than 45 r/min, even when the max. torque command was given.
3E	Spindle speed overrun	1. The spindle motor speed feedback was detected to be accelerated exceeding the commanded speed. 2. The spindle motor was detected to be rotated at a speed exceeding the parameter value, while the speed command was "0" (including the case of operation stoppage during the position control).
3F	Excessive speed error 2	A difference between the speed command and speed feedback was detected to exceed the setting amount or setting time in a constant speed operation.

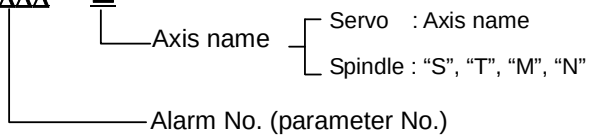
Alarm No.	Name	Meaning
40	Detector selection unit switching error	An error was detected in the motor switching signals that were received from the detector selection unit, while controlling one drive unit and two motors.
41	Detector selection unit communication error	An error was detected in the communication with the detector selection unit, while controlling one drive unit and two motors.
42	Feedback error 1	An error was detected in the feedback signals of the pulse motor end detector in a servo system, or in PLG's feedback signals in a spindle system.
43	Feedback error 2	Excessive difference was detected in position data between the motor end detector and the machine end detector in a servo system. In a spindle system, an error was detected in the encoder feedback signals.
44	Inappropriate coil selected for C axis	When using a coil changeover motor, C-axis was controlled while the high-speed coil was selected.
45	Fan stop	A cooling fan built in the drive unit stopped, and the loads on the unit exceeded the specified value.
46	Motor overheat	Thermal protection function of the motor or in the detector, has started its operation.
47	Regenerative resistor overheat	Thermal protection function of the regenerative resistor, has started its operation.
48	Motor side detector: CPU error 2	A CPU error was detected in the linear scale of a linear servo system.
49	Motor side detector: Overspeed	The specified max. speed was detected in the linear scale of the linear servo system.
4A	Motor side detector: Absolute position data error	An error was detected in the absolute position detection circuit in the linear scale of a linear servo system.
4B	Motor side detector: Relative position data error	An error was detected in the relative position detection circuit in the linear scale of a linear servo system.
4C	Current error at magnetic pole detection	A current error was detected in the IPM spindle motor when the initial magnetic pole was being formed.
4E	NC command mode error	The mode outside the specification was input in spindle control mode selection.
4F	Instantaneous power interruption	The power was momentarily interrupted.
50	Overload 1	Overload detection level became over 100%. The motor or the drive unit is overloaded.
51	Overload 2	Current command of more than 95% of the unit's max. current was being continuously given for longer than 1 second in a servo system. In a spindle system, the load over the continuous rating was being applied for longer than 30 minutes.
52	Excessive error 1	A difference between the actual and theoretical motor positions during servo ON exceeded the setting value in a servo system. In a spindle system, a difference between the position command and position feedback exceeded the setting value.

Alarm No.	Name	Meaning
53	Excessive error 2	A difference between the actual and theoretical motor positions during servo OFF exceeded the setting value.
54	Excessive error 3	When an excessive error 1 occurred, detection of the motor current failed.
55	External emergency stop error	There is no contactor shutoff command, even after 30 seconds has passed since the external emergency stop was input.
57	Option error	An invalid option function was selected.
58	Collision detection 1: G0	When collision detection function was valid, the disturbance torque in rapid traverse (G0) exceeded the collision detection level.
59	Collision detection 1: G1	When collision detection function was valid, the disturbance torque in cutting feed (G1) exceeded the collision detection level.
5A	Collision detection 2	When collision detection function was valid, the command torque reached the max. motor torque.
5C	Orientation feedback error	After orientation was achieved, a difference between the command and feedback exceeded the parameter setting.
5D	Speed monitoring: Input mismatch	As for door state signal of speed monitoring control, a mismatch between the external input signal and the control signal received from the CNC was detected.
5E	Speed monitoring: Feedback speed error	In speed monitoring control, the spindle speed was exceeding the setting speed with the door open.
5F	External contactor error	A contact of the external contactor is welding. Or the contactor fails to be ON during ready ON.
61	Power module overcurrent	Overcurrent protection function in the power module has started its operation.
62	Frequency error	The input power supply frequency increased above the specification range.
63	Supplementary regeneration error	The supplementary regenerative transistor is being ON.
65	Rush relay error	A resistor relay for rush short circuit fails to be ON.
67	Phase interruption	An open-phase condition was detected in input power supply circuit.
68	Watchdog	The system does not operate correctly.
69	Grounding	The motor power cable is in contact with FG (Frame Ground).
6A	External contactor welding	A contact of the external contactor is welding.
6B	Rush relay welding	A resistor relay for rush short circuit fails to be OFF.
6C	Main circuit error	An error was detected in charging operation of the main circuit capacitor.
6D	Parameter error	The capacity of the power supply unit and the regenerative resistor type that was set in the parameter are mismatched.
6E	Memory error	An internal memory error was detected.
6F	Power supply error	A power supply unit is not connected. Or an error was detected in A/D converter of the power supply unit.
71	Instantaneous power interruption	The power was momentarily interrupted.

Alarm No.	Name	Meaning
73	Over regeneration	Over-regeneration detection level became over 100%. The regenerative resistor is overloaded.
74	Regenerative resistor overheat	Thermal protection function of the regenerative resistor, has started its operation.
75	Overvoltage	PN bus voltage in main circuit exceeded the allowable value.
76	External emergency stop setting error	As for the external emergency stop settings, the setting on the rotary switch and the parameter setting are mismatched.
77	Power module overheat	Thermal protection function in the power module has started its operation.
7F	Drive unit power supply restart request	A mismatch of program mode selection was detected. Turn the drive unit power ON again.
80	Detector converting unit 1: Connection error	A connection error was detected between the analog output linear scale and the unit MDS-B-HR that is used in a linear servo system.
81	Detector converting unit 1: Communication error	A communication error was detected between the serial output linear scale and the unit MDS-B-HR that is used in a linear servo system.
83	Detector converting unit 1: Judgment error	Judgment of the linear scale analog frequency failed in the unit MDS-B-HR that is used in a linear servo system.
84	Detector converting unit 1: CPU error	A CPU error was detected in the unit MDS-B-HR that is used in a linear servo system.
85	Detector converting unit 1: Data error	A data error was detected in the unit MDS-B-HR that is used in a linear servo system.
86	Detector converting unit 1: Magnetic pole error	An error was detected in the magnetic pole of the unit MDS-B-HR that is used in a linear servo system.
88	Watchdog	The system does not operate correctly.
89	Detector converting unit 2: Connection error	A connection error was detected between the analog output linear scale and the unit MDS-B-HR in a servo system. In a spindle system, the initial communication with MDS-B-PJEX failed.

Alarm No.	Name	Meaning
8A	Detector converting unit 2: Communication error	An error was detected in the communication with the serial output linear scale of the unit MDS-B-HR in a servo system. In a spindle system, an error was detected in the communication with MDS-B-PJEX.
8B	Detector converting unit 2: Automatic tuning error	An abnormal signal was detected from PLG in automatic PLG tuning.
8C	Detector converting unit 2: Judgment error	The detector type outside the specification was designated in MDS-B-PJEX.
8D	Detector converting unit 2: CPU error	A CPU error was detected in the unit MDS-B-HR in a servo system, or in the unit MDS-B-PJEX in a spindle system.
8E	Detector converting unit 2: Data error	A data error was detected in the unit MDS-B-HR.

S02 INIT PARAM ERR ΔΔΔΔ □

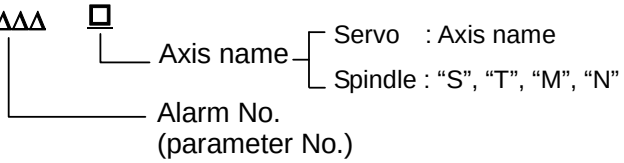


An error was found in the parameters transmitted from the controller to the drive unit when the power was turned ON.
Remove the cause of the alarm, and then reset the alarm by turning the controller power OFF once.

Alarm No.	Details	Remedy
2201 - 2264	The servo parameter setting data is illegal. The alarm No. is the No. of the servo parameter where the error occurred.	Check the descriptions for the appropriate servo parameters and correct them.
2301	The number of constants to be used in the following functions is too large: • Electronic gears • Position loop gain • Speed feedback conversion	Check that all the related parameters are specified correctly. sv001:PC1, sv002:PC2, sv003:PGN1 sv018:PIT, sv019:RNG1, sv020:RNG2
2302	High-speed serial incremental detector Parameters for absolute position detection are set to ON during OSE104 and OSE105 connection. Set the parameters for absolute position detection to OFF. To detect an absolute position, replace the incremental specification detector with an absolute position detector.	Check that all the related parameters are specified correctly. sv017:SPEC, sv025:MTYP
2303	No servo option is found. The closed loop (including the ball screw-end detector) or dual feedback control is an optional function.	Check that all the related parameters are specified correctly. sv025:MTYP/pen sv017:SPEC/dfbx

Alarm No.	Details	Remedy
2304	No servo option is found. The SHG control is an optional function.	Check that all the related parameters are specified correctly. sv057:SHGC sv058:SHGCsp
2305	No servo option is found. The adaptive filtering is an optional function.	Check that all the related parameters are specified correctly. sv027:SSF1/aflt
3201 - 3584	The spindle parameter setting data is illegal. The alarm No. is the No. of the spindle parameter where the error occurred.	Check the descriptions for the appropriate spindle parameters and correct them. Refer to Spindle Drive Maintenance Manual.

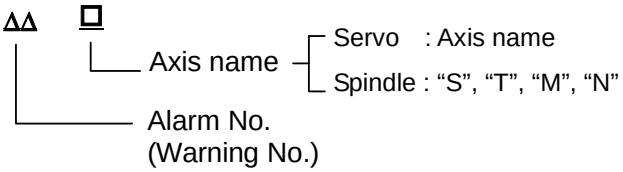
S51 PARAMETER ERROR ΔΔΔΔ □



Warning appears if a parameter set outside the tolerable range is set.
Illegal settings will be ignored.
This alarm will be reset when the correct value is set.

Alarm No.	Details	Remedy
2201 - 2264	Servo parameter setting data is illegal. The alarm No. is the No. of the servo parameter where the warning occurred.	Check the descriptions for the appropriate servo parameters and correct them.
3201 - 3584	Spindle parameter setting data is illegal. The alarm No. is the No. of the spindle parameter where the warning occurred.	Check the descriptions for the appropriate spindle parameters and correct them. Refer to Spindle Drive Maintenance Manual.

S52 SERVO WARNING 0 0 ΔΔ □



The drive unit warning is displayed.

Alarm No.	Name	Meaning
90	Detector: Initial communication error	Initial communication with the absolute position linear scale failed.
91	Detector: Communication error	An error was detected in the communication with the detector in absolute position detection system.
92	Detector: Protocol error	A data error was detected in absolute position detection system.
93	Initial absolute position fluctuation	The position data have fluctuated during the absolute position initializing.
96	Scale feedback error	An excessive deviation was detected between the motor end detector and MP scale feedback data in a MP scale absolute position detection system.
97	Scale offset error	An error was detected in the offset data received from the MP scale in a MP scale absolute position detection system.
9B	Detector converting unit: Magnetic pole shift warning	An error was detected in the shift distance of the magnetic pole in a linear servo system.
9C	Detector converting unit: Magnetic pole warning	A data error was detected in the magnetic pole of MDS-B-HR after passing Z-phase in a linear servo system.

Alarm No.	Name	Meaning
9E	Absolute position detector: Revolution counter error	An error was detected in the revolution counter of the absolute position detector. The absolute position data cannot be compensated.
9F	Battery voltage drop	The battery voltage that is supplied to the absolute position detector dropped. The absolute position data is retained.
A6	Fan stop warning	A cooling fan built in the drive unit stopped.
A8	Turret indexing warning	The designated position shift amount of turret indexing is outside the setting range.
A9	Orientation feedback warning	As an orientation feedback error occurred, the retrial has been conducted.
E0	Over regeneration warning	Over-regeneration detection level exceeded 80%.
E1	Overload warning	Overload detection level exceeded 80%.
E2	Continuous high-speed revolution warning	The motor was continuously rotated at a speed exceeding the rated speed.
E3	Absolute position counter warning	Deviation between the absolute and relative position data was detected.
E4	Set parameter warning	A parameter setting was outside the setting range.
E6	Control axis detachment warning	Control axis detachment was commanded.
E7	In NC emergency stop state	Emergency stop was input from the CNC.
E8	Excessive supplementary regeneration frequency	Regeneration that are beyond the power supply limitation has frequently occurred.
E9	Instantaneous power interruption warning	The power was momentarily interrupted.
EA	In external emergency stop state	External emergency stop signal was input.
EB	Over regeneration warning	Over-regeneration detection level exceeded 80%.

1.4 MCP Alarm

An error has occurred in the drive unit and other interfaces. (The bold characters are the messages displayed on the screen.)

<table>
<tr><td colspan="2">Y02 SYSTEM ALARM</td><td colspan="2">An error occurred in the data transmitted between the MCP and drive unit after the power was turned ON.</td></tr>
<tr><td>Error No.</td><td colspan="2">Details</td><td>Remedy</td></tr>
<tr><td>0050</td><td colspan="2">Background error</td><td>The software or hardware may be damaged. Contact the service center.</td></tr>
<tr><td rowspan="5">0051</td><td>0000</td><td>CRC error
(10 times/910.2 ms)</td><td rowspan="5">A communication error has occurred between the controller and drive unit.
• Take measures against noise.
• Check that the communication cable connector between the controller and drive unit and one between the drive units are tight.
• Check whether the communication cable between the controller and drive unit and one between the drive units are disconnected.
• A drive unit may be faulty. Take a note of the 7-segment LED contents of each drive unit and report to the Service Center.</td></tr>
<tr><td>0001</td><td>CRC error (2 continuous times)</td></tr>
<tr><td>0002</td><td>Reception timing error
(2 continuous times)</td></tr>
<tr><td>××03</td><td>Data ID error
(2 continuous times)
××: Axis No.</td></tr>
<tr><td>××04</td><td>No. of reception frames error
(2 continuous times)
××: Axis No.</td></tr>
</table>

<table>
<tr><td>Y03 AMP. UNEQUIPPED

The drive unit is not correctly connected</td><td colspan="2">Check the drive unit mounting state.
• Check the end of the cable wiring.
• Check the cable for broken wires.
• Check the connector insertion.
• The drive unit input power is not being input.
• The drive unit axis No. switch is illegal.</td></tr>
<tr><td>Error No.</td><td colspan="2">Details</td></tr>
<tr><td>Alphabet (axis name)</td><td colspan="2">Servo axis drive unit not mounted</td></tr>
<tr><td>1 – 4</td><td colspan="2">PLC axis drive unit not mounted</td></tr>
<tr><td>S</td><td colspan="2">No.1 spindle axis drive unit not mounted</td></tr>
<tr><td>T</td><td colspan="2">No.2 spindle axis drive unit not mounted</td></tr>
</table>

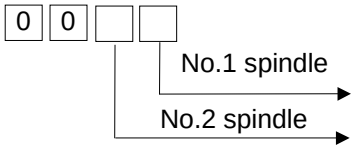
<table>
<tr><td colspan="2">Y05 INIT PARAM ERR <u>□□□□</u>
↑
□□□□ : Error parameter number</td></tr>
<tr><td>Details</td><td>Remedy</td></tr>
<tr><td>There is a problem in the value set for the number of axes or the number of systems.</td><td>Check the value set for the corresponding parameters.
#1001 SYS_ON
#1002 axisno
#1039 spinno etc.</td></tr>
</table>

Y06 mcp_no ERROR	There are differences in the MCP and axis parameters when the NC power is turned ON.	
Error No.	Details	Remedy
0001	There is a skipped number in the channels.	Check the values set for the following parameters. #1021 mcp_no #3031 smcp_no #3032 mbmcp_no
0002	The random layout setting is duplicated.	
0003	The drive unit fixed setting “0000” and random layout setting “****” are both set.	
0004	The spindle/C axis “#3031 mcp_no” and “#3032 smcp_no” are set to the same values.	
0005	A random layout is set for the “#1154 pdoor” =1 two-system.	
0006	The channel No. parameter is not within the setting range.	

Y51 PARAMETER ERROR	An error occurred in a parameter that causes an alarm while the control axis was operating.	
Error No.	Details	Remedy
1	LN FEED ABNL (Linear feed abnormal) The time constant has not been set or the setting exceeded the setting range.	• Check “#2004 G0tL”.
2	CT FEED ABNL (Cutting feed abnormal) The time constant has not been set or the setting exceeded the setting range.	• Check “#2007 G1tL”.
3	DLY F-F ABNL (Delayed fast feed abnormal) The time constant has not been set or the setting exceeded the setting range.	• Check “#2005 G0t1”.
4	DLY CUTG ABNL (Delayed cutting feed abnormal) The time constant has not been set or the setting exceeded the setting range.	• Check “#2008 G1t1”.
9	GRID SPACE ERROR	• Check “#2029 grspc”.
12	SYNCHRONOUS TAP CYCLE ACCELERATION/DECELERATION TIME CONSTANT ERROR The time constant has not been set or the setting exceeded the setting range.	• Check spindle parameters #3017 stapt1 to #3020 stapt4.
15	LN SKIP ABNL (Linear skip abnormal) The time constant has not been set or the setting exceeded the setting range.	• Check “#2102 skip_tL”.
16	DLY SKIP ABNL (Delayed skip abnormal) The time constant has not been set or the setting exceeded the setting range.	• Check “#2103 skip_t1”.
17	"#1205 G0bdcc" for the 2nd system is set to acceleration/deceleration before G0 interpolation.	• Check “#1205 G0bdcc".
101	ROTARY AXIS GEAR RATIO EXCESSIVE (ABSOLUTE POSITION DETECTION)	• Check “#2201 PC1” and “#2202 PC2”.

Y90 SP. NON SIGNAL

(Alarm No.)



Alarm No.	Z open phase	B open phase	A open phase
1			×
2		×	
3		×	×
4	×		
5	×		×
6	×	×	
7	×	×	×

Alarm No.	Details	Remedy
0001 – 0007	There is an error in the spindle encoder signal. The data transmission to the drive unit is stopped when this error occurs.	• Check the spindle encoder's feedback cable and the encoder.

1.5 System Alarms

The following messages are displayed with the register at the time when the error occurred if the system stops due to a system error.

Message	Details	Remedy
Parity error	RAM error	• Write down the displayed register, and contact the service center.
Bus error	A non-existing memory was accessed.	
Zero divide	The division with a 0 denominator was attempted.	
Watch dog error	The software process is not functioning correctly.	
Illegal exception	The alarm was caused by an illegal software function not listed above.	
Address error	An illegal memory was accessed.	
Illegal instruction	The software process is not functioning correctly.	
Stack overflow		

Z30 ETHERNET ERROR □□□□
↑
Warning No.

Warning No.	Explanation
0001	Socket open error (socket)
0002	Socket bind error (bind)
0003	Connection wait queue error (listen)
0004	Connection request acceptance error (accept)
0005	Data receive error (socket error)
0006	Data receive error (data shortage or disconnection)
0007	Data receive error (socket error)
0008	Data receive error (data shortage or disconnection)
000A	Socket close error (close)

Note: If warning No. 0001, 0002, 0003, or 000A is displayed, set the parameters, then turn power OFF and turn it ON again.

Z31 DATA SERVER ERROR □□□□
↑
Warning No.

Warning No.	Explanation
0001	Socket open error (socket)
0002	Socket bind error (bind)
0003	Connection wait queue error (listen)
0004	Connection request acceptance error (accept)
0005	Data receive error (socket error)
0006	Data receive error (data shortage or disconnection)
0007	Data receive error (socket error)
0008	Data receive error (data shortage or disconnection)
000A	Socket close error (close)

Note: If warning No. 0001, 0002, 0003, or 000A is displayed, set the parameters, then turn power OFF and turn it ON again.

Message	Details	Remedy
Z40 FORMAT NOT MET	This appears when the parameter MemVal is formatted at 0, and MemVal is set to 1.	• Either return the MemVal setting, or format and restart.

The bold characters are the messages displayed on the screen.

Message	Details	Remedy
Z51 EE ROM ERROR 000x	This occurs when the parameters were not correctly written into the EEROM. Formatting of the machine manufacturer macro program area did not end correctly. The machine manufacturer macro program was not written into the FROM correctly. <Type> Z51 ROM error 0001: Open error Z51 ROM error 0002: Erase error Z51 ROM error 0003: Write error Z51 ROM error 0004: Verify error	• If the same alarm is output by the same operation, the cause is an H/W fault. Contact the Service Center. • Reformat the area. • Write to the FROM again.
Z52 BATTERY FAULT	The voltage of the battery inserted in the NC control unit has dropped. (The battery used to save the internal data)	• Replace the battery of the NC control unit. • After treating the battery, check the machining program.
Z53 TEMP. OVER	The controller or operation board temperature has risen above the designated value. (Note 1)	• Cooling measures are required. Turn OFF the controller power, or lower the temperature with a cooler, etc.
Z55 RIO NOT CONNECT	This occurs when an error occurs in the communication between the controller and remote I/O unit. • Cable breakage • Remote I/O unit fault • Power supply to remote I/O unit fault (Note 2)	• Check and replace the cables. • Replace the remote I/O unit. • Check the power supply. (existence of supply, voltage)
Z57 SYSTEM WARNING	The program memory capacity setting value cannot be formatted. The expansion cassette (HR437) is not mounted after formatting. An expansion cassette different from the expansion cassette (HR437) mounted during formatting is mounted. (Note 3)	Check the state of the following items. • Program memory capacity • Status of expansion cassette (HR437) mounting • APLC open option
Z58 ROM WR UNFIN	The machine manufacturer macro program was not written to the FROM after being registered, edited, copied, condensed, merged, the number changed, or deleted.	• Write the machine manufacturer macro program to the FROM. * If the operations, such as editing, done while the NC power was OFF can be invalidated, the program does not need to be written to the FROM.

Message	Details	Remedy
Z59 TIME CONSTANT	Acceleration and deceleration time constants are too large. (This alarm is output at the same time as “T02 FEED HOLD 0206.”)	• Increase the value specified as the #1206 G1bF parameter. • Decrease the value specified as the #1207 G1btL parameter. • Lower the feedrate.

⚠ CAUTION

❗ If the battery low warning is issued, save the machining programs, tool data and parameters in an input/output device, and then replace the battery. When the battery alarm is issued, the machining programs, tool data and parameters may be destroyed. Reload the data after replacing the battery.

⚠ Do not replace the battery while the power is ON.
⚠ Do not short circuit, charge, heat, incinerate or disassemble the battery.
⚠ Dispose of the spent battery following local laws.

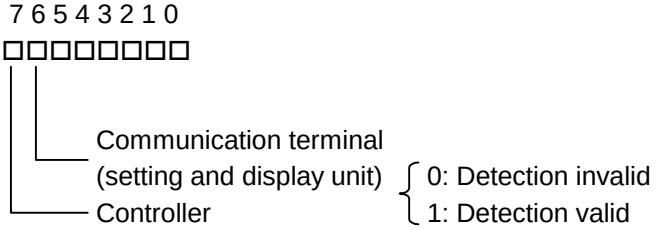
Note 1: Temperature warning

If the alarm is displayed when an overheat alarm is detected, the overheat signal will be output simultaneously. If the machine is in automatic operation, the operation will be continued, but restarting will not be possible after resetting or stopping with M02/M30. (Starting will be possible after block stop or feed hold.) The alarm will be reset and the overheat signal will turn OFF when the temperature drops below the specified temperature.

Z53 TEMP. OVER 000x
↑
0001 : The temperature in the controller is high.
0002 : The temperature around the communication terminal (setting and display unit) is high.
0003 : The temperature in the controller and around the communication terminal (setting and display unit) is high.

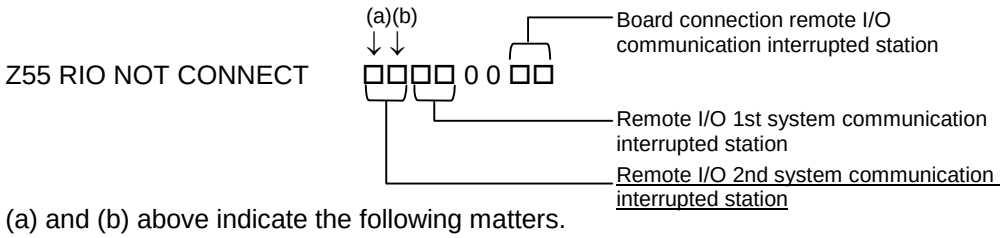
The ambient temperature must be lowered immediately when a “Z53 TEMP.OVER” alarm occurs, but if machining must be continued, the alarm can be invalidated by turning the following parameter OFF.

PLC parameter bit selection #6449



Note 2: RIO communication interrupt

If communication between the control unit and remote I/O unit fails, the alarm and remote I/O unit number are displayed.



(a) and (b) above indicate the following matters.

Alarm number	RIO (seventh station)	RIO (sixth station)	RIO (fifth station)	RIO (fourth station)
0				
1				×
2			×	
3			×	×
4		×		
5		×		×
6		×	×	
7		×	×	×
8	×			
9	×			×
A	×		×	
B	×		×	×
C	×	×		
D	×	×		×
E	×	×	×	
F	×	×	×	×

Alarm number	RIO (third station)	RIO (second station)	RIO (first station)	RIO (0th station)
0				
1				×
2			×	
3			×	×
4		×		
5		×		×
6		×	×	
7		×	×	×
8	×			
9	×			×
A	×		×	
B	×		×	×
C	×	×		
D	×	×		×
E	×	×	×	
F	×	×	×	×

This applies for both the remote I/O 1st system communication interrupted station and board connection remote I/O communication interrupted station.

Note 3: System warning

Z57 SYSTEM WARNING 00xx 0000
↑

001x : When the expansion cassette (HR437) is not mounted, a program memory capacity exceeding 1280m was designated.

002x : When the APLC open option was validated, 5120m was designated
for the program memory capacity.

00x1 : After formatting the program memory capacity to 1280m or more, the expansion cassette (HR437) was removed, or an expansion cassette (HR437) not used during formatting was mounted.

1.6 Absolute Position Detection System Alarms

Z70 ABS. ILLEGAL □□□□ □□□□ (Error No.) (Axis name)		This error is displayed if the absolute position data is lost in the absolute position detection system.			
Error No.	Details	Remedy	Zero point initialization	Alarm reset when power is turned OFF	Servo alarm No.
0001	Zero point initialization is incomplete. Otherwise, the spindle was removed.	Complete zero point initialization.	Required	–	–
0002	The absolute position reference point data saved in the NC has been destroyed.	Input the parameters. If the reference point data cannot be restored, perform zero point initialization.	(Required)	–	–
0003	The parameters used to detect the absolute position have been changed. #1003 iunit #2201PC1 #1016 iout #2202PC2 #1017 rot #2218PIT #1018 ccw #2219RNG1 #1040 M_inch #2220 RNG2 #2049 type #2225MTYP	Correctly set the parameters. Turn the power on again, and perform zero point initialization.	Required	–	–
0004	The zero point initialization point is not at the grid position.	Reperform zero point initialization.	Required	–	–
0005	Restoration was possible with parameter input in the above No.0002 state.	Turn the power on again, and operation will be possible.	Not required	–	–
0080	The absolute value data was lost, because the multi-rotation counter data in the detector was incorrect, etc.	Replace the detector and complete zero point initialization.	Required	–	(9E) etc.
0101	The power was turned ON again after the servo alarm No. 25 displayed.	Reperform zero point initialization.	Required	–	(25)
0106	The power was turned ON again after the servo alarm No. E3 displayed.	Reperform zero point initialization.	Required	–	(E3)

Note: To release alarm “Z70 ABS. ILLEGAL”, enter the parameter data output when establishing the absolute position and turn ON the power again. For the rotation axis, however, the alarm cannot be released by entering the parameter data.

Z71 DETECTOR ERROR □□□□ □□□□ (Error No.) (Axis name)			This alarm is displayed if an error is found in the detector for the absolute position detection system.		
Error No.	Details	Remedy	Zero point initialization	Alarm reset when power is turned OFF	Servo alarm No.
0001	The backup voltage in the absolute position detector dropped.	Replace the battery, check the cable connections, and check the detector. Turn the power ON again, and perform zero point initialization.	Required	– (Z70-0101 displays after power is turned ON again.)	25
0003	Communication with the absolute position detector was not possible.	Check and replace the cables, card or detector. Turn the power ON again, and perform zero point initialization.	(Required) Only when detector is replaced.	Reset	91
0004	The absolute position data fluctuated when establishing the absolute position.	Check and replace the cables, card or detector. Turn the power ON again, and perform zero point initialization.	(Required) Only when detector is replaced.	Reset	93
0005	An error was found in the serial data from the absolute position detector.	Check and replace the cables, card or detector. Turn the power ON again, and perform zero point initialization.	(Required) Only when detector is replaced.	Reset	92
0006	Servo alarm E3 Absolute position counter warning	Operation is possible until the power is turned off.	(Required) When power is turned ON again.	Reset (Z70-0106 displays after power is turned ON again.)	E3
0007	Initial communication with the absolute position detector was not possible.	Check and replace the cables, card or detector. Turn the power ON again, and perform zero point initialization.	(Required) Only when detector is replaced.	Reset	18

Z72 COMPARE ERROR □□□□ □□□□ (Alarm No.) (Axis name)		This alarm is displayed if an error is detected when comparing the detector's absolute position and controller coordinate values in the absolute position system.
Alarm No.	Details	Remedy

Z73 ABS. WARNING □□□□ □□□□ (Warning No.) (Axis name)		This displays a warning in the absolute position detection system.
Alarm No.	Details	Remedy
0001	Servo alarm 9F Battery voltage drop	The battery voltage dropped or a cable is broken. Absolute position initialization is not required.

1.7 Messages During Emergency Stop

EMG EMERGENCY **
Error items
Refer to the explanations for details.

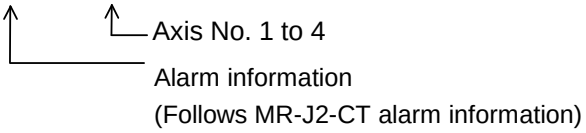
Error No.	Details	Remedy
PLC	The user PLC has entered the emergency stop state during the sequence process.	• Investigate and remove the cause of the user PLC emergency stop.
EXIN	The emergency stop input signal is significant (open).	• Cancel the emergency stop input signal. • Check the wiring to see if any wiring is broken.
SRV	An alarm occurred in the servo system causing an emergency stop.	• Investigate and remove the cause of the servo alarm.
STOP	The user PLC (ladder sequence) is not running.	• Check if the rotary switch CS2 on the top of the controller front panel is set to 1. • Check if the PLC edit file save screen (onboard function) [4RUN/SP] (run/stop) switch is turned ON.
SPIN	Spindle amplifier not mounted The spindle amplifier is not mounted.	• Cancel the causes of the other emergency stop. • Check emergency stop signal input in the spindle amplifier.
PC_H	High-speed PC processing abnormal	• Check the sequence program. (To stop monitoring the high-speed PC processing temporarily, set 1 in #1219 aux03 bit1. Disable the monitoring function only as a temporary measure.)
PARA	Setting of the door open II fixed device is illegal. The dog signal random assignment parameter setting is illegal.	• Specify the #1155 DOOR_m and #1156 DOOR_s parameters correctly. (When the door open II fixed device is not used, set #1155 DOOR_m and #1156 DOOR_s to 100.) • Correctly set the #2073 zrn_dog, #2074 H/W_OT+, #2075 H/W_OT-and #1226 aux 10 bit 5 parameters.
LINK	If the FROM/TO instruction is not executed within 500 ms, an emergency stop occurs.	• Try to execute the FROM or TO instruction one or more times every 500 ms. * Measure the time in which no interrupt request is issued from MELSEC and store the result in the R register. R1880: Current time-out counter R1881: Counter for maximum time-out after power-on R1882: Counter for maximum time-out after system start-up (backed up)

Error No.	Details	Remedy
LINK	MELSEC is held in error and reset states.	• Check the MELSEC states.
	The contents of MELSEC-specific code area in buffer memory have been destroyed.	• Check the MELSEC states.
	PLC serial link communication has stopped. Note: When WAIT is entered for the PLC serial link, only the preparation sequence has been established before the communication stops. Therefore, it is supposed that the basic specification parameters related to serial link parameters #1902 and #1903 are incorrect or the #1909 set-time "Tout (ini)" is too short.	• Check that HR571 card wiring and external sequencer transmission are normal. • Check the diagnostic screen for link communication errors. • Check whether the basic specification parameters related to serial link parameters are specified correctly.
WAIT	The preparation sequence is not sent from the master station. Otherwise, the contents of the received preparation sequence are inconsistent with those of the parameters, so that the usual sequence cannot be started. Note: When LINK is also entered for the PLC serial link, refer to "Note" in the section, "LINK".	• Check that the HR571 card rotary switch and wiring and the external sequencer transmission are normal. • Check the diagnostic screen for link communication errors.
XTEN	The HR571 card operates abnormally or the rotary switch is set incorrectly.	• Check the HR571 card rotary switch and replace the HR571 card if required.
LAD	The user PLC (ladder sequence) has an illegal code.	• Check the user PLC (ladder sequence) to see if it uses illegal device numbers or constants.

1.8 Auxiliary Axis Alarms

Display example

S01 AUX SERVO ALM □□□□ □



(1) S01 AUX SERVO ALM

Alarm information	Details		Remedy
0011	PCB error 1	An error occurred in the amplifier's internal PCB.	• Replace servo amplifier.
0013	Software processing timeout, clock error	An error occurred in the amplifier's internal reference clock.	• Replace servo amplifier.
0016	Motor type, detector type error	Motor type error	• Use a correct amplifier and motor combination.
		Detector initial communication error.	• Connect correctly. • Replace the motor. • Replace or repair cable.
		Detector CPU error	• Replace the motor (detector).
0017	PCB error (A/D conversion initial error)	An error occurred in the amplifier's internal A/D converter.	• Replace servo amplifier.
0025	Absolute position lost	An error occurred in the detector's internal absolute position data.	• Turn the power ON for 2 to 3 minutes while the alarm is occurring, and then turn the power ON again. • Replace the battery, and initialize the absolute position again.
0034	CRC error	An error occurred in the communication with the NC.	• Take countermeasures against noise.
0036	Communication timeout, NC down	Communication with the NC was cut off.	• Connect correctly. • Turn the NC power ON. • Replace the amplifier or NC.
0037	Parameter error (Regenerative resistance error)	The parameter setting value is incorrect.	• Set the parameter correctly.
0038	Frame error	An error occurred in the communication with the NC.	• Take countermeasures against noise.
0039	INFO error	Undefined data was transferred from the NC.	• Change the NC software version to a compatible version.

(2) S02 AUX SERVO ALM

Alarm information	Details		Remedy
0011	PCB error 1 (drive circuit error)	An error occurred in the amplifier's internal PCB.	• Replace servo amplifier.
0013	Software processing timeout, clock error	An error occurred in the amplifier's internal reference clock.	• Replace servo amplifier.
0015	EEROM error	A write error occurred to the EEROM in the amplifier.	• Replace servo amplifier.
0017	PCB error (A/D conversion error)	An error occurred in the amplifier's internal A/D converter.	• Replace servo amplifier.
0018	PCB error (LSI error)	An error occurred in the amplifier's internal LSI.	• Replace servo amplifier.
0020	Detector error	An error occurred in the communication between the servo amplifier and detector.	• Connect correctly. • Replace or repair cable.
0024	Ground fault detection	A ground fault of the output was detected when the power was turned ON.	• Repair the ground fault section. • Replace the cable or motor.

(3) S03 AUX SERVO ALM

Alarm information	Details		Remedy
0010	Undervoltage	The power voltage is 160V or less.	• Review the power supply. • Replace the servo amplifier.
0030	Regeneration error	The tolerable regeneration power of the internal regenerative resistor or external regenerative option was exceeded.	• Set the parameter #002 correctly. • Connect correctly. • Lower the positioning frequency. • Change the regenerative option to a larger capacity. • Lower the load. • Review the power supply.
		Regenerative transistor error	• Replace the servo amplifier.
0031	Overspeed	The motor's rotation speed exceeded the tolerable momentary speed.	• Increase the acceleration/ deceleration time constant. • Review the gear ratio. • Replace the detector.
0032	Overcurrent	A current exceeding the servo amplifier's tolerable current flowed.	• Repair the wiring. • Replace the servo amplifier. • Take countermeasures against noise.

Alarm information	Details		Remedy
0033	Overvoltage	The voltage of the converter in the servo amplifier was 400V or more.	• Wire correctly. • Replace the servo amplifier. • For the internal regenerative resistor, replace the amplifier. • For the external regenerative option, replace the regenerative option.
0046	Motor overheating	An operation state causing the motor to overheat continued.	• Reduce the motor load. • Review the operation pattern.
0050	Overload 1	The servo amplifier or servomotor overload protection function activated.	• Reduce the motor load. • Review the operation pattern. • Change to a motor or amplifier with large output. • Change the setting of the automatic tuning response characteristics. • Correct the connection. • Replace the servomotor.
0051	Overload 2	The max. output current flowed for several seconds due to a machine collision or overload.	• Review the operation pattern. • Change the setting of the automatic tuning response characteristics. • Correct the connection. • Replace the servomotor.
0052	Excessive error	A position deflection exceeding the excessive error detection setting value occurred.	• Increase the acceleration/ deceleration time constant. • Increase the torque limit value. • Review the power facility capacity. • Review the operation pattern. • Replace the servomotor. • Connect correctly. • Repair or replace the cable.

(4) S52 AUX SERVO WRN

Alarm information	Details		Remedy
0092	Battery voltage drop	The absolute position detection battery voltage dropped.	• Mount a battery. • Replace the battery and initialize the absolute position.
00E0	Over-regeneration warning	The regeneration power may have exceeded the tolerable range of the built-in regenerative resistor or external regenerative option.	• Lower the positioning frequency. • Change the regenerative option to a larger one. • Lower the load.
00E1	Overload warning	The overload alarm 1 could occur.	• Refer to the items for S03 0050.
00E3	Absolute position counter warning	There is an error in the absolute position detector internal data.	• Take countermeasures against noise. • Replace the servomotor.
00E9	Main circuit OFF warning	The servo ON signal was input while the main circuit power was OFF. The contactor operation is faulty.	• Turn ON the main circuit power.

(5) Z70 AUX POS. ERR

Alarm information	Details	Cause	Remedy
0001	Zero point initialization incomplete	The zero point (reference point) has not been initialized in the absolute position system.	• Initialize the zero point (reference point).
0002	Absolute position data lost	The absolute position coordinate data in the amplifier has been lost.	• Initialize the zero point (reference point).
0003	Absolute position system related parameter error	The absolute position system related parameters have been changed or lost.	• Correctly set the parameters and then initialize the zero point (reference point).

(6) Z71 AUX DETEC. ERR

Alarm information	Details	Cause	Remedy
0001	Absolute position memory battery voltage drop	The data in the detector has been lost. Battery voltage drop. Detector cable wire breakage or looseness.	• Check the battery and detector cable and then initialize the zero point (reference point).

(7) Z73 AUX SYSTEM WRN

Alarm information	Details	Cause	Remedy
0001	Absolute position memory battery voltage warning	Battery voltage drop. Detector cable wire breakage or looseness.	• Check the battery and detector cable. The zero point does not need to be initialized.
0003	Absolute position counter warning	An error occurred in the detector's absolute position counter.	• Replace the detector.

(8) M00 AUX OPER. ALM

Alarm information	Details	Cause	Remedy
0001	Near-point dog length insufficient	When executing dog-type reference point, the zero point return speed is too fast or the dog length is too short.	• Lower the zero point return speed or increase the dog length.
0003	Reference point return direction illegal	When executing reference point return, the axis was moved in the opposite of the designated direction.	• Move the axis in the correct direction.
0004	External interlock	The axis interlock function is valid.	• Cancel the interlock signal
0005	Internal interlock	An interlock was established by the servo OFF function.	• Cancel the servo OFF.
0007	Soft limit	The soft limit was reached.	• Check the soft limit setting and machine position
0024	In absolute position alarm. Reference point return not possible.	Reference point return was executed during an absolute position alarm.	• Initialize the absolute position reference point and then fix the absolute position coordinates.
0025	In initializing absolute position. Reference point return not possible.	Reference point return was executed while initializing the absolute position.	• Initialize the absolute position reference point and then fix the absolute position coordinates.

(9) M01 AUX OPER. ALM

Alarm information	Details	Cause	Remedy
0101	No operation mode	The operation mode is not designated, or the operation mode was changed during axis movement.	• Correctly designate the operation mode.
0103	Feedrate 0	The operation parameter's feedrate setting is zero. The operation parameter feedrate setting is zero. Or, the override is valid, and the override value is zero.	• Set a value other than zero in the feedrate setting or override value.
0160	Station No. designation illegal. Starting not possible.	A station No. exceeding the No. of indexed divisions was designated.	• Correctly designate the station No.
0161	Reference point return incomplete. Starting not possible.	Automatic/manual operation was started before reference point return was executed with the incremental system.	• Execute the reference point return.
0162	In initializing reference point. Starting not possible.	The start signal was input while initializing the absolute position reference point.	• Complete the absolute position reference point initialization.
0163	In absolute position alarm. Starting not possible.	The start signal was input during an absolute position alarm.	• Initialize the absolute position reference point and then fix the absolute position coordinates.
0164	In random positioning mode. Manual operation not possible.	The manual operation mode was started during the random positioning mode.	• Turn the random positioning mode OFF before switching to the manual operation mode.
0165	Uneven indexing station No. illegal. Starting not possible.	The commanded station No. was higher than 9 or the number of indexing stations during uneven indexing.	• Check the commanded station No. and the parameter “#100 station” setting.

AUXILIARY AXIS MCP ALARMS

Y02 AUX SYSTEM ALM			An error occurred in the data transmitted between the MCP and auxiliary axis amplifier after the power was turned ON.
Error No.	Details		Remedy
0050	Background error		The software or hardware may be damaged. Contact the service center.
0051	0000	CRC error (10 times/910.2ms)	A communication error has occurred between the controller and amplifier. • Take measures against noise. • Check that the communication cable connector between the controller and amplifier and one between the amplifiers are tight. • Check whether the communication cable between the controller and amplifier and one between the amplifiers are disconnected. • A driving amplifier may be faulty. Take a note of the 7-segment LED contents of each driving amplifier and report to the Service Center.
	0001	CRC error (2 continuous times)	
	0002	Reception timing error (2 continuous times)	
	××03	Data ID error (2 continuous times) ××: Axis No.	
	××04	No. of reception frames error (2 continuous times) ××: Axis No.	

Y03 AUX AMP UNEQU. The amplifier is not correctly connected.	Check the auxiliary axis amplifier mounting state. • Check the end of the cable wiring. • Check the cable for broken wires. • Check the connector insertion. The auxiliary axis amplifier input power is not being input. The auxiliary axis amplifier axis No. switch is illegal.
Error No.	Details
Axis No.1 to 4	bit correspondence (bit 0 : 1st axis, bit 1: 2nd axis, bit 2: 3rd axis, bit 3: 4th axis)

1.9 Computer Link Errors

Error Message	Error No.	Details	Remedy
L01 **DNC ERROR**	-4	Communication ends with timeout. CNC has a 248-byte receive buffer. The time during which CNC receives 248 bytes exceeds the "TIME-OUT" value set in the I/O device parameter.	1) Set a greater timeout value in the input/output device parameter. 2) Recheck the HOST software as to whether or not the HOST transmits data in response to DC1 from CNC (data request). 3) Check whether or not start code of computer link parameter is set to 0.
	-10	HOST ER (CNC DR) signal is not turned ON.	1) Check whether or not the cable is disconnected from the connector. 2) Check whether or not the cable is broken. 3) Check whether or not the HOST power is turned ON.
	-15	Communication ends with parity H.	1) Recheck the HOST software as to whether or not the data to be transmitted to CNC is ISO code.
	-16	Communication ends with parity V.	1) Recheck the data to be transmitted to CNC.
	-17	Although CNC transmits DC3 (request to stop data transfer) to the HOST, it receives data of 10 bytes or more from the HOST, thus terminates communication. When CNC is transmitting data to the HOST, it receives data of 10 bytes or more from the HOST.	1) Recheck the software as to whether or not the HOST stops transmitting data within 10 bytes after receiving DC3. 2) Recheck the HOST software as to whether or not the HOST transmits data such as a command or header to CNC during receiving a work program.

1.10 User PLC Alarms

Message	Sub-status		Details	Remedy
	1	2		
U01 No PLC	-	-	The ladder is not a GPPW ladder or PLC4B ladder. (Note) Emergency stop (EMG) will be applied.	Download the ladder of the format selected with the PLC environment selection parameters (bit selection #51/bit 4).
U10 Illegal PLC	0x0010	-	Scan time error The scan time is 1 second or longer.	Edit the ladder size to a smaller size.
	0x0040	-	Ladder operation mode illegal A ladder different from the designated mode was downloaded. (Note) Emergency stop (EMG) will be applied.	Download the ladder having the same format as when the power was reset or turned ON.
	0x0080	-	GPPW ladder code error (Note) Emergency stop (EMG) will be applied.	Download the correct GPPW format ladder.
	0x008x	-	PLC4B ladder code error An illegal circuit was found in the PLC4B ladder. bit1: PC medium-speed circuit illegal bit2: PC high-speed circuit illegal (Note) Emergency stop (EMG) will be applied.	Download the correct PLC4B format ladder.
	0x0400	Number of ladder steps	Software illegal interrupt The ladder process stopped abnormally due to an illegal software command code. (Note) Emergency stop (EMG) will be applied.	Turn the power ON again. If the error is not reset, download the correct ladder.
	0x800x	Number of ladder steps	Software exceptional interrupt The ladder process stopped abnormally due to a bus error, etc.	
			bit 0: BIN command operation error bit 1: BCD command operation error	Refer to the methods for using the BCD and BIN function commands.
			bit6: CALL/CALLS/RET command error bit7: IRET command execution error (Note) Emergency stop (EMG) is applied for bit 6/7.	Turn the power ON again. If the error is not reset, download the correct ladder.
U50 Stop PLC			The ladder is stopped.	Start the ladder.

(Note) The number of ladder steps displayed on the screen may not match the actual number of error occurrence steps because of the ladder timing. Use this as a guideline of the occurrence place.

1.11 Network Service Errors

Message	Details	Remedy
N001 Modem init err	• There is an error in the modem connection when the power is turned ON.	• Check the connection between the NC and modem, connection port and modem power.
N002 Redial over	• The dial transmission failed more than the designated No. of redial times.	• Wait a while, and then transmit again.
N003 TEL unconnect	• The phone line is not connected.	• Check the modem's phone line connection.
N004 Net com. error	• An error other than the above errors occurred during communication.	• Note down the circumstances under which this error occurred, and contact the Service Center.
N005 Bad net com.	• The modem connection port is being used for another function such as input/output. • The modem connection port settings are incorrect.	• Quit using the modem connection port with the other function, and then turn the power ON again. • Check the modem connection port settings.

2. Operation Messages on Setting And Display Unit

If a setting operation error occurs on any setting and display unit screen, the error No. EOO and a message describing the details of the error will display in the line above the data setting area or the menu display area.

2.1 Operation Errors

Δ: Message requiring resetting and restarting
×: Message requiring restarting after canceling error conditions
(The bold characters are the messages displayed on the screen.)

Error No.	Error message		Details
E01	**SETTING ERROR**	Δ	• The setting data is incorrect. An alphabetic character was set when only number can be set, etc. • Data was input without setting number (#).
			(Word editing) • Even though no retrieval data was set, menu key [↓] or [↑] was pressed. • Even though no data is stored in edit buffers, menu key “Replace” was pressed. • One of the following characters was entered as the first character of the retrieval data and edit buffers: 0 to 9, ". ", " " (space), "+", "–", "=","*", "[ ]", and “ " " ”.
			• When the incremental detection system was used, the parameter (#0 absolute position setting) was set on the absolute position setting screen.
			• The data input for the standard parameter setting or during execution of formatting is not "Y" or "N".
			• A value from 4 to 10 was specified for #1043 lang. Or 21 was specified. • Even though no language data exists, its output and comparison were attempted. Check the numbers (0253 and 0254) of the language data to be output.
			• When the machine manufacturer macro program memory area is the SRAM area, the setup parameter #1060 SETUP was set to “20”. • When the machine manufacturer macro program memory area is the SRAM area, writing of the machine manufacturer macro program was attempted on PROGRAM COPY screen.

Error No.	Error message		Details
E02	**DATA OVER**	Δ	• The setting data exceeded the setting range.
			• The compensation data specification exceeded the range when inputting the tool offset data on tape, so that block could not be input. Press the INPUT key again while the input screen is displayed, and the input will continue from the next block.
			• When workpiece coordinate offsets are measured, the calculation results given by pressing the CALC key are exceeding the specified range. Correctly specify the tool length or the wear data of cutting edges used for the calculation.
			• #1003 iunit was set to D when the least command increment 0.01μm option was not available.
			• When there was no option, 2 or more was specified for #1043 lang. Otherwise, an option was added and 24 or more was specified for #1043 lang.
E03	**No. NOT FOUND**	Δ	• The corresponding setting No. (#) was not found. This error occurs if a setting No. not found on the screen was set and input, or if a variable No. not found in the specifications was set and input for the common variables. • When the tool length was measured manually, a nonexisting tool wear compensation number was specified and the sensor was turned ON. Specify the R register of the offset number correctly.
E04	**DEV. NOT READY**	×	• The input/output unit power is not ON. • The cable is disconnected. • Setting of the transfer speed (baud rate) does not agree.

Error No.	Error message		Details
E05	**NOT ACCEPTABLE**	×	• The PLC timer cannot be set from the screen when the program is valid. (When machine parameter bit selection #6449 bit 1 is set to 1.) • The PLC counter cannot be set from the screen when the program is valid. (When machine parameter bit selection #6449 bit 0 is set to 1.)
			• The tool registration data setting is prohibited. (When special relay E71 is valid by the PLC.) • Setting from the tool life management screen is prohibited.
			• Absolute position setting screen's #1 "ORIGIN" and #2 "ZERO" cannot be set when #0 "INIT SET" is invalid.
			• The total of axes set in #1001 SYS_ON, #1002 axisno is illegal. Set so that the total No. of axes is within the specifications range for the target model. • #1037 cmdtyp is not within the setting range.
			• The INPUT key was pressed to perform search for the program that is in background edit status on the word edit screen. • The menu keys (Replace and Insert) on the word edit screen were manipulated when a running program is displayed (PDISP signal: ON). • An attempt was made to set MDI data in an MDI setting lock state (the MDI setting lock parameter is specified with 0 and a non-MDI mode is valid).
			• Language data in display selection status was entered. Change the display selection status once before entering the data. (#1043 lang)
			• When the manual value command protection (#1228 aux12/bit7) function is valid, the first monitor screen was manipulated by manual command operation (M, S, and T keys).
E06	**NO SPEC**	×	• The menu key for a function not in the specifications was pressed. • A parameter not in the specifications was set. • A language that was not added as an option was selected. (#1043 lang) • Set up parameter #1049 mmac_R was set to “1” when the machine manufacturer macro option was not valid. • Set up parameter #1060 SETUP was set to “20” when the machine manufacturer macro option was not valid. • Writing of the machine manufacturer macro program with the PROGRAM COPY screen was attempted when the machine manufacturer macro option was not valid.

Error No.	Error message		Details
E07	**RESET END**	Δ	• The input/output operations were forcibly stopped by reset, etc. (including EMG).
E08	**PHYSICAL ERR**	×	• The input/output parameter setting or input/output unit side setting was incorrect.
E09	**TIME OUT**	×	• The input/output unit parameter "#9116 TIME-OUT SET" setting was too short. • There is no EOB code in the machining program.
E10	**MEMORY OVER**	×	• The program cannot be written because the memory capacity is exceeded. • This error occurs when the MDI data setting on the MDI screen exceeds 500 characters, or when saving MDI, editing or making a program on the edit screen, input on the data input/output screen, program copy, etc.
E11	**PROG. No. DUPLI**	Δ	• When registering a machining program in the memory, a program with the same No. as the designated program No. was found in the memory. Refer to the program file to find a program No. not being used, and reset the program No. • A program with the same No. as the machining program to be copied from the memory was found in the IC card. • This error occurs during MDI registration in the MDI screen or during creation of a program in the edit screen.
E12	**FILE ENTRY OVER**	×	• When registering a machining program in the memory, the No. of programs determined in the specifications is exceeded, preventing registration. This error occurs during MDI registration in the MDI screen, creation of a program in the edit screen, data input in the data input/output screen, and program copy.
E13	**NB NOT FOUND**	Δ	• The block with the designated sequence No. or block No. does not exist in the designated program.
E14	**PROG. NOT FOUND**	Δ	• The designated program is not found in the memory. • The corresponding program No. was not found with search of tape memory during graphic check.
E15	**EDIT LOCK B**	×	• An operation (edit, input/output, buffer correction, transmit, delete, etc.) inhibited for machining program B was attempted.
E16	**EDIT LOCK C**	×	• An operation (edit, input/output, buffer correction, transmit, delete, etc.) inhibited for machining program C was attempted.

Error No.	Error message		Details
E17	**PARITY H ERR**	×	• A parity H error was detected during data input, etc. • Check the paper tape or input device. This error may occur if the paper tape is dirtied with oil, etc.
E18	**PARITY V ERR**	×	• A parity V error was detected during data input. • Check the paper tape to see whether the number of characters in the significant information section of a block is odd. • Also check the state (cable wiring, noise measures, etc.) of the connected equipment.
E21	**PROGRAM RUNNING**	×	• Deletion of a machining program was attempted during operation. • Search was attempted during operation. • Change of data such as parameters was attempted during operation. • Start of graphic check was attempted during operation. • When using the two systems, the program being buffer corrected was running with the other system. • Erasing or inputting (IC → NC) of a program in the IC card being used was attempted. • Formatting of the IC card was attempted during automatic start. • Accessing to the host computer was attempted during automatic operation.
E22	**CODE CHANGE ERR**	×	• There was an illegal code on the paper tape.
E24	**PLC RUN**	×	• Data input/output or comparison was attempted when the PLC was not stopped. • Analog output adjustment was attempted when the PLC was not stopped. • An attempt was made to input or output language data during PLC execution. • When the machine manufacturer macro program memory area was set to the FROM area, formatting of the FROM area (#1060 SETUP “20”) was attempted when the PLC was not stopped, writing of the machine manufacturer macro program was attempted on the PROGRAM COPY screen, or input of the macro program was attempted. (Measures) Stop the PLC. • Set the control unit rotary switch to 1. • Set the onboard file screen RUN/STOP setting to 1.

Error No.	Error message		Details
E25	**DATA MEMORY ERR**	×	• When inputting the tool offset data onto tape, an offset type exceeding the specifications range was designated, and that block could not be input. If the INPUT key is pressed again in the input screen, the input will continue from the next block.
E26	**NO CHARACTERS**	Δ	• The designated character string was not found from the block displayed on the screen to the end of the program when searching with data search in the edit screen. Press the INPUT key again' and the search will start at the head of the program.
E35	**COMPARE ERROR**	×	• An inconsistency was found in the paper tape and memory data during comparison.
E40	**OP MODE ERROR**	×	• Continuous or step graphic check was not possible because the operation mode was illegal.
E50 **E51** **E52** **E53** **E54** **E55** **E56**	**FILE ERR** **FILE OPEN ERR** **FILE CLOSE ERR** **FILE SEEK ERR** **FILE READ ERR** **FILE DELETE ERR** **FILE INSERT ERR**	×	• If one of these errors occurs, the editing or input/output operations cannot be continued. Contact the Service Center. As for E50, a classification No. will display at the end of the message. Inform the service center of this No. as well. E55 is also displayed when deleting the system configuration data "ASSEMBLY.INF" of NC memory was attempted on host screen. The system configuration data cannot be deleted.

Error No.	Error message		Details
E60	**IOP ERR□□**	×	A classification number is displayed after the message for E60. Refer to the section shown in parentheses, and remedy the problem. E60 lOP ERROR - 2 (Port already being used) E60 lOP ERROR - 4 (E09 TIME OUT) E60 lOP ERROR - 5 (E08 PHYSICAL ERR) E60 lOP ERROR - 7 (E07 RESET END) E60 lOP ERROR - 10 (E04 DEV. NOT READY) E60 lOP ERROR - 15 (E17 PARITY H ERR) E60 lOP ERROR - 16 (E18 PARITY V ERR) E60 lOP ERROR - 17 (E20 OVER RUN ERR) E60 lOP ERROR - 18 (E22 CODE CHANGE ERR) E60 IOP ERROR - 20 (framing and H/W errors) • Setting for the bit length is incorrect. (Baud rate, stop bit, and character length) Check the setting of the I/O device system and its parameters and set it again. • Check the situations of the connected devices (cable wiring and noise measures). • Data was input/output or the tape search was executed during the host link. Set 0 in #8109 HOST LINK, and then set 1 again before performing the cycle start. (IOP error -2) • The host link parameter was turned ON during connecting to the Anshin-net. Turn the Anshin-net valid OFF. (IOP error -2) • When #10812 Anshin-net/ Machine builders network system valid is set to 1, the modem connection port of the Anshin-net or machine builders network system is occupied. Perform inputting or outputting using a port other than the modem connection port. (IOP error -2) • When connecting the GX Developer (when the bit selection parameter #6451 bit5 is set to 1), the port 2 of the RS232C communication port is always used. Use a port other than the port 2 of the RS232C communication port. (IOP error -2) • When "#10812 Anshin-net/Machine builders network system valid" is set to 1, the system configuration data output cannot be used. When carrying out the system configuration data output, "#10812 Anshin-net/Machine builders network system valid" is set to 0. (IOP error -2)

Error No.	Error message		Details
E62	**I/O PARAM ERR**	Δ	• The "EIA code" data set for I/O parameter is of an unusable code. • The unusable codes are those used as the EIA standard codes and the even hole codes. • System configuration data output operation was executed without using the data ASCII. Set "0" to EIA output, "1" to data ASCII in the I/O device parameters.
E64	**PROGRAM No. ERR**	Δ	• The same No. as the program No. designated for program copy was found in the memory. • During tape input, the first character of the machining program block is the program No. address "O" or "L".
E65	**PROG. No. DUPLI**	Δ	• During tape input, the same No. as the specified program was found in the memory.
E66	**NO PROG. NUMBER**	Δ	• During tape input, the program No. was not found on the paper tape, and a program No. was not designated on the screen's data setting area. Set the program No., and input again.
E69	**PROG. CHECK MODE**	×	• Search (operation search) was attempted during program check (continuous or step). • Retry search after the program check is completed, or after resetting the program search
E70	**TOOL No. DUPLI**	Δ	• A tool No. already registered was newly registered on the tool life management screen.
E71	**TOOL ENTRY OVER**	×	• Registration of data exceeding the max. No. of registerable tools was attempted on the tool life management screen. • When inputting the tool offset data onto tape, a compensation number exceeding the specifications range was specified, and that block could not be input. If the INPUT key is pressed again in the input screen, the input will continue from the next block.
E73	**CAN'T CALCULATE**	×	• The coordinate value of the hole center cannot be obtained. • Reset the measurement point, which must not applied to the following conditions. The measurement A point is the same as the Y coordinate of the C point. The measurement B is the same as the Y coordinate of the C point. The slope of the line through A and C point is the same as the slope of the line through B and C point.
E74	**MENU IMPOSSIBLE**	×	• Press the operation menu "= Input" or "+ input" during the tool measurement. • Press the operation menu "= Input" or "+ input" during the manual value command mode. • Press the screen selection menu on which "↓" is displayed during the tool measurement. • Press the screen selection menu on which "↓" is displayed during the manual value command mode.

Error No.	Error message		Details
E75	**TLM ILL. SIGNAL**		• The sensor signal was already ON when the tool measurement mode (TLM) signal was validated. • After the tool measurement mode (TLM) signal was validated, the sensor signal turned ON when there was no axis movement. • The sensor signal turned ON at a position within 100μm from the final entry start position. • Turn the tool measurement mode signal input OFF, or turn the sensor signal OFF and move the axis in a safe direction. **(Note)** This display will be erased when another screen is opened. The display will not be erased even if the tool measurement mode signal input is turned OFF, or if the axis is moved in a direction away from the sensor.
E76	**TOOL No. ERROR**	×	• The offset No. to be used for workpiece coordinate system offset data measurement was invalid. Restart from tool selection. (Correctly specify the R register that contains the offset number.)
E77	**AXIS No. REF-RET**	×	• Zero point return has not been completed for the axis being measured. Return the axis to the zero point.
E78	**AX UNMATCH (TLM)**	×	• During movement of two or more axes, the sensor turned ON and the tool length was measured. Keep off from the sensor and perform the measurement for one axis at a time.
E79	**NO REF-RTN (TLM)**	×	• The sensor turned on for an axis that has not completed dog-type reference point return, and the tool length was measured. Return the axis to the zero point.
E80	**TOP SEARCH ERR**	×	• The program head search (unmodal type search) was not executed before type 2 (standard specification) restart search was executed for program restart. Set the type to unmodal, search for the head of the program, and then search for the restart block with type 2.
E82	**ALREADY RESEARCH**	×	• After completing the type 1 or type 2 search for program restart, the unmodal type, type 1 or type 2 search was attempted again. If program restart is continued (if the axis is return to the restart position with automatic or manual operations), the program will restart from the block searched for first. To search again, cancel the previous search by resetting, and then search again.
E84	**CAN'T IN/OUT**	×	• An attempt was made to input a parameter in the setup parameter locked state. Refer to the manual issued by the machine manufacturer. • The parameter "#1925 EtherNet" of the high-speed program server function is set to 0. • When writing data to the IC card, the file name is illegal. (Exceeding 8 characters of file name + 3 characters of extension.) • Input of maintenance data from the host or IC card was attempted.

Error No.	Error message		Details
E86	**INPUT DATA ERR**	×	• When inputting the tool offset data, the data format was not correct, so that block could not be input. • If the INPUT key is pressed again in the input screen, the input will continue from the next block. • When data is read from parameter tape, its format is incorrect. • The format of file written to the NC memory is illegal.
E87	**NOT EDIT PROG.**	×	• Playback edit was executed for a fixed cycle subprogram. Playback edit of a fixed cycle subprogram is not possible.
E88	**CAN'T ADD BLOCK**	×	• Playback edit cannot be executed unless the block being edited with playback is displayed to the end (EOB) on the left side of the machining program display area. Press the cursor key [↓], and display the whole block to the end. Then, input the data.
E91	**MODE ERROR (PBK)**	×	• G90 was set when "PB_G90" was OFF. • G91 was set when "PB_G90" was ON.
E98	**CAN'T RESEARCH**	×	• When restarting the program, the type 3 restart search was attempted with a program containing no T command. Check the program. • When restarting the program, the T command corresponding to the type 3 restart search was not found in the program. Check the program. • When restarting a program for 2-systems, restart search was performed simultaneously for the 1st and 2nd systems, and then the 2nd system was searched again. If program restart is continued (if the axis is return to the restart position with automatic or manual operations), the program will restart from the block searched for first. To search again, cancel the previous search by resetting, and then search again. • When carrying out program restart, restart search 2 was executed during MDI mode. Change to the memory or tape, and search again. • When carrying out program restart, type 3 restart search was attempted while the machine was at the negative (-) side of the restart limit parameters. Manually move the machine to the positive (+) side of the restart limit parameters, and search again.
E165	**AUX RUNNING**	×	• The keys other than Function/Menu/Previous page/Next page were pressed in Auxiliary monitor screen during auxiliary axis operation.
E190	**FORE EDITING**	×	• An attempt was made to perform background search for the program that is in foreground search status. (Word editing)
E191	**NOT COM. SEARCH**	×	• Operation search was attempted in tape mode.
E200	**ADJUST ERROR**	×	• The hardware status can't be read correctly, so automatic adjustment was not possible. • Check the remote I/O unit. • A Z55 RIO NOT CONNECT occurred. • Adjust manually. • Unit defect (replace unit)

Error No.	Error message		Details
E201	**UNIT NOT EQUIP**	×	• The analog output unit is not mounted. • Confirm the remote I/O unit. • Prepare a unit having analog output. • Check the connection (power and signal wires) • Unit defect (replace unit)
E301	**CONNECT ERROR**	×	• A socket connection attempt failed during Ethernet communication. • Check the host address, the setting of the port No. and that the host computer is turned ON.
E302	**LOGIN ERR**	×	• A login attempt failed during Ethernet communication. Check the user name and password. • Check the account settings, such as the home directory.
E303	**TIME OUT**	×	• Transmission of a file with Ethernet communication ended because of timeout.
E311	**DOWNLOAD ERR**	×	• An attempt to read a host file failed during Ethernet communication.
E312	**UPLOAD ERR**	×	• An attempt to write to a host file failed during Ethernet communication.
E313	**NO FILE**	×	• The file specified by host receive (host → IC) operation during Ethernet communication is not found in the host. • The file specified by host send (IC → host) operation during Ethernet communication is not found in the IC card.
E314	**FILE DUPLICATE**	×	• The file name specified to be stored by host receive (host → IC) operation during Ethernet communication already exists in the IC card. • The file name specified to be loaded by host send (IC → host) operation during Ethernet communication already exists in the host.
E315	**FILE WRITE ERR**	×	• An attempt to write to the IC card failed during Ethernet communication.
E316	**FILE READ ERR**	×	• An attempt to read a file from the IC card failed during Ethernet communication.
E317	**MEMORY OVER**	×	• IC card memory is full. • NC memory is full.
E318	**OVER FLOW ERR**	×	• A host directory contains too many files.
E319	**DIRECTORY ERR**	×	• An attempt to move a directory failed. • In the IC card device, accessing a directory in the nineteenth layer or more was attempted.
E320	**HR437 UNEQU**	×	• When backup or writing of the expansion cassette into/from the FROM, the expansion cassette (HR437) was not mounted in CBUS#1 or was incorrectly mounted. • When backup or writing of the expansion cassette into/from the FROM, a card other than the expansion cassette (HR437) was mounted in CBUS#1. • When the program memory was formatted to 1280m or more, the expansion cassette (HR437) was not mounted in CBUS#1.

2.2 Operator Messages

The following messages indicate the status of the setting and display functions, and are not operation errors. They are mainly used to show that operation is normal, and serve as guides for the following operations. There is no classification by numbers.

2.2.1 Search And Operation Related

Message	Message details
SEARCH EXECUTION	• Search is being executed normally.
SEARCH COMPLET	• Search was completed normally.
BUFFER EDIT	The buffer is being corrected. This appears when the cursor or a tab key is pressed and the buffer correction mode is entered. This is erased when INPUT is pressed.
CAN'T BUF. EDIT	When using 2 systems, the program being buffer corrected is being used by the other system. Buffer correcting of a machine manufacturer macro program was attempted.
DATA PROTECTING	Buffer correcting is prohibited since the data protection key 3 is valid.

2.2.2 MDI/Editing Related

Message	Message details
MDI NO SETTING	• Only display of MDI data (no execution)
MDI SETTING COMPLETE	• The MDI data setting has been completed (execution is now possible).
MDI ENTRY COMPLETE	• The MDI data was saved in the memory with the specified program No.
MDI RUNNING	• The NC is operating with an MDI program, and the MDI data cannot be corrected.
PUSH KEY SERCH/PROG	• Status in which no programs to be edited have been called on the editing screen. To edit, press the SEARCH or PROGRAM edit key.
EDITING	• The details of a program are being edited on the screen. Press INPUT to write the data in the memory.
PROGRAM RUNNING	• A machining program to be edited is currently being run with memory operation, and cannot be edited.
DELETE? (Y/N)	• Waiting for a key entry (whether to delete the program) in word edit status (when the background search menu is selected)
BACK GROUND EDITING	• Background edit mode
EDIT POSSIBLE	• Editing can be performed in foreground edit mode.
EDIT IMPOSSIBLE	• Editing cannot be performed in foreground edit mode. • This state also occurs during feed hold or fixed cycle mode (single-block stop).
WORD SEARCH FIN	• The word matching the search data was searched on word editing.

2.2.3 Data Input/Output Related

Message	Message details
DATA IN EXECUTION	• Data is being read without error from the paper tape.
DATA WRITING IN PROGRESS	• Data has been entered normally and the input data is being written to the ROM.
DATA IN COMPLETE	• Data has been stored without error.
COMPARE EXECUTION	• Comparison is being executed without error.
COMPARE COMPLETE	• Comparison has completed without error.
DATA OUT EXECUTION	• Data is being output without error.
DATA OUT COMPLETE	• Data has been output without error.
ERASE EXECUTION	• Data is being erased without error.
ERASE COMPLETE	• Data has been erased without error.
COPY EXECUTION	• The machining program is being copied without error.
COPY COMPLETE	• The machining program has been copied without error.
CONDENSE EXECUTION	• The machining program is being condensed without error.
CONDENSE COMPLETE	• The machining program has been condensed without error.
MERGE EXECUTION	• The machining program is being merged without error.
MERGE COMPLETE	• The machining program has been merged without error.
No. CHANGE EXECUTION	• The machining program No. is being changed without error.
No. CHANGE COMPLETE	• The machining program No. has been changed without error.

2.2.4 S-analog Output Adjustment Related

Message	Message details
ADJUST EXECUTION	• Analog output adjustment is being executed without error.
ADJUST COMPLETE	• Analog output adjustment has completed without error.

2.2.5 Auxiliary Axis

Message	Message details
CONTINUE Y/N	• Type “Y” or “N” to specify whether to perform operation.
BACKUP EXECUTION	• The auxiliary axis parameters are being backed up in SRAM.
BACKUP COMPLETE	• The backup of the auxiliary axis parameters in SRAM has been completed.
AUX. WRITING EXEC.	• The auxiliary axis parameters in SRAM is being written to MR-J2-CT.
WRITE COMPLETE	• The writing of the auxiliary axis parameters in SRAM to MR-J2-CT has been completed.
ABS POS RESTORED	• The absolute position in SRAM has been restored in MR-J2-CT.

2.2.6 Parameter Backup Related

Message	Message details
BACKUP EXEC. Y/N	Type "Y" or "N" to specify whether to perform the operation.
BACKUP EXECUTION	The parameters are being backed up.
BACKUP COMPLTE	Backup of the parameters has been completed.
RESTORE EXEC. Y/N	Type "Y" or "N" to specify whether to perform the operation.
RESTORE EXECUTION	The parameters are being restored.
RESTORE COMPLETE	Restoration of the parameters has been completed.

2.2.7 Others

Message	Message details
DATA PROTECTING	• The data protection key is valid, and the various data cannot be set or erased, etc.
BASE PARA. SET? (Y/N)	• Waiting for the key input of standard parameter setting (Y/N).
BASE PARA EXECUTION	• The standard parameters are being set.
EXECUTE FORMAT? (Y/N)	• Waiting for the key input of execute format (Y/N).
FORMAT EXECUTION	• Formatting is being executed.
SETUP COMPLETE	• The simple setup has been completed. Setup with #1060 SETUP "1" has been completed. Formatting with #1060 SETUP "20" has been completed.
NON SETUP	• Completed without executing simple setup. (When “N” has been set for both “BASE PARA. SET? (Y/N)” and “EXECUTE FORMAT? (Y/N)”.)
CONFIRM OPE? (Y/N)	• Confirmation for erasing operating time or alarm history.
INPUT? (Y/N)	• Waiting for the key input of tool length data by manual measurement.
V-ANALIZER EXEC.	• Waveform display data cannot be output while waveform is displayed.
ROM WRITE? (Y/N)	• The system is waiting for a key input to indicate whether to write the macro programs into the FROM.
DATA WRITING	• The macro program is being written into the FROM.
WRITE COMPLETE	• The macro program has been written into the FROM.

3. Program Error

(The bold characters are the message displayed in the screen.)
These alarms occur during automatic operation, and the causes of these alarms are mainly program errors which occur, for instance, when mistakes have been made in the preparation of the machining programs or when programs which conform to the specification have not been prepared.

Error No.	Details	Remedy
P 10	**EXCS. AXIS No.** The number of axis addresses commanded in the same block exceeds the specifications.	• Divide the alarm block command into two. • Check the specifications.
P 11	**AXIS ADR. ERROR** The axis address commanded by the program and the axis address set by the parameter do not match.	• Revise the axis names in the program.
P 20	**DIVISION ERROR** An axis command which cannot be divided by the command unit has been issued.	• Check the program.
P 29	**NOT ACCEPT CMND** • The normal line control command (G40.1, G41.1, G42.1) has been issued during the modal in which the normal line control is not acceptable. • 2-part system synchronous thread cutting command was issued during a modal for which a 2-part system synchronous thread cutting command cannot be issued.	• Check the program.
P 30	**PARITY H** The number of holes per character on the paper tape is even for EIA code and odd for ISO code.	• Check the paper tape. • Check the tape puncher and tape reader.
P 31	**PARITY V** The number of characters per block on the paper tape is odd.	• Make the number of characters per block on the paper tape even. • Set the parameter parity V selection OFF.
P 32	**ADDRESS ERROR** An address not listed in the specifications has been used.	• Check and revise the program address. • Check and correct the parameters values. • Check the specifications.
P 33	**FORMAT ERROR** The command format in the program is not correct.	• Check the program.

Error No.	Details	Remedy
P 34	**G-CODE ERROR** A G code not listed in the specifications has been used. An illegal G code was commanded during the coordinate rotation command (G68).	• Check and correct the G code address in the program.
	G51.2 or G50.2 was commanded when the rotary tool axis No. (#1501 polyax) was set to “0”. G51.2 or G50.2 was commanded when the tool axis was set to the linear axis (#1017 rot “0”).	• Check the parameter setting values.
P 35	**CMD-VALUE OVER** The setting range for the addresses has been exceeded.	• Check the program.
P 36	**PROGRAM END ERR** “EOR” has been read during tape and memory operation.	• Enter the M02 and M30 command at the end of the program. • Enter the M99 command at the end of the subprogram.
P 37	**PROG. NO. ZERO** A zero has been specified for program and sequence numbers.	• The program numbers are designated across a range from 1 to 99999999. • The sequence numbers are designated across a range from 1 to 99999.
P 39	**NO SPEC ERR** • A non-specified G code was specified. • The high-speed program server operation specifications are not provided.	• Check the specifications.
P 40	**PREREAD BL. ERR** When tool radius compensation is executed, there is an error in the pre-read block and so the interference check is disabled.	• Reconsider the program.
P 60	**OVER CMP. LENG.** The commanded movement distance is excessive. (Over 2^{31})	• Reconsider the axis address command.
P 62	**F-CMD. NOTHING** • No feed rate command has been issued. • There is no F command in the cylindrical interpolation or pole coordinate interpolation immediately after the G95 mode is commanded.	• The default movement modal command at power ON is G01. This causes the machine to move without a G01 command if a movement command is issued in the program, and an alarm results. Use an F command to specify the feedrate. • Specify F with a thread lead command.
P 65	**NO G05P3 SPEC**	• Check the high-speed mode III specifications.

Error No.	Details	Remedy
P 70	**ARC ERROR** • There is an error in the arc start and end points as well as in the arc center. • The difference of the involute curve through the start point and the end point is large. • When arc was commanded, one of the two axes configuring the arc plane was a scaling valid axis.	• Check the numerical values of the addresses that specify the start and end points, arc center as well as the radius in the program. • Check the "+" and "-" directions of the address numerical values.
P 71	**ARC CENTER** • The arc center is not sought during R-specified circular interpolation. • The curvature center of the involute curve cannot be obtained.	• Check the numerical values of the addresses in the program. • Check whether the start point or end point is on the inner side of the base circle for involute interpolation. When carrying out tool radius compensation, check that the start point and end point after compensation are not on the inner side of the base circle for involute interpolation. • Check whether the start point and end point are at an even distance from the center of the base circle for involute interpolation.
P 72	**NO HELICAL SPEC** A helical command has been issued though it is not included in the specifications.	• Check the helical specifications. • An Axis 3 command was issued by the circular interpolation command. If there is no helical specification, the linear axis is moved to the next block.
P 90	**NO THREAD SPEC** A thread cutting command has been issued though it is not included in the specifications.	• Check the specifications.
P 93	**SCREW PITCH ERR** The screw pitch has not been set correctly when the thread cutting command is issued.	• Issue the thread cutting command and then set the screw pitch command properly.
P100	**NO CYLIND SPEC** Cylindrical interpolation was commanded when the cylindrical interpolation specifications were not provided.	• Check the specifications.
P111	**PLANE CHG (CR)** Plane selection commands (G17, G18, and G19) were issued when a coordinate rotation command (G68) was issued.	• Before issuing the plane selection commands, issue G68 and then G69 (coordinate rotation cancel).

Error No.	Details	Remedy
P112	**PLANE CHG (CC)** • A plane selection command (G17, G18, G19) has been issued when the tool radius compensation command (G41, G42) or nose R compensation command (G41, G42, G46) is issued. • The plane selection command was issued when nose R compensation is completed, there is no axial movement command after the G40 command, and the compensation has not been canceled.	• Issue the plane selection command after the tool radius compensation command or nose R compensation command has been canceled (issue axial movement command after the G40 cancel command).
P113	**ILLEGAL PLANE** The arc command axis is not on the selected plane.	• Issue arc command on the correctly selected plane.
P122	**NO AUTO C-OVR** An automatic corner override command (G62) has been issued though it is not included in the specifications.	• Check the specifications. • Delete the G62 command from the program.
P126	**ILL. CMD(H.A.)** An illegal command was issued during the high-accuracy control mode. • A G code group 13 command was issued during the high-accuracy control mode. • Milling, cylindrical interpolation or pole coordinate interpolation was commanded during the high-accuracy control mode.	• Reconsider the program.
P130	**2nd AUX. ADDR** The 2nd miscellaneous function address specified in the program does not match that set by the parameter.	• Check and correct the 2nd miscellaneous function address in the program.
P131	**NO G96 SPEC** (No constant peripheral speed) The constant peripheral speed command (G96) was issued despite the fact that such a command does not exist in the specifications.	• Check the specifications. • Change from the constant peripheral speed command (G96) to the rotation speed command (G97).
P132	**SPINDLE S = 0** No spindle speed command has been specified.	• Reconsider the program.
P133	**G96 P-No. ERR** An invalid constant peripheral speed control axis has been specified.	• Reconsider the parameter specified for the constant peripheral speed control axis.

Error No.	Details	Remedy
P134	**G96 Clamp Err.** The constant surface speed control command (G96) was issued without commanding the spindle speed clamp (G92/G50).	Press the reset key and carry out the remedy below. • Check the program. • Issue the G92/G50 command before the G96 command. • Command the constant surface speed cancel (G97) to switch to the rotation speed command. (Applicable only to M65 V series and M64 C version series)
P140	**NO T-POS OFST** The position compensation command (G45 to G48) specifications are not available.	• Check the specifications.
P141	**PAT-ROT ERROR** Position compensation was commanded during the figure rotation or coordinate rotation command.	• Reconsider the program.
P142	**T-OFFS G2 ERR** A position compensation invalid arc command was commanded.	• Reconsider the program.
P150	**NO R-CMP SPEC** • Even though there were no tool radius compensation specifications, tool radius compensation commands (G41 and G42) were issued. • Even though there were no nose R compensation specifications, nose R compensation commands (G41, G42, and G46) were issued.	• Check the specifications.
P151	**G2, 3 CMP. ERR** A compensation command (G40, G41, G42, G43, G44, G46) has been issued in the arc mode (G02, G03).	• Issue the linear command (G01) or rapid traverse command (G00) in the compensation command block or cancel block. (Set the modal to linear interpolation.)
P152	**I.S.P NOTHING** In interference block processing during execution of a tool radius compensation (G41 or G42) or nose R compensation (G41, G42, or G46) command, the intersection point after one block is skipped cannot be determined.	• Reconsider the program.
P153	**I.F ERROR** An interference error has arisen while the tool radius compensation command (G41, G42) or nose R compensation command (G41, G42, G46) was being executed.	• Reconsider the program.

Error No.	Details	Remedy
P155	**F-CYC ERR (CC)** A fixed cycle command has been issued in the radius compensation mode.	• The radius compensation mode is established when a fixed cycle command is executed and so the radius compensation cancel command (G40) should be issued.
P156	**BOUND DIRECT** At the start of G46 nose R compensation, the compensation direction is undefined if this shift vector is used.	• Change the vector to that with which the compensation direction is defined. • Exchange with a tool having a different tip point number.
P157	**SIDE REVERSED** During G46 nose R compensation, the compensation direction is inverted.	• Change the G command to that which allows inversion of the compensation direction (G00, G28, G30, G33, or G53). • Exchange with a tool having a different tip point number. • Turn ON the #8106 G46 inversion error avoidance parameter.
P158	**ILLEGAL TIP P.** During G46 nose R compensation, the tip point is illegal (other than 1 to 8).	• Change the tip point number to a legal one.
P170	**NO CORR. No.** The compensation number (DOO, TOO, HOO) command was not given when the radius compensation (G41, G42, G43, G46) command was issued. Alternatively, the compensation number is larger than the number of sets in the specifications.	• Add the compensation number command to the compensation command block. • Check the number of compensation number sets a correct it to a compensation number command within the permitted number of compensation sets.
P172	**G10 L-No. ERR** (G10 L-number error) The L address command is not correct when the G10 command is issued.	• Check the address L-Number of the G10 command and correct the number.
P173	**G10 P-No. ERR** (G10 compensation error) When the G10 command is issued, a compensation number outside the permitted number of sets in the specifications has been commanded for the compensation number command.	• First check the number of compensation sets and then set the address P designation to within the permitted number of sets.
P177	**LIFE COUNT ACT** Registration of tool life management data with G10 was attempted when the used data count valid signal was ON.	• The tool life management data cannot be registered when counting the used data. Turn the used data count valid signal OFF.

<table>
<tr><th>Error No.</th><th>Details</th><th>Remedy</th></tr>
<tr><td>P178</td><td>LIFE DATA OVER
The No. of registration groups, total No. of registered tools or the No. of registrations per group exceeded the specifications range.</td><td>• Review the No. of registrations. The maximum No. of registrations is shown below.
<table>
<tr><td>System</td><td>System 1</td><td>System 2</td></tr>
<tr><td>No. of groups</td><td>80</td><td>40/40</td></tr>
<tr><td>No. of tools</td><td>80</td><td>40/40</td></tr>
<tr><td>Per group</td><td colspan="2">16</td></tr>
</table></td></tr>
<tr><td>P179</td><td>GROUP No. ILL.
• When registering the tool life management data with G10, the group No. was commanded in duplicate.
• A group No. that was not registered was designated during the T□□□□99 command.
• An M code command must be issued as a single command but coexists in the same block as that of another M code command.
• The M code commands set in the same group exist in the same block.</td><td>• The group No. cannot be commanded in duplicate. When registering the group data, register it in group units.
• Correct to the correct group No.</td></tr>
<tr><td>P180</td><td>NO BORING CYC.
A fixed cycle command was issued though there are not fixed cycle (G72 – G89) specifications.</td><td>• Check the specifications.
• Correct the program.</td></tr>
<tr><td>P181</td><td>NO S-CMD (TAP)
The spindle rotation speed command has not been issued when the hole drilling fixed cycle command is given.</td><td>• Issue the spindle rotation speed command (S) when the hole drilling fixed cycle command G84, G74 (G84, G88) is given.</td></tr>
<tr><td>P182</td><td>SYN TAP ERROR
Connection to the main spindle unit was not established.</td><td>• Check connection to the main spindle.
• Check that the main spindle encoder exists.</td></tr>
<tr><td>P183</td><td>PTC/THD, No.
The pitch or thread number command has not been issued in the tap cycle of a hole drilling fixed cycle command.
The pitch is too small for the spindle rotation speed.
The thread number is too large for the spindle rotation speed.</td><td>• Specify the pitch data and the number of threads by F or E command.</td></tr>
</table>

Error No.	Details	Remedy
P184	**NO PTC/THD CMD** The pitch or the number of threads per inch is illegal in the tap cycle of the hole drilling fixed cycle command. The pitch is too small for the spindle rotation speed. The thread number is too large for the spindle rotation speed.	• Check the pitch or the number of threads per inch.
P190	**NO CUTTING CYC** A lathe cutting cycle command was input although the lathe cutting cycle was undefined in the specification.	• Check the specification. • Delete the lathe cutting cycle command.
P191	**TAPER LENG ERR** In the lathe cutting cycle, the specified length of taper section is illegal.	• The radius set value in the lathe cycle command must be smaller than the axis shift amount.
P192	**CHAMFERING ERR** Chamfering in the thread cutting cycle is illegal.	• Set a chamfering amount not exceeding the cycle.
P200	**NO MRC CYC SPC** The fixed cycle for compound lathe I (G70 to G73) was commanded when the fixed cycle for compound lathe I specifications were not provided.	• Check the specification.

P201	**PROG. ERR (MRC)**
	• When called with a fixed cycle for compound lathe I command, the subprogram contained at least one of the following commands:
	  • Reference point return command (G27, G28, G29, G30)
	  • Thread cutting (G33, G34)
	  • Fixed cycle skip-function (G31)
	• The first move block of the finish shape program in fixed cycle for compound lathe I contains an arc command.
		• Delete the following G codes from this subprogram that is called with the fixed cycle for compound lathe I commands (G70 to G73): G27, G28, G29, G30, G31, G33, G34, fixed cycle G-code.
		• Remove G2 and G3 from the first move block of the finish shape program in fixed cycle for compound lathe I.

P202	**BLOCK OVR (MRC)** The number of blocks in the shape program of the fixed cycle for compound lathe I is over 50 or 200 (this differs according to the model).	• Specify 50 or a less value. The number of blocks in the shape program called by the fixed cycle for compound lathe I commands (G70 to G73) must be decreased below 50 or 200 (this differs according to the model).
P203	**CONF. ERR (MRC)** The fixed cycle for compound lathe I (G70 to G73) shape program could not cut the work normally because it defined an abnormal shape.	• Check the fixed cycle for compound lathe I (G70 to G73) shape program.
P204	**VALUE ERR (MRC)** A command value of the fixed cycle for compound lathe (G70 to G76) is illegal.	• Check the fixed cycle for compound lathe (G70 to G76) command value.

Error No.	Details	Remedy
P210	**NO PAT CYC SPC** • A fixed cycle for compound lathe II (G74 to G76) command was input although it was undefined in the specification. • In 1-part system, 2-part system synchronous thread cutting command was issued.	• Check the specification.
P220	**NO SPECIAL CYC** No special fixed cycle specifications are available.	• Check the specifications.
P221	**NO HOLE (S_CYC)** A 0 has been specified for the number of holes in special fixed cycle mode.	• Reconsider the program.
P222	**G36 ANGLE ERR** A G36 command specifies 0 for angle intervals.	• Reconsider the program.
P223	**G12 G13 R ERR** The radius value specified with a G12 or G13 command is below the compensation amount.	• Reconsider the program.
P224	**NO G12, G13 SPC** There are no circular cutting specifications.	• Check the specifications.
P230	**NESTING OVER** • A subprogram has been called 4 or more times in succession from the subprogram. • The program in the IC card contains the M198 command. • The program in the IC card has been called more than once (the program in the IC card can be called only once at a time).	• Check the number of subprogram calls and correct the program so that it does not exceed 4 times. • When using the IC card, the IC card and the number of IC card program calls.
P231	**NO N-NUMBER** At subprogram call time, the sequence number set at return from the subprogram or specified by GOTO, was not set.	• Specify the sequence numbers in the call block of the subprogram. • When using an IC card, check the program and its No. in the IC card.
P232	**NO PROGRAM No.** The subprogram has not been found when the subprogram is called.	• Enter the subprogram. • Check the program number in the IC card.
P241	**NO VARI NUMBER** The variable number commanded is higher than the numbers in the specifications.	• Check the specifications. • Check the program variable number.
P242	**EQL. SYM. MSSG.** The "=" sign has not been commanded when a variable is defined.	• Designate the "=" sign in the variable definition of the program.

Error No.	Details	Remedy
P243	**VARIABLE ERR.** An invalid variable has been specified in the left or right side of an operation expression.	• Correct the program.
P252	**PAT.&COOD-ROT** A coordinate rotation related command (G68, G69) was issued during figure rotation.	• Reconsider the program.
P260	**NO COOD-RT SPC** Even though there were no coordinate rotation specifications, a coordinate rotation command was issued.	• Check the specifications.
P270	**NO MACRO SPEC** A macro specification was commanded though there are no such command specifications.	• Check the specifications.
P271	**NO MACRO INT.** A macro interrupt command has been issued though it is not included in the specifications.	• Check the specifications.
P272	**MACRO ILL.** A statement and a macro statement exist together in the same block.	• Reconsider the program and place the executable statement and macro statement in separate blocks.
P273	**MACRO OVERCALL** The number of macro call nests exceeded the specifications.	• Reconsider the program and correct it so that the macro calls do not exceed the limit imposed by the specification.
P275	**MACRO ARG. EX.** The number of macro call argument type II sets has exceeded the limit.	• Reconsider the program.
P276	**CALL CANCEL** A G67 command was issued though it was not during the G66 command modal.	• Reconsider the program. • The G67 command is the call cancel command and so the G66 command must be designated first before it is issued.
P277	**MACRO ALM MESG** An alarm command has been issued in #3000.	• Refer to the operator messages on the DIAG screen. • Refer to the instruction manual issued by the machine manufacturer.
P280	**EXC. [,** The number of parentheses "[" or "]" which can be commanded in a single block has exceeded five.	• Reconsider the program and correct it so the number of "[" or "]" does not exceed five.
P281	**[,] ILLEGAL** The number of "[" and "]" parentheses commanded in a single block does not match.	• Reconsider the program and correct it so that "[" and "]" parentheses are paired up properly.
P282	**CALC. IMPOSS.** The arithmetic formula is incorrect.	• Reconsider the program and correct the formula.

Error No.	Details	Remedy
P283	**DIVIDE BY ZERO** The denominator of the division is zero.	• Reconsider the program and correct it so that the denominator for division in the formula is not zero.
P290	**IF SNT. ERROR** There is an error in the IF conditional GOTO□ statement.	• Reconsider the program.
P291	**WHILE SNT. ERR** There is an error in the WHILE conditional DO□-END□ statement.	• Reconsider the program.
P292	**SETVN SNT. ERR** There is an error in the SETVN□ statement when the variable name setting was made.	• Reconsider the program. • The number of characters in the variable name of the SETVN statement must be 7 or less.
P293	**DO-END EXCESS** The number of □'s for DO-END□ in the WHILE conditional DO□ - END□ statement has exceed 27.	• Reconsider the program and correct it so that the number of □'s in the DO - END statement does not exceed 27.
P294	**DO-END MMC.** The DO's and END's are not paired off properly.	• Reconsider the program and correct it so that the DO's and END's are paired off properly.
P295	**WHILE/GOTO TPE** There is a WHILE or GOTO statement on the tape during tape operation.	• During tape operation, a program which includes a WHILE or GOTO statement cannot be executed and so the memory operation mode is established instead.
P296	**NO ADR (MACRO)** A required address has not been specified in the user macro.	• Review the program.
P297	**ADR-A ERR.** The user macro does not use address A as a variable.	• Review the program.
P298	**PTR OP (MACRO)** User macro G200, G201, or G202 was specified during tape or MDI operation.	• Review the program.
P300	**VER. NAME ERROR** The variable names have not been commanded properly.	• Reconsider the variable names in the program and correct them.
P301	**VAR NAME DUPLI** The name of the variable has been duplicated.	• Correct the program so that the name is not duplicated.
P350	**NO SCALING SPC** The scaling command (G50, G51) was issued when the scaling specifications were not available.	• Check the specifications.
P360	**NO PROG.MIRR.** A mirror image (G50.1 or G51.1) command has been issued though the programmable mirror image specifications are not provided.	• Check the specifications.

Error No.	Details	Remedy
P370	**NO OPOS MR SPC** The facing turret mirror image specifications are not provided.	• Check the specifications.
P371	**MIRR ILLEGAL** Facing turret mirror image was commanded to an axis for which external mirror image or parameter mirror image is valid. Facing turret mirror image validating mirror image for a rotary axis was commanded.	• Check the program. • Check the parameters.
P380	**NO CORNER R/C** A command was issued for corner chamfering/corner rounding though there are no such specifications.	• Check the specifications. • Remove the corner chamfering/corner rounding command from the program.
P381	**NO ARC R/C SPC** Corner chamfering/corner rounding was specified in the arc interpolation block although corner chamfering/corner rounding II is unsupported.	• Check the specifications.
P382	**CORNER NO MOVE** The block next to corner chamfering/ corner rounding is not a movement command.	• Replace the block succeeding the corner chamfering/corner rounding command by G01 command.
P383	**CORNER SHORT** In the corner chamfering/corner rounding command, the movement distance was shorter than the value in the corner chamfering/corner rounding command.	• Make the corner chamfering/corner rounding less than the movement distance since this distance is shorter than the corner chamfering/ corner rounding.
P384	**CORNER SHORT** When the corner chamfering/corner rounding command was input, the movement distance in the following block was shorter than the length of the corner chamfering/corner rounding.	• Make the corner chamfering/corner rounding less than the movement distance since this distance in the following block is shorter than the corner chamfering/corner rounding.
P385	**G0 G33 IN CONR** A block with corner chamfering/corner rounding was given during G00 or G33 modal.	• Recheck the program.
P390	**NO GEOMETRIC** A geometric command was issued though there are no geometric specifications.	• Check the specifications.
P391	**NO GEOMETRIC 2** There are no geometric IB specifications.	• Check the specifications.
P392	**LES AGL (GEOMT)** The angular difference between the geometric line and line is 1° or less.	• Correct the geometric angle.

Error No.	Details	Remedy
P393	**INC ERR (GEOMT)** The second geometric block was specified by an incremental value.	• Specify this block by an absolute value.
P394	**NO G01 (GEOMT)** The second geometric block contains no linear command.	• Specify the G01 command.
P395	**NO ADRS (GEOMT)** The geometric format is invalid.	• Recheck the program.
P396	**PL CHG. (GEOMT)** A plane switching command was executed during geometric command processing.	• Execute the plane switching command before geometric command processing.
P397	**ARC ERR (GEOMT)** In geometric IB, the circular arc end point does not contact or cross the next block start point.	• Recheck the geometric circular arc command and the preceding and following commands.
P398	**NO GEOMETRIC 1B** Although the geometric IB specifications are not included, a geometric command is given.	• Check the specifications.
P421	**PRAM. IN ERROR** • The specified parameter number or set data is illegal. • An illegal G command address was input in parameter input mode. • A parameter input command was input during fixed cycle modal or nose R compensation.	• Check the program.
P430	**AXIS NOT RET.** • A command was issued to move an axis, which has not returned to the reference point, away from that reference point. • A command was issued to an axis removal axis.	• Execute reference point return manually. • The command was issued to an axis for which axis removal is validated so invalidate axis removal.
P431	**NO 2nd REF. SPC** A command for second, third or fourth reference point return was issued though there are no such command specifications.	• Check the specifications.
P434	**COLLATION ERR** One of the axes did not return to the start position when the origin point collate command (G27) was executed.	• Check the program.

Error No.	Details	Remedy
P435	**G27/M ERROR** An M command was issued simultaneously in the G27 command block.	• An M code command cannot be issued in a G27 command block and so the G27 command and M code command must be placed in separate blocks.
P436	**G29/M ERROR** An M command was issued simultaneously in the G29 command block.	• An M code command cannot be issued in a G29 command block and so the G29 command and M code command must be placed in separate blocks.
P438	**NOT USE (G52)** A local coordinate system command was issued during execution of the G54.1 command.	• Review the program.
P450	**NO CHUCK BARR.** The chuck barrier on command (G22) was specified although the chuck barrier was undefined in the specification.	• Check the specification.
P460	**TAPE I/O ERROR** An error has arisen in the tape reader or, alternatively, in the printer during macro printing.	• Check the power and cable of the connected devices. • Check the I/O device parameters.
P461	**FILE I/O ERROR** A file of the machining program cannot be read.	• In memory mode, the programs stored in memory may have been destroyed. Output all of the programs and tool data once and format them. • Ensure that the external device (including a floppy disk drive and IC card) that contains the file is mounted.
P462	**DNC ERROR** A communication error occurred during the BTR operation.	• L01 DNC ERROR is displayed simultaneously, so remedy the problem according to the error No.
P480	**NO MILL SPEC** • Milling was commanded when the milling specifications were not provided. • Pole coordinate interpolation was commanded when the pole coordinate interpolation specifications were not provided.	• Check the specification.
P481	**MILL ILL. G** • An illegal G code was used during the milling mode. • An illegal G code was used during cylindrical interpolation or pole coordinate interpolation. • The G07.1 command was issued during the tool radius compensation.	• Check the program.

Error No.	Details	Remedy
P482	**MILL ILL. AXIS** • A rotary axis was commanded during the milling mode. • Milling was executed even though an illegal value was set for the milling axis No. • Cylindrical interpolation or pole coordinate interpolation was commanded during mirror image. • Cylindrical interpolation or pole coordinate interpolation was commanded before the tool compensation was completed after the T command. • G07.1 was commanded when cylindrical interpolation was not possible (there is no rotary axis, or external mirror image is ON). • G12.1 was commanded when polar coordinate interpolation was not possible. • An axis other than a cylindrical coordinate system axis was commanded during cylindrical interpolation.	• Check the machining program, parameters and PLC I/F signal.
P484	**MILL AXIS RET.** • Movement was commanded to an axis that had not completed reference point return during the milling mode. • Movement was commanded to an axis that had not completed reference point return during cylindrical interpolation or pole coordinate interpolation.	• Carry out manual reference point return.

Error No.	Details	Remedy
P485	**MILL ILL. MODAL** • The milling mode was turned ON during nose R compensation or constant surface speed control. • A T command was issued during the milling mode. • The mode was switched from milling to cutting during tool compensation. • Cylindrical interpolation or pole coordinate interpolation was commanded during the constant surface speed control mode (G96). • The command unacceptable in the cylindrical interpolation was issued. • A T command was issued during the cylindrical interpolation or pole coordinate interpolation mode. • A movement command was issued when the plane was not selected just before or after the G07.1 command. • A plane selection command was issued during the pole coordinate interpolation mode. • Cylindrical interpolation or pole coordinate interpolation was commanded during tool radius compensation. • The G16 plane in which the radius value of a cylinder is 0 was specified. • A cylindrical interpolation or pole coordinate interpolation command was issued during program coordinate rotation (G68).	• Check the program. • Before issuing G12.1, issue G40 or G97. • Before issuing G12.1, issue a T command. • Before issuing G13.1, issue G40. • Specify the radius value of a cylinder other than 0, or specify the X axis's current value other than 0 before issuing G12.1/G16.
P486	**MILLING ERROR** • The milling command was issued during the mirror image (when parameter or external input is turned ON). • Pole coordinate interpolation, cylindrical interpolation or milling interpolation was commanded during facing turret mirror image. • The start command of the cylindrical interpolation or polar coordinate interpolation was issued during the normal line control.	• Check the program.

Error No.	Details	Remedy
P511	**SYNC CODE ERR** • Two or more synchronization M codes were commanded in the same block. • The synchronization M code and "!" code were commanded in the same block.	• Check the program.
P600	**NO AUTO TLM.** An automatic tool length measurement command (G37) was execute though there are no such command specifications.	• Check the specifications.
P601	**NO SKIP SPEC.** A skip command (G31) was issued though there are no such command specifications.	• Check the specifications.
P602	**NO MULTI SKIP** A multiple skipping command (G31.1, G31.2 or G31.3) was issued though there are no such command specifications.	• Check the specifications.
P603	**SKIP SPEED 0** The skip speed is 0.	• Specify the skip speed.
P604	**TLM ILL. AXIS** No axis or more than one axis was specified in the automatic tool length measurement block.	• Specify only one axis.
P605	**T-CMD IN BLOCK** The T code is in the same block as the automatic tool length measurement block.	• Specify this T code before the block.
P606	**NO T-CMD BEFOR** The T code was not yet specified in automatic tool length measurement.	• Specify this T code before the block.
P607	**TLM ILL. SIGNL** Before the area specified by the D command or decelerating area parameter d, the measurement position arrival signal went ON. The signal remains OFF to the end.	• Check the program.
P608	**SKIP ERROR (CC)** A skip command was specified during radius compensation processing.	• Specify a radius compensation cancel (G40) command' or remove the skip command.

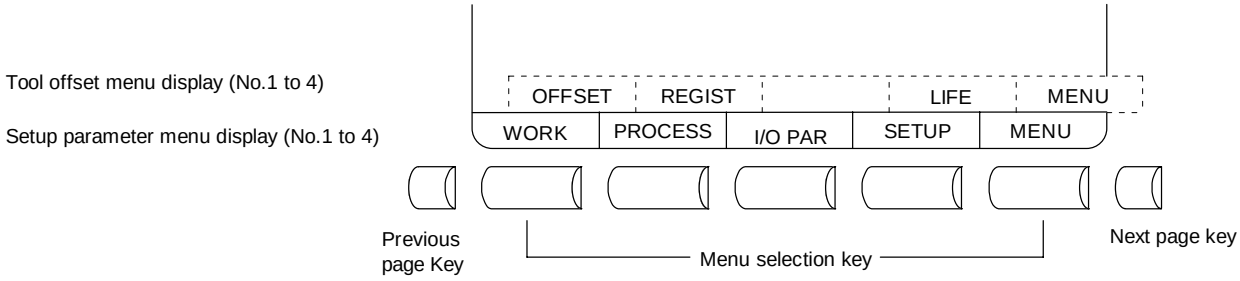
Error No.	Details	Remedy
P610	**ILLEGAL PARA.** • The parameter setting is not correct. • G114.1 was commanded when the spindle synchronization with PLC I/F command was selected. • G113 was commanded when the spindle-spindle polygon machining option was OFF and the spindle synchronization with PLC I/F command was selected.	• Check whether #1549 Iv0vR1 to #1553 Iv0vR5 are set in descending order (in order of large values). • Check whether #1554 Iv0rd2 to #1557 Iv0rd5 are set in descending order. • Check and correct #1514 expLinax and #1515 expRotax. • Check the program. • Check the parameter.
P612	**EXP. ERROR** A movement command for exponential function interpolation was issued during facing turret mirror image.	• Check the program.
P700	**CMD-VALUE ILL.** Spindle synchronization was commanded to a spindle that is not connected serially.	• Check the program. • Check the parameter.
P900	**NO TANZ. SPEC** A normal line control command (G40.1, G41.1, G42.1) was issued when the normal line control specifications were not provided.	• Check the specifications.
P901	**TAN. AXIS G92** A coordinate system preset command (G92) was issued to a normal line control axis during normal line control.	• Check the program.
P902	**TAN. AXIS LINE** • The normal line control axis was set to a linear axis. • The normal line control axis was set to the linear type rotary axis II axis. • The normal line control axis has not been set. • The normal line control axis was the same as the plane selection axis.	• Correct the normal line control axis.
P903	**PLANE CHG (TAN)** The plane selection command (G17, G18, G19) was issued during normal line control.	• Delete the plane selection command (G17, G18, G19) from the program for normal line control.
P990	**PREPRO S/W ERR** Combining commands that required pre-reading (nose R offset, corner chamfering/corner rounding, geometric I, geometric IB, and fixed cycle for compound lathe) resulted in eight or more pre-read blocks.	• Reduce the number of commands that require pre-reading or delete such commands.

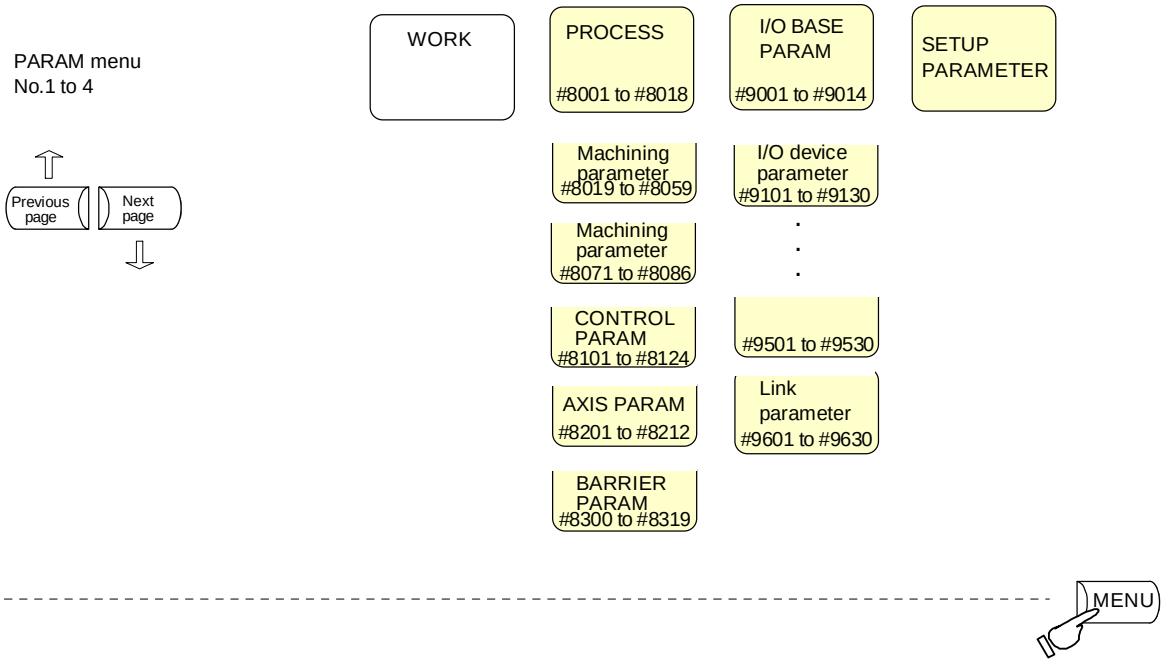
II EXPLANATION OF PARAMETERS

1. Screen Configuration

1.1 Screen Transition Charts

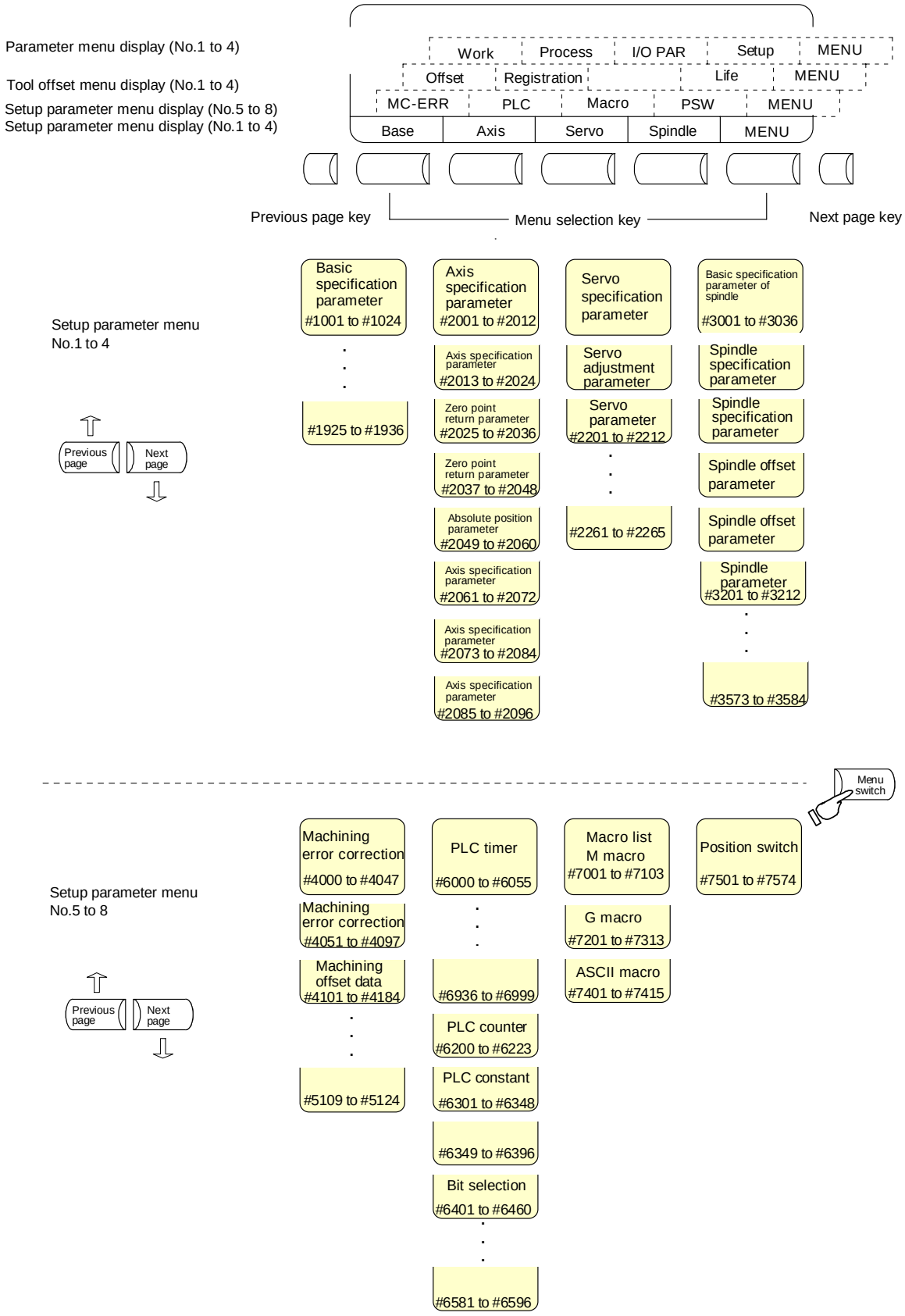
When the function selection key [MENU] is pressed, the following menu appears:
TOOL menu is displayed after the power is turned on. To display PARAM menu, use menu key on the TOOL screen.





TOOL menu The contents of TOOL menu depends on the system.

Press the menu key [SETUP] to display the setup selection screen.
If the setup parameter menu opening option is specified in this screen, the setup parameters can be set up and displayed.



2. Machining Parameters

2.1 Process Parameters

<WRK COUNT> (No. of workpieces machined)

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

<AUTO TLM> (Automatic tool length measurement)

#	Item	Contents	Setup range (unit)
8004	SPEED	Set the feedrate during automatic tool length measurement.	1 to 60000 (mm/min)
8005	ZONE r	Set the distance between the measurement point and deceleration start point.	0 to 99999.999 (mm)
8006	ZONE d	Set the tolerable zone of the measurement point. If the sensor signal turns ON in front of d before the measurement point, or if the signal does not turn ON after d is passed, an alarm will occur.	0 to 99999.999 (mm)

<AUTO CORNER OVR> (Automatic corner override)

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

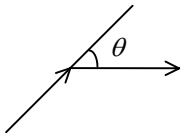
<T-TIP OFFSET> (Wear data input)

#	Item	Contents	Setup range (unit)
8010	ABS. MAX. (For L system only)	Set the max. value when inputting the tool wear compensation amount. A value exceeding this setting value cannot be set.	0 to 999.999 (mm)
8011	INC. MAX. (For L system only)	Set the max. value for when inputting the tool wear compensation amount in the incremental mode.	0 to 999.999 (mm)

<FIXED C.> (Fixed cycle)

#	Item	Contents	Setup range (unit)
8012	G73 n (For M system only)	Set the return amount for G73 (step cycle).	0 to 99999.999 (mm)
8013	G83 n	Set the return amount for G83 (deep hole drilling cycle).	0 to 99999.999 (mm)
8014	CDZ-VALE (For L system only)	Set the screw cut up amount for G76, G78 (thread cutting cycle).	0 to 127 (0.1 lead)
8015	CDZ-ANGLE (For L system only)	Set the screw cut up angle for G76, G78 (thread cutting cycle).	0 to 89 (°)
8016	G71 MINIMUM (For L system only)	Set the minimum cut amount for the final cutting in G71, G72 (rough cutting cycle). If the final cutting amount is smaller than this value, the final cut will not be performed.	0 to 999.999 (mm)
8017	DELTA-D (For L system only)	Set the change amount to the command cut amount D for G71, G72 (rough cutting cycle). Each cut amount will be the value obtained by adding or subtracting this value from command D, and thus, the amount can be changed each cut.	0 to 999.999 (mm)
8018	G84/G74 return (For M system only)	Set up return length m at a G84/G74 pecking tap cycle. Note: Set "0" to specify a usual tap cycle.	0 to 999.999 (mm)

<PRECISION> (High precision control)

#	Item	Contents	Setup range (unit)
8019	R COMP	Set up a compensation coefficient for reducing a control error in the reduction of a corner roundness and arch radius. Indicates a maximum control error (mm) in parentheses. The larger the setup value, the smaller the theoretical error will be. However, since the speed at the corner goes down, the cycle time is extended. Coefficient = 100 - setting value Note: This is valid when "#8021 COMP CHANGE" is set to "0".	0 to 99 (%)
8020	DCC ANGLE	Set up the minimum value of an angle (external angle) that should be assumed to be a corner. When an inter-block angle (external angle) in high-accuracy mode is larger than the set value, it is determined as a corner and the speed goes down to sharpen the edge.  If the set value is smaller than θ, the speed goes down to optimize the corner. Note: If "0" is set, it will be handled as 5 degrees.	0 to 89 (degrees) 0: The angle will be 5°.
8021	COMP CHANGE	Select whether to share or separate the compensation coefficient at the corner/curve during the high-accuracy control mode. 0: Share (#8019 R COMP) 1: Separate • Corner (#8022 CORNER COMP) • Curve (#8023 CURVE COMP) (Note) Set "1" when using SSS control.	0/1
8022	CORNER COMP	Set the compensation coefficient to further reduce or increase the roundness at the corner during the high-accuracy control mode. Coefficient = 100 - setting value Note: This is valid when "#8021 COMP CHANGE" is set to "1".	-1000 to 99 (%)
8023	CURVE COMP	Set the compensation coefficient to further reduce or increase the radius reduction amount at the curve (arc, involute, spline) during the high-accuracy control mode. Coefficient = 100 - setting value Note: This is valid when "#8021 COMP CHANGE" is set to "1".	-1000 to 99 (%)
8024	EDGE ANGLE	Not used.	-

<PRECISION> (High precision control)

#	Item	Contents	Setup range (unit)
8025	SPLINE ON (for M system only)	Specify whether to enable the spline function. 0: Disable the spline function. 1: Enable the spline function.	0/1
8026	CANCEL ANG. (for M system only)	When the angle made by blocks exceeds the set value, spline interpolation is canceled temporarily. In consideration of the pick feed, set a value a little smaller than the pick feed angle.	0 to 180 (°) 0: 180 (°)
8027	Toler-1 (for M system only)	Specify the maximum chord error (tolerance) in a block that includes an inflection point. Set the tolerance applicable when the applicable block is developed to fine segments by CAM. (normally about 10 μm) When 0.000 is set, the applicable block is linear.	At 1μm 0.000 to 100.000mm At 0.1μm 0.0000 to 10.0000mm
8028	Toler-2 (for M system only)	Specify the maximum chord error (tolerance) in a block that includes no inflection point. Set the tolerance applicable when the applicable block is developed to fine segments by CAM. (normally about 10 μm) When 0.000 is set, the applicable block is linear.	At 1μm 0.000 to 100.000mm At 0.1μm 0.0000 to 10.0000mm
8029	FairingL (for M system only)	Set the length of the block subject to fairing. (Valid when #8033 Fairing ON is set to 1.)	0 to 100.000mm
8030	MINUTE LENGTH (for M system only)	When the length of one block exceeds the set value, spline interpolation is canceled temporarily and linear interpolation is performed. Set a value a little smaller than linear block length of the workpiece to be machined. If - 1 is set, spline interpolation is performed regardless of block length.	-1 to 127mm 0: 1mm
8033	Fairing ON (for M system only)	Set whether to use the fairing function. 0: Fairing invalid 1: Fairing valid	0/1
8034	AccClamp ON (for M system only)	Set the method for clamping the cutting speed. 0: Clamp with parameter "#2002 clamp" or the corner deceleration function. 1: Clamp the cutting speed with acceleration judgment. (Valid when #8033 Fairing ON is set to 1.)	0/1
8035	AccClampMag	Not used.	
8036	CordecJudge (for M system only)	Change the conditions for judging a corner. 0: Judge the corner from the angle of the neighboring block. 1: Judge the corner from the angle of the neighboring block, excluding minute blocks. (Valid when #8033 Fairing ON is set to 1.)	0/1
8037	CorJudgeL (for M system only)	Set the length of the block to be excluded. (Valid when #8036 CordecJudge is set to 1.)	0 to 99999.999 (mm)

<C axis normal line>

#	Item	Contents	Setup range (unit)
8041	C-rot.R	This is valid with normal line control type II. Set the length from the center of the normal line control axis to the end of the tool. This is used to calculate the turning speed at the block joint.	0.000 to 99999.999 (mm)
8042	C-ins.R	This is valid with normal line control type I. Set the radius of the arc to be automatically inserted into the corner during normal line control.	0.000 to 99999.999 (mm)

<Fixed cycle>

#	Item		Contents	Setup range (unit)
8051	G71	THICK	Set the amount of cut-in by the rough cutting cycle (G71, G72)	0 to 99999.999 (mm)
8052		PULL UP	Set the amount of recess after cutting by the rough cutting cycle (G71, G72).	0 to 99999.999 (mm)
8053	G73	U	Set the X-axis cutting margin of the forming rough cutting cycle (G73).	-99999.999 to 99999.999 (mm)
8054		W	Set the Z-axis cutting margin of the forming rough cutting cycle (G73).	-99999.999 to 99999.999 (mm)
8055		R	Set the number of times cutting is performed by the forming rough cutting cycle (G73).	0 to 99999 (times)
8056	G74	RETRACT	Set the amount of retract (amount of cut-up) of the push-cut cycle (G74, G75).	0 to 999.999 (mm)
8057	G76	LAST-D	Set the amount of final cut-in by the composite threading cycle (G76).	0 to 99.999 (mm)
8058		TIMES	Set the number of times the amount of final cut-in (G76 finish margin) is divided in the composite threading cycle (G76).	0 to 99 (times)
8059		ANGLE	Set the angle (thread angle) of the tool nose in the composite threading cycle (G76).	0 to 99 (°)

<3-dimensional tool radius compensation>

#	Item	Contents	Setup range (unit)
8071	3-D CMP (for M system only)	Value of p in the following denominator constants for 3-dimensional tool radius compensation Vx = i x r/p, Vy = j x r/p, Vz = k x r/p Vx, Vy, Vz: X, Y, and Z axes or vectors of horizontal axes i, j, k: Program command value r: Offset p = $\sqrt{i^2 + j^2 + k^2}$ when the set value is 0.	0 to 99999.999

< Scale factor>

#	Item	Contents	Setup range (unit)
8072	SCALING P (for M system only)	Set the scale factor for reduction or magnification for the machining program for which the G50 or G51 command is issued. This parameter is effective when the program specifies no scale factor.	0 to 99.999999

<Tool ID>

#	Item	Contents	Setup range (unit)
8073	OfsetPosition (for M system only)	Set the tool offset memory number position for writing the tool information data's tool length offset amount, tool radius compensation amount, tool length wear amount and tool radius wear amount into the tool offset data. Note: If 0 or a value exceeding the number of tool compensation sets is set, the data will not be written into the tool offset data.	0 to 999
8074	IDMacroTop (for M system only)	Set the head position when writing the tool information data's user areas 4 to 9 in the macro variables.	0 to 999

<Spiral interpolation>

#	Item	Contents	Setup range (unit)
8075	SpiralEndErr (for M system only)	Designate the tolerable error range (absolute value) when the end point position commanded with the command format type 2 spiral interpolation or conical interpolation command differs from the end point position obtained from the speed and increment/ decrement amount.	0 to 99999.999 (mm)
8076	SpiralMinRad (for M system only)	Not used.	

<Involute interpolation>

#	Item	Contents	Setup range (unit)
8077	InvoluteErr (for M system only)	Set the tolerable error value of the involute curve that passes through the start point and the involute curve that passes through the end point during involute interpolation.	0 to 99999.999 (mm)

<Screen saver>

#	Item	Contents	Setup range (unit)
8078	Screen Saver	Set the time to turn the screen OFF. The screen saver will not turn ON if 0 is set. (Note) This parameter setting is valid only for the LCD display unit.	0 to 60 (min) 0: Do not turn screen OFF.

<Deep hole drilling cycle>

#	Item	Contents	Setup range (unit)
8083	G83S modeM (for M system only)	Set the M command code for changing to the small diameter deep hole drilling cycle mode.	1 to 99999999
8084	G83S Clearanse (for M system only)	Set the clearance amount for the G83 small diameter deep hole drilling cycle.	0 to 999.999 (mm)
8085	G83S Forward F (for M system only)	Set the feedrate from the R point to the cutting start position in the G83 small diameter deep hole drilling cycle.	0 to 99999 (mm/min)
8086	G83S Back F (for M system only)	Set the speed for returning from the hole base during the G83 small diameter deep hole drilling cycle.	0 to 99999 (mm/min)

<SSS control>

#	Item	Contents	Setup range (unit)
8090	SSS ON (for M system only)	Set whether to validate SSS control with G05 P10000. 0: Invalid 1: Valid	0/1
8091	StdLength (for M system only)	Adjust the maximum value of the range for recognizing the shape. To eliminate the effect of steps or errors, etc., set a large value. To enable sufficient deceleration, set a small value. If "0.000" is set, the standard value (1.000mm) will be applied.	0 to 100.000 (mm)
8092	ClampCoeff (for M system only)	Adjust the clamp speed at the curved section configured of fine segments. Coefficient = $\sqrt{\ }$ setting value	1 to 100
8093	StepLeng (for M system only)	Set the width of the step at which the speed is not to be decelerated. (Approximately the same as the CAM path difference [Tolerance].) If 0 is set, the standard value (5µm) will be applied. If a minus value is set, the speed will decelerate at all minute steps.	-0.001 to 0.100 (mm)
8094	DccWaitAdd (for M system only)	Set the time to wait for deceleration when the speed FB does not drop to the clamp speed.	0 to 100 (ms)
8095	Tolerance (for M system only)	Set the tolerable error when the error between the command path and tool path is large. The error will decrease when a small value is set, but the machining time will increase. If "0.000" is set, the error will not be adjusted.	0 to 100.000 (mm)

2.2 Control Parameters

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

<table>
<tr><th>#</th><th>Item</th><th>Contents</th><th>Setup range (unit)</th></tr>
<tr><td>8109</td><td>HOST LINK</td><td>Specify whether to enable computer link B instead of the RS-232C port.
0: Disable computer link B to enable normal RS-232C communication.
1: Enable computer link B to disable normal RS-232C communication.</td><td>0/1</td></tr>
<tr><td>8110</td><td>G71/G72 POCKET</td><td>Set the pocket machining if there is a dimple (pocket) in the rough cutting cycle (G71, G72) finishing program.
0: Pocket machining OFF
1: Pocket machining ON</td><td>0/1</td></tr>
<tr><td>8111</td><td>Milling Radius</td><td>Select the diameter and radius of the linear axis for milling (cylindrical/pole coordinate) interpolation.
0: All axes radius value command
1: Each axis setting (follows #1019 dia diameter designated axis)
Note: This parameter is valid only in the milling (cylindrical/pole coordinate) interpolation mode.</td><td>0/1</td></tr>
<tr><td>8112</td><td>DECIMAL PNT-P</td><td>0: The decimal point command for G04 address P is invalidated.
1: The decimal point command for G04 address P is validated.</td><td>0/1</td></tr>
<tr><td>8113</td><td>MillingInitG16</td><td rowspan="2">Designate which plane to use for milling machining after the power is turned ON or reset.
<table><tr><th>#8113</th><th>#8114</th><th>Plane</th></tr><tr><td>0</td><td>0</td><td>G17 plane</td></tr><tr><td>0</td><td>1</td><td>G19 plane</td></tr><tr><td>1</td><td>0</td><td rowspan="2">G16 plane</td></tr><tr><td>1</td><td>1</td></tr></table>Note: This parameter is valid for the G code system 2, 3 (#1037 cmdtyp=3, 4).</td><td>0: Plane other than G16
1: Select G16 plane</td></tr>
<tr><td>8114</td><td>MillingInitG19</td><td>0: Plane other than G19
1: Select G19 plane</td></tr>
</table>

2.3 Axis Parameters

Set up the parameter required for each axis.

#	Item	Contents	Setup range (unit)
8201	AX. RELEASE	Select the function to remove the control axis from the control target. 0: Control as normal. 1: Remove from control target.	0/1
8202	OT-CHECK OFF	Select the stored stroke limit II function set in #8204 and #8205. 0: Stored stroke limit II valid 1: Stored stroke limit II invalid	0/1
8203	OT-CHECK-CANCEL	When the simple absolute position method (#2049 type is 9) is selected, the stored stroke limits I, II (or IIB) and IB will be invalid until the first zero point return is executed after the power is turned ON. 0: Stored stroke limit II valid (according to #8202) 1: Stored stroke limit II invalid Note: Temporary cancel of #8203 soft limit affects all the stored stroke limits.	0/1
8204	OT-CHECK-N	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. If the sign and value are the same as #8205, the stored stroke limit II (or IIB) will be invalid. If the stored stroke limit IIB function is selected, the prohibited range will be between two points even when #8204 and #8205 are set in reverse. When II is selected, the entire range will be prohibited.	±99999.999 (mm)
8205	OT-CHECK-P	This sets the coordinates of the (+) direction in the moveable range of the stored stroke limit II or the upper limit coordinates of the prohibited range of stored stroke limit IIB.	±99999.999 (mm)
8206	TOOL CHG. P	Set the coordinates of the tool change position for G30. n (tool change position return). Set with coordinates in the basic machine coordinate system.	±99999.999 (mm)
8207	G76/87 IGNR (For M system only)	Select the shift operation at G76 (fine boring) and G87 (back boring).	0: Shift effective 1: No shift
8208	G76/87 (–) (For M system only)	Specifies the shift direction at G76 and G87.	0: Shift to (+) direction 1: Shift to (-) direction
8209	G60 SHIFT (For M system only)	Set the last positioning direction and distance for a G60 (uni-directional positioning) command.	±99999.999 (mm)

#	Item	Contents	Setup range (unit)
8210	OT INSIDE	The stored stoke limit function to be set in #8204 and #8205 prevents the machine from moving to the inside or outside of the specified range. 0: Inhibits outside area (select stored stroke limit II.) 1: Inhibits inside area (select stored stroke limit II B.)	0/1
8211	MIRR. IMAGE	Enable or disable the parameter mirror image function. 0: Disable 1: Enable	0/1

2.4 Barrier Data

#	Item	Contents	Setup range (unit)
8300	P0 (For L system only)	Set the reference X-coordinates of the chuck and the tail stock barrier. Set the center coordinate (Radius value) of workpiece by the basic machine coordinate system.	±99999.999 (mm)
8301 8302 8303 8304 8305 8306	P1 P2 P3 P4 P5 P6 (For L system only)	Set the area of the chuck and tail stock barrier. (Radius value) Set the coordinate value from the center of workpiece for X-axis. Set the coordinate value by basic machine coordinate system for Z-axis.	±99999.999 (mm)
8310	Barrier ON (For L system only)	Select the validity of the chuck and tailstock barrier. 0: Invalid (Setting from special display unit valid) 1: Valid	0/1
8311 8312	P7 P8 (For L system only)	Set the area of the left spindle section. • X axis: Set the coordinate value from the workpiece center (P0). (radius value) • Z axis: Set the coordinates in the basic machine coordinate system.	±99999.999 (mm)
8313 8314	P9 P10 (For L system only)	Set the area of the right spindle section. • X axis: Set the coordinate value from the workpiece center (P0). (radius value) • Z axis: Set the coordinates in the basic machine coordinate system.	±99999.999 (mm)
8315	BARRIER TYPE (L) (For L system only)	Set the shape of the left chuck and tailstock barrier. 0: No area 1: Chuck 2: Tailstock	0/1/2
8316	BARRIER TYPE (R) (For L system only)	Set the shape of the right chuck and tailstock barrier. 0: No area 1: Chuck 2: Tailstock	0/1/2

#	Item	Contents	Setup range (unit)
8317	DELIV. AX. NAME (For L system only)	When the right chuck and tailstock barrier is movable, set the name of the delivery axis. When using the 2-system method and the delivery axis is an axis in the other system, designate the system as 1A, 1B or 2A, 2B. If the system is not designated as A and B, the set system will be used.	A/B/.. (axis address) 1A/1B/.. 2A/2B/.. (system designation) 0 (cancel)
8318	STOCK ANGLE (L) (For L system only)	Set the angle for the left tailstock end section. The angle will be interpreted as 90° if there is no setting (0).	0 to 180 (°) 0: 90° default
8319	STOCK ANGLE (R) (For L system only)	Set the angle for the right tailstock end section. The angle will be interpreted as 90° if there is no setting (0).	0 to 180 (°)

2.5 Tool Measurement Parameters

Set up the parameter of the tool (touch tool sensor), etc, used for measurement.

#	Item	Contents	Setup range (unit)
8701	Tool length	Set the length to the end of the touch tool.	±99999.999 (mm)
8702	Tool Dia	Set the spherical diameter of the touch tool end.	±99999.999 (mm)
8703	OFFSET X	Set the spindle center deviation amount from the touch tool center in the X axis direction.	±99999.999 (mm)
8704	Y	Set the spindle center deviation amount from the touch tool center in the Y axis direction.	±99999.999 (mm)
8705	RETURN	Set the return distance to contact the touch tool against the workpiece again.	±99999.999 (mm)
8706	FEED	Set the feedrate when contacting the touch tool against the workpiece again.	1 to 60000 (mm/min)

3. I/O Parameters

Pressing the menu key [I/O PARA] displays the I/O BASE PARAM screen.
There are basically two types of input/output parameters which must be set when inputting, outputting or referring to data, or when performing tape operation. One type is the parameters related to the input/output device. The baud rate, etc., is set according to each device. Up to five types of input/output devices can be registered. The other type of input/output parameters is the I/O base parameters which determine which device is connected to which channel per input/output application.

3.1 Base Parameters

<I/O>	#	<PORT No.>	#	<DEV. No.> <DEV. NAME>
		Specify the board No. to which the serial input/output device is connected to 2. • Set "1" to use ch1. • Set "2" to use ch2.		Set the input/output device No. for each application. The device Nos. are 0 to 4 and correspond to the input/output device parameters. The device name set in the input/output device parameter is also displayed for identification.
DATA IN	9001	Specify the port for inputting the data such as machine program and parameters.	9002	Specify the device No. that inputs the data.
DATA OUT	9003	Specify the port for outputting the data such as machine program and parameters.	9004	Specify the device No. that outputs the data.
TAPE MODE	9005	Specify the input port for running with the tape mode.	9006	Specify the device No. to be run with the tape mode.
MACRO PRINT	9007	Specify the output port for the user macro DPRINT command.	9008	Specify the device No. for the DPRINT command.
PLC IN/OUT	9009	Specify the port for inputting/outputting various data with PLC.	9010	Specify the device No. for the PLC input/output.
REMOTE PROG IN	9011	Specify the port for inputting remote programs. The port No. must be "2".	9012	Specify the device No. used to input remote programs.
EXT UNIT	9013	Specify the port for communication with an external unit.	9014	Specify the unit No. used for communication with an external unit

#	Item	Contents	Setup range (unit)
9015	PORT NO. (tool ID)	Set the number of the port connected with the tool ID. (Either ch1 or ch2 can be used.) • Set "1" to use ch1. • Set "2" to use ch2.	1/2 (M64)
9016	DEV. NO. (tool ID)	Set the number of the input/output device to be used. (Any device No. can be used.)	0 to 4 (M64)

3.2 I/O Device Parameters

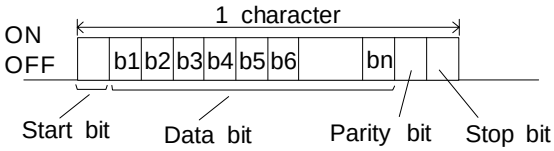
Parameters for up to five types of input/output devices can be set in DEV <0> to <4>.

#	Item	Contents	Setup range (unit)
9101	DEVICE NAME	Set the device name corresponding to the device No. Set a simple name for quick identification.	Use alphabet characters, numerals and symbols to set a name within 3 characters.
9102	BAUD RATE	Set the serial communication speed.	0: 19200 (bps) 1: 9600 2: 4800 3: 2400 4: 1200 5: 600 6: 300 7: 150
9103	STOP BIT	Set the stop bit length used in the start-stop system.	1: 1 (bit) 2: 1.5 3: 2
9104	PARITY CHECK	Specify whether to add the parity check bit to the data during communication.	0: Parity bit not added 1: Parity bit added
9105	EVEN PARITY	Specify the odd or even parity when it is added to the data.	0: Odd parity 1: Even parity
9106	CHR. LENGTH	Set the length of the data bit.	0: 5 (bit) 1: 6 2: 7 3: 8
9107	TERMINATOR TYPE	The code to terminate data reading can be selected.	0 and 3: EOR 1 and 2: EOB or EOR
9108	HAND SHAKE	Specify the transmission control method. The method will be no procedure if a value except 1 to 3 is set.	1: RTS/CTS method 2: No procedure (No handshaking) 3: DC code method
9109	DC CODE PARITY	Specify the DC code when the DC code method is selected.	0: No parity to DC code (DC3 = 13H) 1: DC code with parity (DC3 = 93H)
9111	DC2/DC4 OUTPUT	Specify the DC code handling when outputting data to the output device.	DC2 / DC4 0: None / None 1: Yes / None 2: None / Yes 3: Yes / Yes
9112	CR OUTPUT	Specify whether to insert the <CR> code just before the EOB (L/F) code during output.	0: Do not add 1: Add

#	Item	Contents	Setup range (unit)
9113	EIA OUTPUT	In data output mode, select the ISO or EIA code for data output. In data input mode, the ISO and EIA codes are identified automatically.	0: ISO code output 1: EIA code output
9114	FEED CHR.	Specify the length of the tape feed to be output at the start and end of the data during tape output.	0 to 999 (characters)
9115	PARITY V	Specify whether to check the parity of the No. of characters in block during data input. The No. of characters is factory-set so that the check is valid at all times.	0: Do not perform parity V check 1: Perform parity V check
9116	TIME-OUT	Set the time out time to detect an interruption in communication. Time out check will not be executed when set to 0 to 30 seconds.	0 to 30 (s)
9117	DR OFF	Specify whether to check the DR data at the data input/output.	0: DR valid 1: DR invalid
9118	DATA ASC II	0: Output in ISO/EIA code (Depends on whether #9113, #9213, #9313, #9413, or #9513 EIA output parameter is set up) 1: Output in ASC II code	0/1
9119	INPUT FORM	Specify the mode for input (collation). 0: Standard input (Data from the very first EOB is handled as significant information.) 1: EOBs following the first EOB of the input data are skipped until data other than EOB is input.	0/1
9121 9122 9123 9124 9125 9126 9127 9128	EIA CODE [ ] # * = : $!	When output with EIA code, data can be output using the alternate code in which the special ISO code not included in EIA is specified. Specify the codes which do not duplicate the existing EIA codes by hexadecimal for respective special codes.	0 to FF (hexadecimal)

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

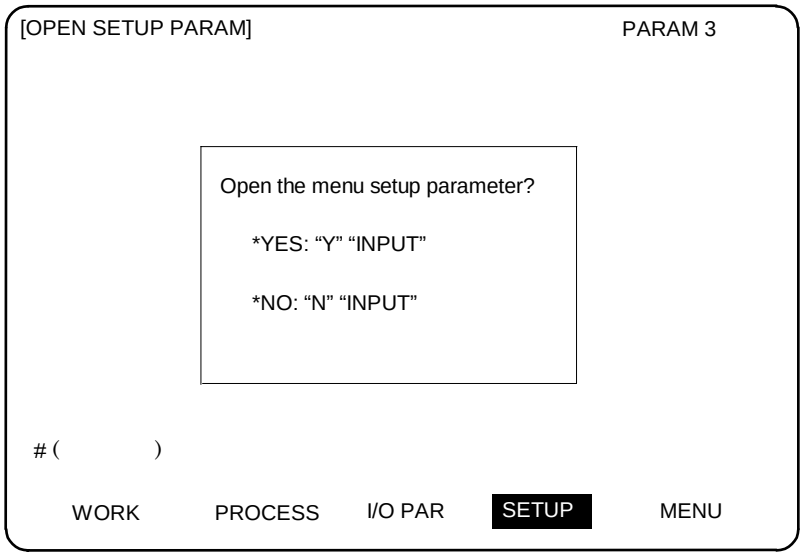
3.3 Computer Link Parameters

#	Item	Contents	Setup range (unit)
9601	BAUD RATE	Specify the rate at which data is transferred.	0: 19200 (bps) 1: 9600 2: 4800 3: 2400 4: 1200 5: 600 6: 300 7: 110 8: 38400
9602	STOP BIT	Specify stop bit length used in start-stop mode. See "PARITY EFFECTIVE" in #9603. The number of characters is adjusted in output mode so that no problems occur if the parity check is enabled.	1: 1 2: 1.5 3: 2
9603	PARITY EFFECTIVE	This parameter is set when using a parity bit separately from the data bit.  Set this to match the input/output device specifications.	0: No parity bit used in I/O mode 1: Parity bit used in I/O mode
9604	EVEN PARITY	Specify whether even or odd parity is used when parity is used. This parameter is ignored when no parity is used.	0: Odd parity 1: Even parity
9605	CHR. LENGTH	Specify data bit length. See "PARITY EFFECTIVE" in #9603.	2: 7 3: 8
9606	HAND SHAKE	RS-232C transmission control mode DC control mode should be set for computer line B.	0: No control 1: RTS/CTS method 2: No handshaking 3: DC control mode
9607	TIME-OUT SET	Specify time-out time at which an interruption of data transfer during data input/output should be detected. If 0 is set, time infinity is specified.	0 to 999 (1/10s)
9608	DATA CODE	Specify the code to be used. See “PARITY EFFECTIVE” in #9603.	0: ASCII code 1: ISO code

#	Item	Contents	Setup range (unit)
9609	LINK PARAM. 1	Bit 1: DC1 output after NAK or SYN Specify whether to output the DC1 code after the NAK or SYN code is output. Bit 7: Enable/disable resetting Specify whether to enable resetting in the computer link.	0: Don't output the DC1 code. 1: Output the DC1 code. 0: Enable resetting in the computer link. 1: Disable resetting in the computer link
9610	LINK PARAM. 2	Bit 2: Specify the control code parity (even parity for the control code). Set the parity in accordance with the I/O device specifications. Bit 3: Parity V Specify whether to enable checking of parity V in one block in data input mode.	0: No control code parity added 1: Control code parity added 0: Disable 1: Enable
9611	LINK PARAM. 3	Not used	
9612	LINK PARAM.4	Not used	
9613	LINK PARAM.5	Not used	
9614	START CODE	Specify the code by which file data transfer begins at first. This parameter is used for a specific user, and set 0 in this parameter for normal operation.	0: DC1 (11H) 1: BEL (07H)
9615	CTRL. CODE OUT	Bit 0: NAK output Specify whether to send the NAK code to the host if a communication error occurs in computer link B. Bit 1: SYN output Specify whether to send the SYN code to the host if NC resetting or an emergency stop occurs in computer link B. Bit 3: DC3 output Specify whether to send the DC3 code to the host when communication ends in computer link B.	0: Do not output the NAK code. 1: Output the NAK code. 0: Do not output the SYN code. 1: Output the SYN code. 0: Do not output the DC3 code. 1: Output the DC3 code.
9616	CTRL. INTERVAL	Not used	
9617	WAIT TIME	Not used	
9618	PACKET LENGTH	Not used	
9619	BUFFER SIZE	Not used	
9620	START SIZE	Not used	
9621	DC1 OUT SIZE	Not used	
9622	POLLING TIMER	Not used	
9623	TRANS. WAIT TMR	Not used	
9624	RETRY COUNTER	Not used	

4. Setup Parameters

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



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

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

(Note 1) Refer to "5. Base Specifications Parameters" to "13. Position Switch" for details on the setup parameters.
(Note 2) Be sure to turn OFF the power supply after selecting the setup parameter.
(Note 3) If a key other than the screen changeover key is pressed when the setup parameters are locked, the message "Data Protected" will appear.

5. Base Specifications Parameters

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

(SETUP PARAM 1. 1/15)

#	Items		Details	Setting range (unit)
1001 (PR)	SYS_ON	System validation setup	Specify the existence of the 1st system, 2nd system and PLC axis with 1 or 0.	0: Not used 1: Used
1002 (PR)	axisno	Number of axes	Set No. of axes in each system and the No. of PLC axes. Specify 6 as the maximum value for each system and 4 as that for the PLC axis so that the total of those values is 6 or less.	0 to 6
1003 (PR)	iunit	Input setup unit	Specify the input setting value for each system and the PLC axis. The parameter units will follow this specification.	B: 1 μm C: 0.1 μm D: 0.01 μm
1013	axname	Axis name	Specify each axis' name address with an alphabetic character. Use the characters X, Y, Z, U, V, W, A, B or C. Do not specify the same address in one system. The same address can be specified for the 1st and 2nd system. The PLC address does not need to be set. (The axis name is displayed as 1 and 2.)	Axis addresses such as X, Y, Z, U, V, W, A, B, and C
1014	incax	Increment command axis name	When specifying the program movement rate's absolute or incremental method with an address, specify the incremental command axis name address with an alphabetic character. The address that can be used is the same as #1013 axname. Specify an address that is different from that #1013. Setting is not required if absolute/incremental specification with addresses is not performed (#1076 Abslnc = 0).	
1015 (PR)	cunit	Command unit	Specify the minimum unit of the program movement amount. cunit Movement amount for movement command 1 0: Follow #1003 iunit 1: 0.0001 mm (0.1 μm) 10: 0.001 mm (1 μm) 100: 0.01 mm (10 μm) 1000: 0.1 mm (100 μm) 10000: 1.0 mm If there is a decimal point in the movement command, the decimal point position will be handled as 1mm regardless of this setting.	0 #1003 iunit 1 0.1 μm 10 1 μm 100 10 μm 1000 100 μm 10000 1 mm

#	Items		Details	Setting range (unit)
1016 (PR)	iout	Inch output	Specify whether the machine system (ball screw pitch, position detection unit) is an inch unit system or metric unit system.	0: Metric unit system 1: Inch unit system
1017 (PR)	rot	Rotational axis	Specify whether the axis is a rotary axis or linear axis. For the rotary axis, the position display will be 360°, and the axis will return to 0°. If the position display is to be continuously displayed even with the rotary axis, set the axis as a linear axis	0: Linear axis 1: Rotary axis
1018 (PR)	ccw	Motor CCW	Specify the direction of the motor rotation to the command direction. 0: Rotates clockwise (looking from motor shaft) with the forward rotation command. 1: Rotates counterclockwise (looking from motor shaft) with the forward rotation command.	0: Rotates clockwise 1: Rotates counter-clockwise
1019 (PR)	dia	Diameter specification axis	Specify whether the program movement amount is to be commanded with the diameter dimension or as movement amount. When the movement amount is commanded with the diameter dimensions, 5mm will be moved when the command is a movement distance of 10mm. The movement amount per pulse will also be halved during manual pulse feed. Among parameters concerning length, the tool length, the wear compensation amount and the workpiece coordinate offset are displayed in diameter value when diameter is specified, but other parameters are always displayed in radius value.	0: Command with movement amount 1: Command with diameter dimension
1020 (PR)	sp_ax	Spindle Interpolation	Specify 1 when the NC control axis is used as the spindle.	0: The NC control axis is used as the servo axis. 1: The NC control axis is used as the spindle.
1021 (PR)	mcp_no	Amplifier I/F channel No. (servo)	Using a 4-digit number, set the amplifier interface channel No. and which axis in that channel is to be used when connecting an axis amplifier. High-order two digits : Amplifier interface channel No. Low-order two digits : Axis No. When using the conventional fixed layout, set all axes to “0000”.	0000 0101 to 0107 0201 to 0207
1022 (PR)	axname2	2nd axis name	Set the name of the axis displayed on the screen with two characters. (X1, Z2, etc.)	Two digits between A to Z and 1 to 9 (Setting is cleared when 0 is set)

#	Items		Details	Setting range (unit)
1023 (PR)	crsadr	Command address during cross machining	Set the address for issuing a command to this axis during cross machining control.	A to Z (Setting is cleared when 0 is set)
1024 (PR)	crsinc	Incremental command address during cross machining	Set the address for issuing an incremental command to this axis during cross machining control.	A to Z (Setting is cleared when 0 is set)

(SETUP PARAM 1. 2/15)

#	Items		Details	Setting range (unit)
1025	l_plane	Initial plane selection	Specify the plane to be selected when the power is turned ON or reset. When 0 is specified, 1 is assumed (X-Y plane).	1: X-Y plane (G17 command state) 2: Z-X plane (G18 command state) 3: Y-Z plane (G19 command state)
1026 1027 1028	base_I base_J base_K	Base axis I Base axis J Base axis K	Specify the basic axis address that composes the plane. Specify the axis address set in #1013 axname. If all three items do not need to be specified, such as for 2-axis specifications, input “0”, and the parameter will be blank. Normally, when X, Y and Z are specified respectively for base_I,_J,_K, the following relation will be established: G17: X-Y G18: Z-X G19: Y-Z Specify the desired address to set an axis address other than the above.	Control axis addresses such as X, Y, and Z
1029	aux_I	Flat axis I	If there is an axis parallel to #1026 base_I, specify that axis address.	Control axis addresses such as X, Y, and Z
1030	aux_J	Flat axis J	If there is an axis parallel to #1027 base_J, specify that axis address.	Control axis addresses such as X, Y, and Z
1031	aux_K	Flat axis K	If there is an axis parallel to #1028 base_K, specify that axis address.	Control axis addresses such as X, Y, and Z

<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td>1037</td><td>cmdtyp</td><td>Command type</td><td>Specify the program G code series and compensation type.
<table>
<tr><th>cmdtyp</th><th>G code series</th><th>Compensation type</th></tr>
<tr><td>1</td><td>System 1 (for M)</td><td>Type A (one compensation amount for one compensation number)</td></tr>
<tr><td>2</td><td>System 2 (for M)</td><td>Type B (shape and wear amounts for one compensation number)</td></tr>
<tr><td>3</td><td>System 2 (for L)</td><td>Type C (two kinds of compensation amount of shape and wear per compensation No.)</td></tr>
<tr><td>4</td><td>System 3 (for L)</td><td>Same as above</td></tr>
<tr><td>5</td><td>System 4 (for special L)</td><td>Same as above</td></tr>
<tr><td>6</td><td>System 5 (for special L)</td><td>Same as above</td></tr>
<tr><td>7</td><td>System 6 (for special L)</td><td>Same as above</td></tr>
<tr><td>8</td><td>System 7 (for special L)</td><td>Same as above</td></tr>
</table>
There are some items in the specifications that can be used or cannot be used according to the value set in this parameter.
The file structure may also change depending on the compensation data type.
Thus, after changing this parameter, initialize the system with #1060 SETUP.</td><td>1 to 8</td></tr>
<tr><td>1038</td><td>plcsel</td><td>Ladder selection</td><td>Specify the PLC type.</td><td>0: User custom PLC
1: Standard PLC
2: Exclusive PLC for MELSEC bus link</td></tr>
<tr><td>1039</td><td>spinno</td><td>Number of spindles</td><td>Specify the existence of a spindle.</td><td>0: No spindle
1: One spindle
2: Two spindles
3: Three spindles
4: Four spindles</td></tr>
<tr><td>1040 (PR)</td><td>M_inch</td><td>Constant input (inch)</td><td>Specify the parameter unit system for the position and length.</td><td>0: Metric system
1: Inch system</td></tr>
<tr><td>1041 (PR)</td><td>I_inch</td><td>Initial state (inch)</td><td>Specify the unit system for the program movement amount when the power is turned ON or reset and for position display. Designate an internal unit.</td><td>0: Metric system
1: Inch system</td></tr>
<tr><td>1042 (PR)</td><td>pcinch</td><td>PLC axis command (inch)</td><td>Specify the unit system for the commands to the PLC axis.</td><td>0: Metric system
1: Inch system</td></tr>
</table>

#	Items		Details	Setting range (unit)
1043	lang	Select language displayed	Specify the display language. 0: Japanese display (Standard) 1: English display (Standard) 2: Third language displayed (Note) (Option) 3: Fourth language displayed (Note) (Option) 11: Display in German (Option) 12: Display in French (Option) 13: Display in Italian (Option) 14: Display in Spanish (Option) 15: Display in Chinese (traditional Chinese) (Option) 16: Display in Korean (Option) 17: Display in Portuguese (Option) 18: Display in Dutch (Option) 19: Display in Swedish (Option) 20: Display in Hungarian (Option) 22: Display in Chinese (simplified Chinese) (Option) 23: Display in Russian (Option) Note: If no character package is available for a specified language, the screen is displayed in English.	0 to 3 11 to 22
1044 (PR)	auxno	MR-J2-CT Connections	Specify the number of MR-J2-CTs connected.	0 to 4
1045 (PR)	nskno	Megatorgue motor connections	Specify the number of NSK megatorque motors connected. When a value other than 0 is specified, 2nd miscellaneous function data is output as signed binary data.	0 to 16
1049 (PR)	mmac_R	Machine maker macro RAM-ROM changeover	Select the memory area for the machine manufacturer macro program. 0: SRAM area 1: FROM area When this parameter is changed, the power must be turned OFF and ON, and the area must be formatted. Note: "1" cannot be set if the machine manufacturer macro option is not valid.	0/1

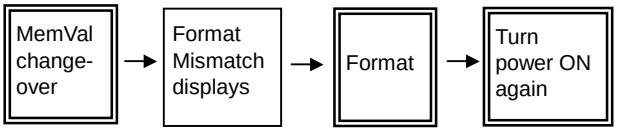
Note: Selection of inch and metric unit
When set value of #1041 I_inch is changed, the unit of length is changed after reset.
Among parameters concerning length, following items are not changed automatically, therefore change the set values to agree with the new unit system when the unit system is changed.

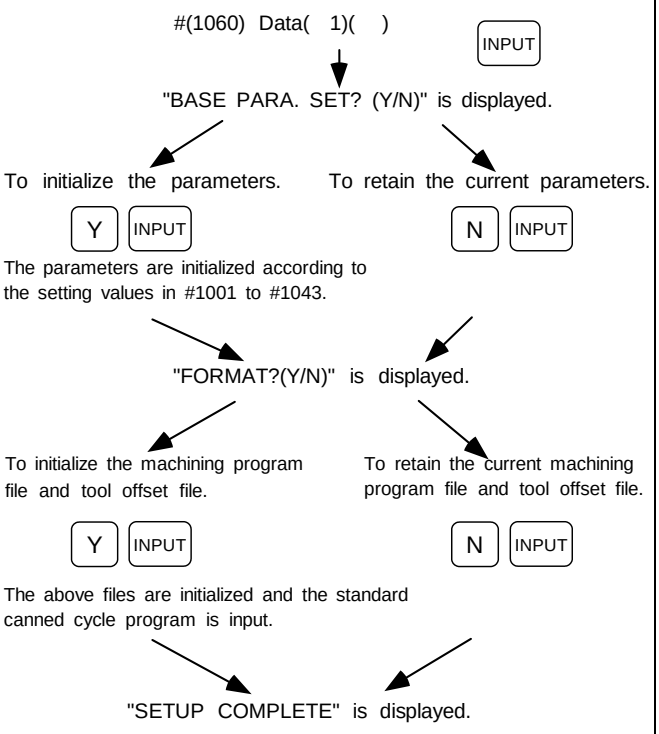
Tool compensation amount (Tool length compensation amount, tool wear compensation amount and tool tip compensation amount)			
Workpiece coordinate offset			
Machining parameter	#8004 SPEED	#8027 Toler-1	#8056 G74 RETRACT
	#8005 ZONE r	#8028 Toler-2	#8057 G76 LAST-D
	#8006 ZONE d	#8029 FairingL	#8075 SpiralEndErr
	#8009 DSC. ZONE	#8030 MINUTE LENGS	#8077 InvoluteErr
	#8010 ABS. MAX.	#8037 CorJudgeL	
	#8011 INC. MAX.	#8041 C-rot. R	#8084 G83S Clearanse
	#8012 G73n	#8042 C-ins. R	
	#8013 G83n	#8051 G71 THICK	#8085 G83S Forward F
	#8016 G71 MINIMUM	#8052 PULL UP	#8086 G83S Back F
	#8017 G71 DELTA-D	#8053 G73U	
	#8018 G84/G74n	#8054 W	
Axis parameter	#8204 OT-CHECK-N		
	#8205 OT-CHECK-P		
	#8206 TOOL CHG.P		
	#8209 G60 Shift		
Barrier data	#8300 – #8306, #8311 – #8314		
Basic specification parameter	#1084 RadErr		

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

<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td>1050
(PR)</td><td>MemPrg</td><td>Definition of program save area</td><td>
<table>
<tr><td>Setting</td><td>0</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>Machining program</td><td>○</td><td>△</td><td>○</td><td>△</td></tr>
<tr><td>MDI data</td><td>○</td><td>○</td><td>△</td><td>△</td></tr>
</table>
(Machining program)
○: System common
Machining program save area is shared by systems.
△: System independent
Machining programs can be registered for each system.

(MDI data)
○: System common
MDI data is shared by systems.
△: System independent
MDI data can be set for each system.

When this parameter is changed, the power must be turned OFF and ON, and the system formatted.
(Note) This parameter is valid when #1001 SYS_ON[2] is 1.
</td><td>0 to 3</td></tr>
<tr><td>1051
(PR)</td><td>MemTol</td><td>Tool compensa-tion memory common for systems</td><td>0: Tool compensation memory separate for systems
1: Tool compensation memory common for systems</td><td>0/1</td></tr>
<tr><td>1052
(PR)</td><td>MemVal</td><td>No. of common variables shared in system designation</td><td>0: Common variables common for system (number fixed)
#100 to : Per system
#500 to : Common for systems
1: Common variables common for system (number fixed)
#100 to : Designate with V1comN
#500 to : Designate with V0comN
* When this parameter is changed, the method of reading the file system will change after the power is turned ON, so always reformat again.
Setting order
 
</td><td>0/1</td></tr>
</table>

#	Items		Details	Setting range (unit)
1060	SETUP	Activate setup processing	Execute the functions required for initializing the system. 1: Execute one-touch setup  Note: Most setup parameters will be initialized with one-touch setup, so confirm the data before executing. This parameter will automatically be set to 0 when the power is turned ON.	1

(SETUP PARAM 1. 3/15)

<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td>1061
(PR)</td><td>intabs</td><td>Manual ABS updating</td><td>Defines whether to update the absolute value data during automatic handle interrupt.
This parameter is valid only when #1145 I_abs is set to 1.</td><td>0: Do not update (shift coordinates the amount of the interruption)
1: Update (same coordinates as when interrupt did not occur will be applied.)</td></tr>
<tr><td>1062</td><td>T_cmp</td><td>Tool offset function</td><td>Specify whether the tool length offset and wear compensation is valid during T command execution.
<table><tr><th>Setting value</th><th>Tool length offset</th><th>Wear compensation</th></tr><tr><td>0</td><td>Valid</td><td>Valid</td></tr><tr><td>1</td><td>Valid</td><td>Invalid</td></tr><tr><td>2</td><td>Invalid</td><td>Valid</td></tr><tr><td>3</td><td>Invalid</td><td>Invalid</td></tr></table></td><td>0 to 3</td></tr>
<tr><td>1063</td><td>mandog</td><td>Manual dog-type</td><td>The initial return to the reference point is performed with dog-type return after the power is turned ON, and the coordinate system is established.
Specify the manual reference point return method after the coordinate system is established with this parameter. (This setting is not required when using absolute position detection.)</td><td>0: High speed return
1: Dog-type</td></tr>
<tr><td>1064
(PR)</td><td>svof</td><td>Error correction</td><td>Specify whether to correct the error when the servo is OFF.</td><td>0: Do not correct the error
1: Correct the error</td></tr>
</table>

#	Items		Details	Setting range (unit)
1065	JOG_H	JOG response type	Set up an improved JOG response type. 0: Conventional specification The system is started and stopped by signal via ladder without reference to external input signals. 1: Type 1 The system is started up and stopped by external signal. 2: Type 2 The system is started up and stopped by performing the AND operation for external signals and those via ladder. 3: Type 3 The system is started up when signals via ladder rise. It is stopped when external signals and those via ladder fall. 4: Type 4 Zero point return mode: The system is started up and stopped by signal via ladder without reference to external input signals (conventional specification). Non-zero point return mode: The system is started up and stopped by performing AND for external signals and those via ladder (type 2).	0 to 4
1066	JOG_HP	Select JOG activation (+) device	Specify the number of the device that inputs +JOG activation signals. The device type is specified by JOG_D in #1071. The effective range of set values vary depending on the device type. A value outside of the effective range is invalid if specified.	X: 0000 to 013F (hexadecimal) G: 0000 to 3071 M: 0000 to 5119 (decimal)
1067	JOG_HN	Select JOG activation (–) device	Specify the number of the device that inputs -JOG activation signals. The device type is specified by JOG_D in #1071. The effective range of set values vary depending on the device type. A value outside of the effective range is invalid if specified.	X: 0000 to 013F (hexadecimal) G: 0000 to 3071 M: 0000 to 5119 (decimal)
1068 (PR)	slavno	Slave axis number	Specify the number of the slave axis for synchronous control. The axis number is an NC number excluding the spindle and PLC axis. Two or more slave axes cannot be set up for one master axis. slaveno cannot be set up for a slave axis. A dual system cannot be set up so that the relationship between the master and slave axes extends over a system.	0: No slave axis 1 to 4: First to fourth axes 1 to 14: 1st axis to 14th axis (For simple C axis synchro-nous control)

#	Items		Details	Setting range (unit)
1069 (PR)	no_dsp	Axis with no counter display	Set up an axis that displays no counter. This option is valid on the counter display screen (relative value screen).	0: Displays the counter 1: Does not display the counter.
1070	axoff	Axis removal	Define an axis that enables axis removal control.	0: Disables axis removal. 1: Enables axis removal
1071 (PR)	J0G_D	±J0G activation signal device name	Specify the number of the device that inputs ±J0G activation signals. 0: X device 1: G device 2: M device Set the JOG_HP (#1066) and JOG_HN (#1067) parameters according to this device specification parameter.	0 to 2
1072	chop_ax	Chopping axis	Designate the chopping axis.	0: Non-chopping axis 1: Chopping axis

(SETUP PARAM 1. 4/15)

#	Items		Details	Setting range (unit)
1073	I_Absm	Initial absolute value	Specify the absolute value/incremental value mode for when the power is turned ON or reset.	0: Incremental value command mode 1: Absolute value command mode
1074	I_Sync	Initial synchronous feed	Specify the feedrate specification mode for when the power is turned ON or reset. 0: Asynchronous feed (feed per minute) 1: Synchronous feed (feed per rotation)	0: Asynchronous feed 1: Synchronous feed
1075	I_G00	Initial G00	Specify the linear command mode for when the power is turned ON or reset. 0: Linear interpolation (G01 command state) 1: Positioning (G00 command state)	0: Linear interpolation 1: Positioning
1076	Abslnc (For L system only)	ABS/INC address	The absolute value/incremental commands can be issued by using the absolute value address and incremental value address for the same axis. 0: Absolute/incremental with G command 1: Absolute/incremental with address code (The #1013 axname address will be the absolute value command, and #1014 incax address will be the incremental value command)	0: Absolute/ incremental with G command 1: Absolute/ incremental with address code
1077	radius	Incremental command for diameter specification axis	Specify if the diameter specification axis' (#1019 dia is set to 1) incremental value command uses the diameter value or radius value	0: Diameter value 1: Radius value
1078	Decpt2	Decimal point type 2	Specify the unit of position commands that do not have a decimal point. 0: The min. input command unit is used (follows #1015 cunit) 1: 1mm (or 1inch) unit is used (For the dwell time, 1s unit is used.)	0: The min. input command unit is used 1: 1mm (or 1inch) unit is used
1079	F1digt	Validate F1 digit	Specify whether to execute the F command with a 1-digit code command or with a direct numerical command. 0: Direct numerical command (command feedrate during feed per minute or rotation) 1: 1-digit code command (feedrate specified with #1185 spd_F1 – #1189 F5)	0: Direct numerical command 1: 1-digit code command
1080	Dril_Z (For D system only)	Specify boring axis	Specify a fixed cycle hole drilling axis. 0: Use an axis vertical to the selected plane as the hole drilling axis. 1: Use the Z axis as the hole drilling axis regardless of the selected plane.	0/1

#	Items		Details	Setting range (unit)
1081	Gmac_P	Give priority to G code parameter	Specify the G code priority relationship during the macro call with the G command. 0: G code used in system is priority. 1: Registered G code for call out is priority.	0/1
1082	Geomet (For L system only)	Geometric	Specify whether to use the geometric I or IB function. 0: Do not use. 1: Use only geometric I. 2: Use geometric I and IB. With geometric, specific address codes are used for exclusive meanings. Thus, if A or C is used for the axis address or 2nd miscellaneous command code, the A used for the axis address may function as the geometric's angle designation. Take special care when designating the axis name, etc., when using this function.	0/1/2
1084	RadErr	Arc error	Specify the tolerable error range when a deviation occurs in the end point and center coordinate in the circular command.	0 to 1.000 (mm)
1085	G00Drn	G00 dry run	Specify whether to apply dry run (feed with manual setting speed instead of command feedrate) to the G00 command. 0: Do not apply to G00. (move at rapid traverse rate) 1: Apply to G00. (move at manual set feedrate)	0: Do not apply to G00 1: Apply to G00
1086	G0Intp	G00 non-interpolation	Specify the G00 movement path type 0: Move linearly toward the end point. (interpolation type) 1: Move to the end point of each axis at the rapid traverse feedrate for each axis. (non-interpolation)	0/1
1087	G96_G0	Constant surface speed control by rapid traverse feed command	Specify how to handle the cycle speed for the G00 command when using the constant surface speed control function. 0: Calculate the cycle speed constantly even during G00 movement. 1: Calculate the cycle speed at the block end point in the G00 command.	0/1
1088	G30SL	Disable G30 soft limit	Specify how to handle the soft limit during G30 (2nd reference point return) movement. 0: Soft limit valid during G30 movement 1: Soft limit invalid during G30 movement	0: Soft limit valid 1: Soft limit invalid
1089	Cut_RT	Short cut for rotary axis	Specify how to handle the short cut control for the rotary axis (#1017 rot is set to 1). 0: No short cut (move toward end point) 1: Use short cut (when using the absolute value command, move in the direction where the movement amount will be 180° or less)	0: No short cut 1: Use short cut

#	Items		Details	Setting range (unit)
1090	Lin_RT	Linear rotary axis	Specify how to handle a command for the rotary axis that exceeds 360°. 0: For absolute value commands that exceed 360°, the value will be converted into a remainder of 360° and the axis will move. Example: If the command is 420°, the applied value will be 60°. 1: For absolute value commands that exceed 360°, the axis will move in the same manner as a linear axis. Example: If the command is 420°, the axis will pass the 360° position and will move to the 60° position.	0/1
1091	Mpoint	Ignore middle point	Specify now to handle the middle point during G28 and G30 reference point return. 0: Move to the reference point after passing the middle point designated in the program. 1: Ignore the middle point designated in the program and move straight to the reference point.	0/1
1092	Tchg _A	Replace tools for additional axis	Specify the movement of the additional axis during tool change position return. 0: The additional axis does not move with the tool change position return command. 1: After returning the standard axis with the tool change position return command, the additional axis also returns to the tool change position.	0/1
1093	Wmvfin	Inter-system waiting method	Specify the method for waiting between systems when using two systems. When the movement command is found in the wait command (!, M) block: 0: Wait before executing movement command 1: Wait after executing movement command	0/1
1094	Tl_SBK (for L system only)	Select life count for single block	Select whether to count the data units to be used for a single block when using the tool life management II function (L system). 0: Does not count the data units. 1: Count the data units.	0/1

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

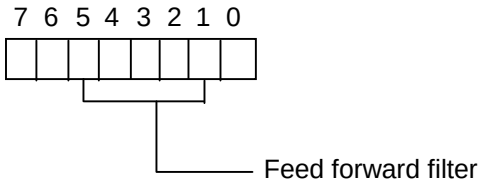
#	Items		Details	Setting range (unit)
1100	Tmove	Tool wear compen-sation	Specify the period to perform tool length offset and wear compensation. 0: Compensate when T command is executed. 1: Superimpose and compensate with the movement command in the block where the T command is located. If there is no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

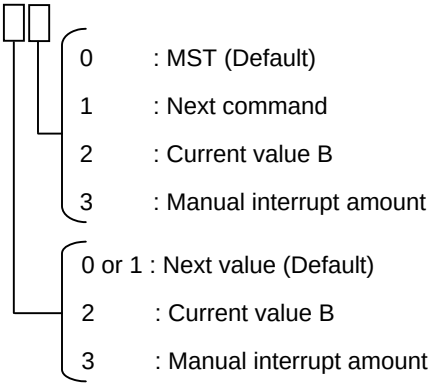
#	Items		Details	Setting range (unit)
1105	T_Sel2	Tool selection method 2	Select the tool selection method for when #1103 T_Life is set to 1. 0: Select in order of registered No. from the tools used in the same group. 1: Select the tool with the longest remaining life from tools used in the same group and the unused tools.	0/1
1106	Tcount (For L system only)	Life management count	Specify the function when address N is omitted when inputting data (G10 L3 command) for tool life management function II.	0: Time specified input 1: No. of times specified input
1107	Tllfsc (For L system only)	Split life management display screen	Set up the number of groups to be displayed on the tool life management II (L system) screen. 0: Displayed group count 1, maximum number of registered tools: 16 1: Displayed group count 2, maximum number of registered tools: 8 2: Displayed group count 4, maximum number of registered tools: 4	0 to 2
1108	TlrectM (For L system only)	Life management re-count M code	Set up the M code for tool life management II (L system) re-count.	0 to 99
1109 (PR)	subs_M	Validate alternate M code	Select the user macro interrupt with the substitute M code.	0: Alternate M code invalid 1: Alternate M code valid
1110	M96_M	M96 alternate M code	Specify an M code to replace M96 when #1109 subs_M is set to 1.	3 to 97 (excluding 30)
1111	M97_M	M97 alternate M code	Specify an M code to replace M97 when #1109 subs_M is set to 1.	3 to 97 (excluding 30)
1112 (PR)	S_TRG	Validate status trigger system	Specify the validity conditions for the user macro interrupt signal. 0: Valid when interrupt signal (UIT) turns OFF to ON. 1: Valid when interrupt signal (UIT) is ON.	0: Valid when interrupt signal (UIT) turns OFF to ON. 1: Valid when interrupt signal (UIT) is ON.
1113 (PR)	INT_2	Validate interrupt method type 2	Specify the movement after user macro interrupt signal (UIT) input. 0: Execute interrupt program without waiting for block being executed to end. 1: Execute interrupt program after completing block being executed.	0/1

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

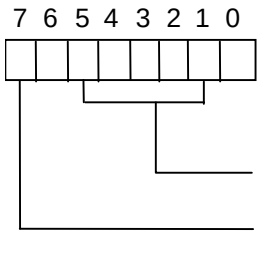
(SETUP PARAM 1. 5/15)

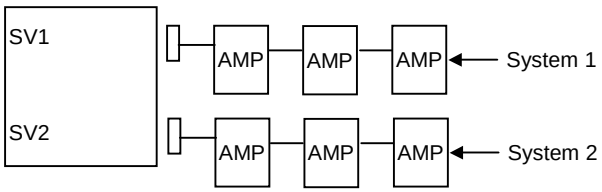
#	Items		Details	Setting range (unit)
1121	edlk_c	Edit lock C	Specify whether to prohibit editing of program Nos. 9000 to 9999. Note: If #1122 is set to 1 or 2, 1 will be set in #1121 when the power is turned ON.	0: Editing possible 1: Editing prohibited
1122 (PR)	pglk_c	Program display lock	The display and search of program Nos. 9000 to 9999 can be prohibited. Specify whether to prohibit display and search. 0: Display and search is possible. 1: Program details are not displayed. 2: Program details are not displayed, and operation search is prohibited. The program details will not be displayed, but the program No. and sequence No. will display in the prohibited state. Note: If #1122 is set to 1 or 2, 1 will be set in #1121 when the power is turned ON.	0 to 2
1123	origin	Origin zero inhibition	Select whether to use the origin zero function.	0: Use 1: Do not use
1124	ofsfix	Fix tool wear compen-sation number	Specify whether to automatically increment the offset No. by 1 with the input or to display the No. as it is in the setting on the tool offset screen. 0: Increment the # No. by 1 when the input key is pressed. (Same as general parameters) 1: # No. does not change even if INPUT key is pressed. When making settings in sequence, 0 is handier. When changing and setting repeatedly while adjusting one offset value, 1 is handier	0/1
1125	real_f	Actual feedrate display	Specify the feedrate display on the monitor screen.	0: Command speed 1: Real movement feedrate
1126	PB_G90	Playback G90	Specify whether the playback movement amount when performing playback editing is to be an absolute value or incremental value.	0: Incremental value 1: Absolute value
1127	DPRINT	DPRINT alignment	Specify the alignment for printing out with the DPRINT function. 0: No alignment, data is printed with left justification. 1: Align the minimum digit and output.	0/1

#	Items		Details	Setting range (unit)
1128	RstVCl	Clear variables by resetting	Specify how to handle the common variables when resetting. 0: Common variables do not change after resetting. 1: The following common variables are cleared by resetting: During variable 100 group specifications: #100 to #149 are cleared. During variable 200 group and 300 group specifications: #100 to #199 are cleared.	0/1
1129	PwrVCl	Clear variables by power-ON	Specify how to handle the common variables when the power is turned ON. 0: The common variables are in the same state as before turning the power OFF. 1: The following common variables are cleared when the power is turned ON. During variable 100 group specifications: #100 to #149 are cleared. During variable 200 group and 300 group specifications: #100 to #199 are cleared.	0/1
1130	set_t	Display selected tool number	Specify the tool command value display on the POSITION screen. 0: T-modal value of program command is displayed. 1: Tool number sent from PLC is displayed.	0/1
1131 (PR)	Fldcc	Feed forward filter	Parameter to suppress acceleration changes with a filter when starting acceleration or deceleration Specify the parameter in bits.  	bit1: 7.1 (ms) bit2: 14.2 (ms) bit3: 28.4 (ms) bit4: 56.8 (ms) bit5: 113.6 (ms) If bit 1 to bit 5 are all 0 or two or more bits of bit 1 to bit 5 are 1, 3.5 ms is set up.
1132	CRT	CRT brightness control	This parameter adjusts the brightness of the CRT display unit. 3: Highest luminance (Brightest state) –3: Lowest luminance (Darkest state) Adjust this parameter to an appropriate brightness between –3 and 3. The EL display unit does not have brightness adjustment, so setting is not required.	–3 to 3

#	Items		Details	Setting range (unit)
1133	ofsmem	Select how to set up tool wear compensa-tion screen	Select the number stored by previous setup when selecting the tool wear compensation screen. 0: Does not display the number when selecting the screen. 1: Displays the stored number when selecting the screen.	0/1
1134	LCDneg	LCD reverse display	Specify 1 to reverse the display on the 10.4-type monochrome LCD.	0: Normal display 1: Reverse display
1135	unt_nm	Unit name	Set up a unit name. Set up the unit name with 4 or less characters consisting of both alphabets and numbers. If 0 is set up, the unit name is not displayed.	4 or less characters consisting of both alphabets and numbers
1136	optype	Operation menu display valid	This parameter validates the operation menu display. Specify the setting method for the tool offset data's absolute value or incremental value. 0: Mode selection method (Conventional specification) 1: Menu selection method This parameter is valid on the following screens. • TOOL TIP OFFSET screen (L system) • TOOL DATA screen (L system) • NOSE-R screen (L system) • TOOL OFFSET screen type I (M system) • TOOL OFFSET screen type II (M system)	0/1
1137	Cntsel	Coordinate value screen display counter select	Set the type of the position counter to be displayed on the COORDINATE screen.  	1st digit : 0 to 3 2nd digit: 0 to 3 (Default : 00)
1138	Pnosel	Select screen by parameter number:	Specify whether to enable the function to select a screen by specifying a parameter number.	0: Disable 1: Enable

#	Items		Details	Setting range (unit)
1139	edtype	Edit type selection	Set up an edit type. 0: Screen edit type (M50 or equivalent operation) 1: Screen edit type (The screen of EDIT or MDI is changed automatically according to the selected operation mode.) 2: Word edit type (The screen of EDIT or MDI is changed automatically according to the selected operation mode.) 3: Screen edit type (type 0 + retaining cursor position) (Applicable only to M64 D version series) 4: Screen edit type (type 1 + retaining cursor position) (Applicable only to M64 D version series)	0/1/2/3/4
1140	Mn100	M code number	First number of M code that corresponds to setup number from 100 to 199	0 to 99999999
1141	Mn200	M code number	First number of M code that corresponds to setup number from 200 to 299	0 to 99999999
1142	Mn300	M code number	First number of M code that corresponds to setup number from 300 to 399	0 to 99999999
1143	Mn400	M code number	First number of M code that corresponds to setup number from 400 to 499	0 to 99999999
1144	mdlkof	MDI setup lock	Select whether to enable MDI setup in non-MDI mode.	0: Disable MDI setup 1: Enable MDI setup
1145	I_abs	Manual ABS parameter	Specify how to handle the absolute value data during automatic handle interrupt. 0: Absolute value data is renewed if manual ABS switch is ON. Data is not renewed if switch is OFF. 1: Follows the intabs state when #1061 intabs is valid.	0/1
1146	Sclamp	Spindle rotation speed clamp function	Specify how to handle the spindle rotation speed clamp function with the G92S command. 0: G92S command is handled as a clamp command only in the G96 state (during constant surface speed control). G92S will be handled as normal S command in G97 state (constant surface speed OFF). 1: The S command in the same block as G92 is constantly handled as a clamp command.	0/1
1147	smin_V	Minimum spindle rotation speed clamp type	Specify the type of spindle min. rotation speed clamp value. 0: Rotation speed setting 1: Output voltage coefficient setting Set the #3023 smini parameter according to this type setting.	0/1

#	Items		Details	Setting range (unit)
1148	I_G611	Initial high precision	The modal state when the power is turned ON is set to the high accuracy control mode. 0: OFF 1: ON	0/1
1149	cireft	Arc deceleration speed change	Specify whether to enable deceleration at the arc entrance or exit. 0: Disable 1: Enable	0/1
1150	Fldc0	G00 feed forward filter	This parameter is used to filter acceleration changes at the start of rapid acceleration/deceleration. Specify the filters in bit units.  	bit1: 7.1 (ms) bit2: 14.2 (ms) bit3: 28.4 (ms) bit4: 56.8 (ms) bit5: 113.6 (ms) When bits 1 to 5 are all 0 or when two or more of bits 1 to 5 are 1, 3.5 (ms) is assumed.
1151	rstint	Reset initial	Specify whether to initialize (power ON state) the modals by resetting. 0: Do not initialize modal state. 1: Initialize modal state.	0/1
1152	I_G20	Initial command unit	Specify whether the default mode after power-ON or resetting, inch command or metric command mode. 0: Metric command (G21 command state) 1: Inch command (G20 command state) Valid when reset input is made. Related parameter: Bit 6 “Select setting and display unit” of #1226	0/1
1153	FixbDc	Hole bottom deceleration check	Specify whether to perform a deceleration check or in-position check at the hole bottom in the hole drilling cycle. This parameter is valid only for a hole drilling cycle in which no dwell command can be issued at the hole bottom. 0: Perform no deceleration check and in-position check. 1: Perform a deceleration check. 2: Perform an in-position check.	0 to 2

#	Items		Details	Setting range (unit)
1154 (PR)	pdoor	Door interlock II (for each system)	Specify whether to control door interlock II independently for each of the two systems. When door interlock II is controlled for each system of the two systems, system 1 is connected to SV1 (channel 1) of the base I/O unit and system 2 is connected to SV2 (channel 2) of the base I/O unit. Base I/O unit  When the auxiliary axis (MR-J2-CT) is used, connect it to the SV2 side (after the spindle). This validates door interlock II of system 2. 0: Do not use door interlock II independently for channels. 1: Use door interlock II independently for channels. (Separate systems when using two systems) 2: Use door interlock II independently for channels. (Use independently for system 1 channels) (Use both for system 2) When 0 is specified for this parameter, “Signal input device 1 for door interlock II (#1155 DOOR_m)” and “Signal input device 2 for door interlock II (#1156 DOOR_s)” are valid. When 1 is specified, “Signal input device 1 for door interlock II: for each system (#1511 DOORPm)” and “Signal input device 2 for door interlock II: for each system (#1512 DOORPs)”.	0/1

#	Items		Details	Setting range (unit)
1155	DOOR_m	Signal input device 1 for door interlock II	Set up a fixed device number (X??) for door interlock II signal input. A device number from X01 to XFF can be set up. Device number 000 is invalid. Set up device number 100 when using no fixed device number for door interlock II signal input. Related parameter: #1154 pdoor Door interlock II (for each system)	000 to 100 (Hexadecimal)
1156	DOOR_s	Device number 2 for door interlock II signal input	Set up a fixed device number (X??) for door interlock II signal input. (Set up the same value as that of #1155.) Related parameter: #1154 pdoor Door interlock II (for each system)	000 to 100 (Hexadecimal)
1157	F0atrn	F0 automatic running	Not used	
1158	F0atno	F0 automatic running program	Not used	
1165	p_trans	Parameter FROM backup	The parameters are written, read and compared. 0: No process 1: The backed up parameters are read from the FROM. 2: The parameters are written into the FROM. 3: The parameters are compared with those backed up in the FROM.	0 to 3
1166	fixpro	Fixed cycle editing	Select whether to use the edit, program list and data input/output functions for the fixed cycles, machine manufacturer macro programs or general programs. 0: General programs can be edited, etc. 1: The fixed cycles can be edited, etc. Password No.: The machine manufacturer macro programs can be edited, etc.	0 to 99999999
1167	e2rom		Not used.	
1168	test	Simulation test	Specify the test mode for the control unit. The test mode does not use reference point return, and tests with a hypothetical zero point return completed state. This is limited to test operation of the control unit itself, and must not be used when connected to the machine.	0: Normal operation mode 1: Test mode

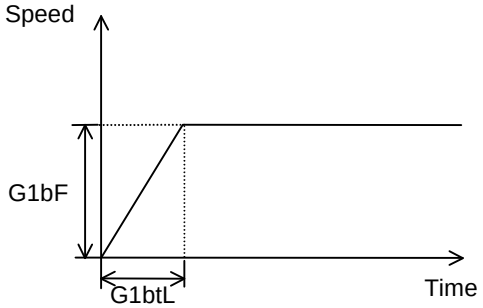
(SETUP PARAM 1. 6/15)

#	Items		Details	Setting range (unit)
1169	system name	System name	Set the name of each system. This must be set only when using two systems. This name is displayed on the screen only when the systems must be identified. Use a max. of four alphabetic characters or numerals.	A max. of four alphabetic characters or numerals.
1170	M2name	Second miscellaneous code	Set this address code when using the 2nd miscellaneous command. Set an address with A, B and C that is not used with #1013 axname or #1014 incax.	A, B, C
1171	taprov	Tap return override	Set the tap return override value for the synchronous tap.	1 to 100 (%)
1172	tapovr	Tap return override	Set the override value when leaving the tap end point in the synchronous tap cycle. The setting range is 1 to 999, and the unit is %. When a value less than 100 is set, it will be judged as 100%.	1 to 999 (%)
1173	dwlskp	G04 skip condition	Specify the skip signal for ending the G04 (dwell) command.	Skip condition 0 to 7 Set-ting / PLC interface input signal: Skip 3 / Skip 2 / Skip 1 0: × × × 1: × × ○ 2: × ○ × 3: × ○ ○ 4: ○ × × 5: ○ × ○ 6: ○ ○ × 7: ○ ○ ○ End when ○ signal is input.
1174	skip_F	G31 skip speed	Specify the feedrate when there is no F command in the program at G31 (skip) command.	1 to 999999 (mm/min)
			Specify the skip signal in the G31.1 to G31.3 (multi-step skip) command, and the feedrate when there is no F command in the program.	Skip condition 0 to 7 Set-ting / PLC interface input signal: Skip 3 / Skip 2 / Skip 1 0: × × × 1: × × ○ 2: × ○ × 3: × ○ ○ 4: ○ × × 5: ○ × ○ 6: ○ ○ × 7: ○ ○ ○
1175	skip1	G31.1 skip condition	Skip signal specified at G31.1	
1176	1f	G31.2 skip speed	Skip feedrate at G31.1	
1177	2	G31.2 skip condition	Skip signal specified at G31.2	
1178	2f	G31.2 skip speed	Skip feedrate at G31.2	Skip feedrate 1 to 999999 (mm/min)
1179	3	G31.3 skip condition	Skip signal specified at G31.3	
1180	3f	G31.3 skip speed	Skip feedrate at G31.3	

#	Items		Details	Setting range (unit)
1181	G96_ax	Constant surface speed control	Specify the axis to be targeted for constant surface speed control. 0: Program specification will be invalidated, and the axis will always be fixed to the 1st axis. 1: 1st axis specification 2: 2nd axis specification 3: 3rd axis specification : : 8: 8th axis specification The program specification will be the priority for all settings other than 0.	0 to 8
1182	thr_F	Thread cutting speed	Set the screw cut up speed when not using chamfering in the thread cutting cycle. 0: Cutting feed clamp feedrate 1 to 60000 mm/min: Set feedrate	0 to 60000 (mm/min)
1183	clmp_M	M code for clamp	Set the M code for C-axis clamp in the hole drilling cycle.	0 to 99999999
1184	clmp_D	Dwelling time after outputting M code for unclamp	Set the dwell time after outputting the M code for C-axis unclamp in the hole drilling cycle.	0.000 to 99999.999 (s)
		F1 digit feedrate	Specify the feedrate for the F command in the F1-digit command (#1079 F1 digt is set to 1).	1 to 60000 (mm/min)
1185	spd_F1	F1	Feedrate when F1 is issued (mm/min)	
1186	F2	F2	Feedrate when F2 is issued (mm/min)	
1187	F3	F3	Feedrate when F3 is issued (mm/min)	
1188	F4	F4	Feedrate when F4 is issued (mm/min)	
1189	F5	F5	Feedrate when F5 is issued (mm/min)	
1190 (PR)	s_xcnt (For L system only)	Validate inclined-axis control	Specify whether to disable or enable inclined-axis control. 0: Disable inclined-axis control 1: Enable inclined-axis control	0/1
1191 (PR)	s_angl (For L system only)	Inclination angle	Specify the inclination angle (θ). Note: If 0 is specified for this parameter, the angle determined by three-side setting is valid.	$\pm$ 80.000 (°)
1192 (PR)	s_zrmv (For L system only)	Compensation at origin return	Specify whether to perform compensation for the base axis corresponding to the inclined axis at original return. 0: Perform compensation. 1: Don't perform compensation.	0/1

(SETUP PARAM 1. 7/15)

#	Items		Details	Setting range (unit)
1193	inpos	The setting is selected with "#1306 InpsTyp Deceleration check specification type". 0: Deceleration check method 1 1: Validate in-position check		
		Deceleration check method 1	Specify the deceleration check method for G0. 0: Command deceleration check 1: In-position check	0/1
		Validate in-position check	Specify the deceleration confirmation method for the positioning or cutting command. 0: G0, G1+G9 Command deceleration check 1: G0, G1+G9 In-position check	0/1
1194	H_acdc	Time constant 0 for handle feed	Specify the time constant for the manual handle feed. 0: Use time constant for G01 1: Time constant 0 (step)	0/1
1195 1196 1197 1198	Mmac Smac Tmac M2mac	Macro call for M command Macro call for S command Macro call for T command Macro call with 2nd miscellaneous code	Specify the user macro M, S or T command macro call out. Macro call out with M command Macro call out with S command Macro call out with T command Macro call out with 2nd miscellaneous command	0: Invalid 1: Valid
1199	Sselect	Select initial spindle control	Select the initial condition of spindle control after power is turned ON. 0: 1st spindle control mode (G43.1) 1: Selected spindle control mode (G44.1) 2: All spindle simultaneously control mode (G47.1) Note: Spindle No. when G44.1 is commanded is selected with #1534 SnG44.1.	0: G43.1 1: G44.1 2: G47.1
1200 (PR)	G0_acc	Validate acceleration and deceleration with inclination angle constant G0	Set up acceleration and deceleration types when a rapid traverse command is issued 0: Acceleration and deceleration (conventional) with time constant 1: Acceleration and deceleration with inclination angle constant	0: Acceleration and deceleration with time constant 1: Acceleration and deceleration with inclination angle constant

#	Items		Details	Setting range (unit)
1201 (PR)	G1_acc	Validate acceleration and deceleration with inclination constant G1	Set up acceleration and deceleration types when a liner interpolation command is issued. 0: Acceleration and deceleration (conventional) with time constant 1: Acceleration and deceleration with inclination angle constant	0: Acceleration and deceleration with time constant 1: Acceleration and deceleration with inclination angle constant
1202	mirofs (For L system only)	Distance between facing turrets	Set up the distance between tools (edges) (between facing turrets).	0 to 99999.999 (mm)
1203	TmirS1 (For L system only)	Select turrets as facing turrets with T command	Set up turrets as shown in the mirror image of facing turrets with the T command that corresponds to tool numbers 1 to 32.	0 to FFFFFFFF
1204	TmirS2 (For L system only)	Select turrets as facing turrets with T command	Set up turrets as shown in the mirror image of facing turrets with the T command that corresponds to tool numbers 33 to 64.	0 to FFFFFFFF
1205	G0bdcc	Acceleration and deceleration before G0 interpolation	0: G00 acceleration and deceleration are selected as those after interpolation. 1: The G00 acceleration/deceleration is the acceleration/decelerate before interpolation regardless of whether the mode is the high accuracy control mode. (Note) "1" cannot be set for the 2nd system.	0/1
1206	G1bF	Maximum speed	Set up a cutting feedrate when selecting acceleration and deceleration before interpolation.	1 to 999999 (mm/min)
1207	G1btL	Time constant	Set up a cutting feed time constant when selecting acceleration and deceleration before interpolation. 	1 to 5000 (ms)
1208	RCK	Arc radius error compen-sation factor	An arc radius error compensation can be increased and decreased from –60.0 to 20.0%.	-60.0 to +20.0 (%)

<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td>1209</td><td>cirdcc</td><td>Arc deceleration speed</td><td>Specify the deceleration speed at the arc entrance or exit.</td><td>1 to 999999 (mm/min)</td></tr>
<tr><td>1210</td><td>RstGmd</td><td>Modal G code reset</td><td>Specify whether to initialize each G code group modal and the H and D codes when the system is reset.
Specify the initialization items in bit correspondence.
0. Initialize. 1: Don't initialize.
M system
<table>
<tr><td>0</td><td>Group 1 Move G modal</td></tr>
<tr><td>1</td><td>Group 2 Flat selection modal</td></tr>
<tr><td>2</td><td>Group 3 Absolute/increment command modal</td></tr>
<tr><td>3</td><td></td></tr>
<tr><td>4</td><td>Group 5 Feed G modal</td></tr>
<tr><td>5</td><td>Group 6 Inch/metric modal</td></tr>
<tr><td>6</td><td>Group 7 Radius compensation modal</td></tr>
<tr><td>7</td><td>Group 8 Length compensation modal</td></tr>
<tr><td>8</td><td></td></tr>
<tr><td>9</td><td>Group 10 Fixed cycle return command modal</td></tr>
<tr><td>A</td><td></td></tr>
<tr><td>B</td><td>Group 12 Workpiece coordinate system modal</td></tr>
<tr><td>C</td><td>Group 13 Cut modal</td></tr>
<tr><td>D</td><td></td></tr>
<tr><td>E</td><td>Grpup 15 Normal line control modal</td></tr>
<tr><td>F</td><td></td></tr>
</table>
<table>
<tr><td>10</td><td>Group 17 Constant surface speed control command modal</td></tr>
<tr><td>11</td><td>Group 18 pole coordinate command modal</td></tr>
<tr><td>12</td><td>Group 19 G command mirror modal</td></tr>
<tr><td>13</td><td>Group 20 Spindle 2 control modal</td></tr>
<tr><td>14</td><td></td></tr>
<tr><td>15</td><td></td></tr>
<tr><td>16</td><td></td></tr>
<tr><td>17</td><td></td></tr>
<tr><td>18</td><td>H, D codes</td></tr>
<tr><td>19</td><td>Spindle clamp rotation speed</td></tr>
<tr><td>1A</td><td></td></tr>
<tr><td>1B</td><td></td></tr>
<tr><td>1C</td><td></td></tr>
<tr><td>1D</td><td></td></tr>
<tr><td>1E</td><td></td></tr>
<tr><td>1F</td><td></td></tr>
</table>
The H code indicates the tool length offset number, and the D code indicates the tool radius compensation number.
When bit 18 is set to ON, the H and D codes and group 8 G modal area retained.
When bit 7 is set to ON, the H code and group 8 G modal are retained.
(To be continued to the next page)</td><td>Specify a hexadecimal number.</td></tr>
</table>

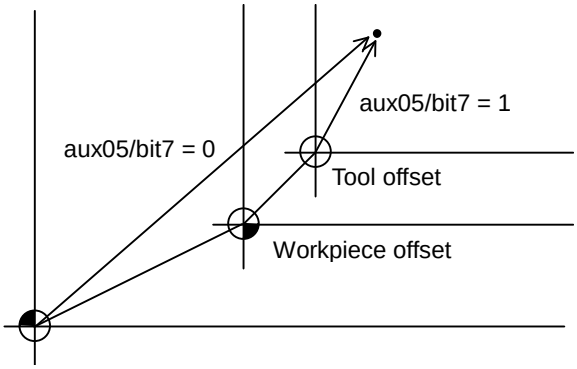
<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td></td><td></td><td></td><td>(Continued from the previous page)
L system
<table><tr><td>0</td><td>Group 1 Move G modal</td></tr><tr><td>1</td><td>Group 2 Flat selection modal</td></tr><tr><td>2</td><td>Group 3 Absolute/increment command modal</td></tr><tr><td>3</td><td>Group 4 Barrier check modal</td></tr><tr><td>4</td><td>Group 5 Feed G modal</td></tr><tr><td>5</td><td>Group 6 Inch/metric modal</td></tr><tr><td>6</td><td>Group 7 Nose R compensation modal</td></tr><tr><td>7</td><td></td></tr><tr><td>8</td><td></td></tr><tr><td>9</td><td>Group 10 Fixed cycle return command modal</td></tr><tr><td>A</td><td></td></tr><tr><td>B</td><td>Group 12 Workpiece coordinate system modal</td></tr><tr><td>C</td><td>Group 13 Cut modal</td></tr><tr><td>D</td><td></td></tr><tr><td>E</td><td></td></tr><tr><td>F</td><td></td></tr></table><table><tr><td>10</td><td>Group 17 Constant surface speed control command modal</td></tr><tr><td>11</td><td>Group 18 Balance cut</td></tr><tr><td>12</td><td></td></tr><tr><td>13</td><td>Group 20 Spindle 2 control modal</td></tr><tr><td>14</td><td>Group 15 Facing turret mirror image</td></tr><tr><td>15</td><td></td></tr><tr><td>16</td><td></td></tr><tr><td>17</td><td></td></tr><tr><td>18</td><td></td></tr><tr><td>19</td><td></td></tr><tr><td>1A</td><td></td></tr><tr><td>1B</td><td></td></tr><tr><td>1C</td><td></td></tr><tr><td>1D</td><td></td></tr><tr><td>1E</td><td></td></tr><tr><td>1F</td><td></td></tr></table></td><td>Specify a hexadecimal number.</td></tr>
<tr><td>1211</td><td>FHtyp</td><td>Feed hold stop type</td><td>Specify the type of the external signal used for feed hold.
0: Disable the external signal.
1: Enable the external signal (contact A)
2: Enable the external signal (contact B)</td><td>0 to 2</td></tr>
<tr><td>1212</td><td>FHno</td><td>Feed hold external signal device</td><td>Specify the number (X??) of the device used to input the feed hold signal.</td><td>000 to 13F (hexadecimal)</td></tr>
<tr><td>1213</td><td>proaxy (For L system only)</td><td>Side 1 of inclination angle</td><td>Specify the length on the rectangular coordinates of the inclined axis in the triangle made up of the inclination angle.</td><td>±9999.999</td></tr>
</table>

#	Items		Details	Setting range (unit)
1214	macaxy (For L system only)	Side 2 of inclination angle	Specify the length of the actual base axis corresponding to the inclined axis in the triangle made up of the inclination angle.	±9999.999
1215	macaxx (For L system only)	Side 3 of inclination angle	Specify the length of the actual axis of the inclined axis in the triangle made up of the inclination angle.	±9999.999
1216	extdcc	External deceleration level	Use an upper limit value at the feedrate indicated when validating external deceleration signals. This parameter is valid when #1239 set11/bit6 is set to 0.	1 to 999999 (mm/min)

(SETUP PARAM 1. 8/15)

#	Items		Details	Setting range (unit)
1217	aux01		Not used	
1218	aux02 (bit3)	Parameter input/output format	Specify a parameter input/output format. 0: Type I 1: Type II (related to #1218 aux02/bit5)	0/1
	aux02 (bit4)	Tool number selection	Specify the R register that contains the tool number used for automatic calculation when measuring the coordinate offset of an external workpiece. 0: Conforms to #1130 set_t. 1: Uses the tool number indicated by user PLC	0/1
	aux02 (bit5)	Parameter I/O II spindle specification address	Specify the spindle specification address of parameter I/O type II. 0: C 1: T This parameter also applies to the spindle specification address for input and collation. Note: This parameter is valid only for parameter I/O type II (bit 3 of aux02 in #1218 is 1).	0/1
	aux02 (bit6)	Set No. valid when program input	Specify which program No. is selected when inputting operation using "#1 MAIN PROGRAM" in Data I/O screen. 0: The No. in the input data is valid. 1: The No. set in the data setting area is valid.	0/1
	aux02 (bit7)	Input by program overwrite	(1) When inputting operation using "#1 MAIN PROGRAM" in Data I/O screen, select one of the following options when the input program has already been registered: 0: An operation error (E65) occurs. 1: Input by overwrite. (2) When using the high-speed program server, select the operation if the name of the file to be transmitted with transmission (IC → host) operations already exists in the host. 0: Overwrite prohibit 1: Overwrite valid	0/1
1219	aux03 (bit1)	Stop high-speed PC monitoring function	Set 1 to disable the function that stops the system when the high-speed processing time is extended. Disable the monitoring function only as a temporary measure.	0/1
	aux03 (bit2)	Improve skip coordinate accuracy	0: Skip accuracy (conventional specification) 1: Changes skip accuracy (correct a position in skip coordinates when entering skip signals).	0/1
	aux03 (bit5)	Dog-type intermediate point	Select whether to move to the intermediate point during automatic dog-type reference point return. 0: Do not move to intermediate point during dog-type reference point return. 1: Move to intermediate point during dog-type reference point return.	0/1

#	Items		Details	Setting range (unit)
1220	aux04 (bit 0) (For L system only)	Tool life check timing selection	Specify the life check standard applicable when the use count is incremented in tool life management II. 0: Determine that the tool life is over when the incremented use count exceeds the life count. (Use count > life count) 1: Determine that the tool life is over when the incremented use count has reached the life count. (Use count ≥ life count)	0/1 (Default: 0)
	aux04 (bit1)	Validity of space code in comment	Validate or invalidate the space code described in the comment statements in the machining program in edit operation with the special display. 0: Invalidate the space code in the comment statements of the machining program. 1: Validate the space code in the comment statements of the machining program.	0/1 (Default: 0)
	aux04 (bit2)		Not used.	
	aux04 (bit3)		Not used.	
	aux04 (bit4)	Data input/ output unit selection	Specify the input/output data unit for tool data and user parameter input/output. 0: Internal unit (metric) 1: Follows command mode set with #1152 I_G20 Metric when set to 0 Inch when #1152 I_G20 is set to 1 This parameter is valid when initial metric (#1041 I_inch 0) is set and the setting and display unit is the command unit (#1226 aux10 bit6 1). In all other cases, the tool data will be input and output with the internal units.	0/1
	aux04 (bit7)	Host communication validity during automatic operation	Set whether Ethernet communication is enabled during automatic operation. 0: Ethernet communication disabled during automatic operation 1: Ethernet communication enabled during automatic operation (Note) If Ethernet communication is enabled during automatic operation, interrupt processes required for communication will be carried out, so the machining performance could be affected.	0/1

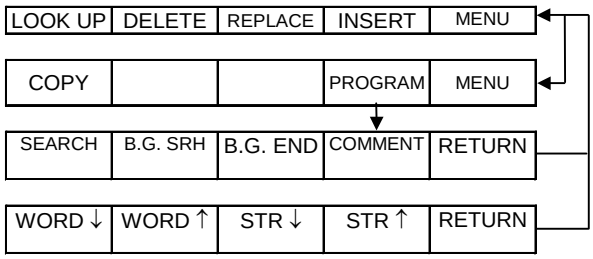
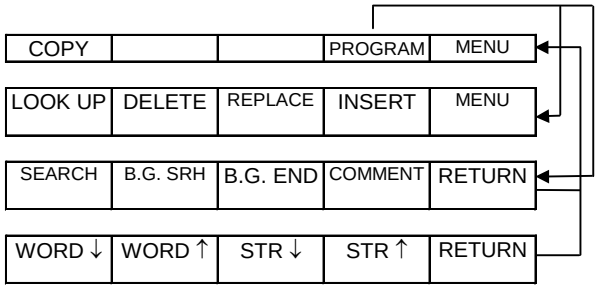
#	Items		Details	Setting range (unit)
1221	aux05 (bit7)	Current value B valid	Select the type of counter to be displayed on the POSITION screen. 0: Displays a relative value (value that includes tool length offset amount, tool radius compensation amount and workpiece coordinate offset amount) 1: Displays current value B (value that does not include tool length offset amount, tool radius compensation amount and workpiece coordinate offset amount)  (Note1) When "#1221 aux05/bit7" is set to "1", the current value B is selected regardless of the bit type of #1287 ext23. When the current value B is valid, the counter zero or origin zero is invalid. (Note2) The following limits apply to M64A/M64: • This is compatible only with the lathe system. • The relative value counter on the COORDINATE screen will also display the current value B. • When "#1287 ext23/bit3" is set to 0, the relative value will be displayed instead of the current value B regardless of this parameter setting.	0/1
1222	aux06 (bit0)	Validity of tool length measurement confirmation message	0: Display no confirmation message when tool compensation data is set. 1: Display a confirmation message when tool compensation data is set. (Applicable only to M64 D version series)	0/1
	aux06 (bit1)	Height axis specification	When 1 is set in this parameter, the axis specified by base specification parameter #1028 base_k is measured and no other axes are measured if they move. (Applicable only to M64 D version series)	0/1

#	Items		Details	Setting range (unit)
	aux06 (bit2)	Servo waveform display	Specify whether to enable the waveform display function. (Applicable only to M64 D version series) 0: Disable the waveform display function. 1: Enable the waveform display function.	0/1
	aux06 (bit3)	Enable/disable setup parameter lock	Specify whether to enable the setup parameter lock function. 0: Disable 1: Enable	0/1
	aux06 (bit4)	Minimum cut-in amount selection	Select the minimum cut-in amount command value for the compound type thread cutting cycle (G76 command) when the minimum cut-in amount (Q) does not exist in 1st block or 1st block is omitted. 0: The minimum cut-in amount (Q) is "0.". 1: The minimum cut-in amount (Q) is the last command value.	0/1
	aux06 (bit5)	Fixed cycle for compound lath command format check selection	Select the operation to be made if the 1st block of the fixed cycle for compound lathe is omitted when the conventional format is selected (#1265 ext01/bit0 "0"). 0: Program error (P33) occurs. 1: Parameter setting value is used.	0/1
	aux06 (bit7)	Zero point return deceleration check method	Set the deceleration check method used during automatic reference point return. (Applicable only to M64 D version series) 0: In-position check 1: Commanded deceleration check	0/1
1223	aux07 (bit0)	Rapid traverse inclination constant multi-stage acceleration and deceleration	Specify whether to enable the rapid traverse inclination constant multi-stage acceleration/deceleration function. (Applicable only to M64 D version series) 0: Disable 1: Enable Related parameters: #2064 rapid2 Speed 2 #2065 G0tL2 Time constant 2 #2066 rapid3 Speed 3 #2067 G0tL3 Time constant 3	0/1
	aux07 (bit1)	Deceleration check method 2	Select the deceleration check method in G1+G9. 0: Command deceleration check in G1+G9 1: In-position check in G1+G9 The deceleration check is not performed except G1+G9. When “#1306 InpsTyp deceleration check specification type” is set to 1 (Deceleration check specification type 2), this parameter will be invalid.	0/1

#	Items		Details	Setting range (unit)
	aux07 (bit2)	Synchronous tap R-point in-position check	0: Disable the synchronous tap I-point → R-point in-position check. 1: Enable the synchronous tap I-point → R-point in-position check. (Applicable only to M64 D version series) Note: This parameter is valid only when 1 (in-position check is valid) is set in bit 3 of #1223 aux07 (synchronous tap in-position check improvement).	0/1
	aux07 (bit3)	Synchronous tap in-position check improvement	Specify whether to enable the synchronous tap in-position check improvement function. (Applicable only to M64 D version series) 0: Disable 1: Enable Related parameters: #1223 bit 2 Synchronous tap R-point in-position check bit 4 Synchronous tap hole bottom in-position check bit 5 Synchronous tap R-point in-position check 2	0/1
	aux07 (bit4)	Synchronous tap hole bottom in-position check	0: Disable the synchronous tap hole bottom in-position check. 1: Enable the synchronous tap hole bottom in-position check. (Applicable only to M64 D version series) Note: This parameter is valid only when 1 (in-position check is valid) is set in bit 3 of #1223 aux07 (synchronous tap in-position check improvement).	0/1
	aux07 (bit5)	Synchronous tap R-point in-position check 2	0: Disable synchronous tape R-point in-position check. 1: Enable synchronous tape R-point in-position check. (Applicable only to M64 D version series) Note: This parameter is valid only when 1 (in-position check is valid) is set in bit 3 of #1223 aux07 (synchronous tap in-position check improvement).	0/1
	aux07 (bit6)	Cancel synchronous tap (,S) return	0: Retains a spindle rotation speed (, S) when performing synchronous tap return. 1: Cancels a spindle rotation speed (, S) by return with G80.	0/1
	aux07 (bit7)	Synchronous tap method	Specify a synchronous tap method. 0: Synchronous tap (multi-step acceleration and deceleration and rapid return) 1: Conventional type synchronous tap	0/1
1224	aux08 (bit0)	Sampling data output	Set the validity of the sampling data output. 0: Sampling output invalid 1: Sampling output valid	0/1

#	Items		Details	Setting range (unit)
1225	aux09 (bit0)	PLC Interface Diagnosis screen changeover	Set this to change to the PLC Interface Diagnosis screen. 0: 40-character compatible screen 1: 80-character compatible screen	0/1
	aux09 (bit7)	Enable/disable spindle rotation speed clamp	Specify whether to enable spindle rotation speed clamp by the spindle rotation speed clamp command (G92S, Q) instead of the spindle rotation speed command (R108) specified by the user ladder. 0: Enable 1: Disable	0/1
1226	aux10 (bit0)	Tool compen-sation data for external workpiece coordinate offset measurement	Select the tool offset data to be used for external workpiece coordinate offset measurement. 0: Tool length data and tool nose wear data 1: Tool length data	0/1
	aux10 (bit1)	Optional block skip type	Specify whether to enable optional block skipping in the middle of a block. 0: Enable block skipping only at the beginning of a block. 1: Enable block skipping at the beginning of the block and in the middle of a block.	0/1
	aux10 (bit2)	Single block stop timing	Specify the time at which the single block signal is activated. 0: When the signal goes ON while automatic operation is starting, the block stops after it is finished. 1: When the signal is ON at the end of the block, the block stops.	0/1
	aux10 (bit3)	C-axis reference point return type	Specify the C-axis reference point return type. 0: Origin return is performed by the G28 reference point return command or when manual reference point return is activated. The origin dog is used. 1: When the first C-axis command is issued after the C-axis mode is entered in automatic mode, reference point return is performed before execution of the block. Also, reference return is performed by the G28 reference point return command or when manual reference point return is activated. The Z phase of the encoder is used.	0/1
	aux10 (bit4)	S command during constant surface speed	Specify whether to output a strobe signal when the S command is issued in constant surface speed mode. 0: Output no strobe signal in constant surface speed mode. 1: Output strobe signals in constant surface speed mode.	0/1

#	Items		Details	Setting range (unit)
	aux10 (bit5)	Arbitrary allocation of dog signal	Specify whether to enable the arbitrary allocation parameter for the origin dog and H/W OT. 0: Disable arbitrary allocation. (Fixed device) 1: Enable arbitrary allocation. (Device specified by the parameter)	0/1
	aux10 (bit6)	Setup and display unit	Specify the unit to be used as the setup/display unit or handle feed unit, the command unit or internal unit. The machining program variables (system variables for coordinate system) are changed simultaneously. 0: Internal unit 1: Unit specified by command Note 1: This parameter is valid only in initial millimeter mode (0 is set in 14041 I_inch). The internal unit is always used in initial inch mode (1 is set in 14041 I_inch). Note 2: This parameter is validated immediately after it is set. Note 3: If addition setting is performed for tool and workpiece offset data with the command unit being inch and internal unit being mm, an error may be generated. Note 4: If “1” is set for this parameter and two systems are used, the operation will follow the unit commanded for each system. Note 5: The internal data is an internal unit determined with #1041 I_inch. Note 6: This parameter is not related to the PLC axis. Related parameter: #1152 I_G20 (Initial command unit)	0/1
	aux10 (bit7)	Shorten JOG stop time	Specify whether to shorten the JOG stop time. 0: Do not shorten the JOG stop time. (Same as before) 1: Shorten the JOG stop time.	0/1
1227	aux11 (bit0)	Select PLC signal or spindle feedrate attained	Set up this option when disabling the cutting start interlock by spindle feedrate attained. 0: Cutting start interlock by PLC signal 1: Cutting start interlock by spindle feedrate attained	0/1
	aux11 (bit1)	Select H or D code	Set up this option to validate the data that is set up on the tool life management screen when issuing the H99 or D99 command. 0: The H and D codes validate the data that is set up on the management setup screen. 1: Validates the data that is set up on the management setup screen when issuing the H99 or D99 command.	0/1

#	Items		Details	Setting range (unit)
	aux11 (bit2)	Measures against tool setter chattering	Select a condition where a relieving operation completes after measurement with tools. 0: Sensor signals has stopped for 500 ms or longer. 1: 100 μs or longer has passed after sensor signals stopped.	0/1
	aux11 (bit3)	Absolute coordinate switching (nose R) [Special display unit compatible]	Select whether to display a tool nose position or coordinate value with the absolute coordinate counter. 0: Displays the tool nose position. 1: Displays the position specified by program command.	0/1
	aux11 (bit4)	Program address check	Specify whether to simply check the program address when the machining program is executed. 0: Don't check the program address. 1: Check the program address.	0/1
	aux11 (bit5)	Spindle rotation speed clamp	Specify whether to clamp the rotation in constant surface speed mode when the spindle rotation speed clamp command is issued. 0: Clamp the rotation regardless of the constant surface speed mode. 1: Clamp the rotation only in constant surface speed mode.	0/1
	aux11 (bit6)	Word edit menu	Select the word edit menu format. Set 0 in this parameter to select the following menu format:  Set 1 in this parameter to select the following mer  	0/1

#	Items		Details	Setting range (unit)
	aux11 (bit7)	Switch the range of tool life data to be input (For M system only)	set up the range of tool life data to be input or compared. 0: Inputs or compares all of the data output. 1: Inputs or compares part of the data output 1) Tool life management I data to be input or compared tool number (D), lifetime (E), life count (F), and auxiliary data (B). 2) Tool life management II data to be input or compared Group number (G), method (M), life (E/F), tool number (D), and compensation number (H) Note: When the maintenance function data input/ output #(99) ( ) is set, all data will be input and compared.	0/1
1228	aux12 (bit0)	Switch coordinate value screen	Set up this option to switch the coordinate value screen. 0: 80-character screen 1: 40-character screen	0/1
	aux12 (bit1)	Switch offset and parameter screen	Set up this option to switch the offset and parameter screen to the parameter screen. 0: Displays the offset and parameter screen. 1: Displays the parameter screen.	0/1
	aux12 (bit2)	Switch data protection in data transmission mode	Set up the range of data protection in data transmission mode. 0: Protects both send and receive data. 1: Protects receive data only.	0/1
	aux12 (bit3)	Nose R specification	Select whether to specify the nose R compensation by shape or wear number. 0: Specifies the nose R compensation by shape number. 1: Specifies the nose R compensation by wear number.	0/1
	aux12 (bit4)	Select operation error or stop code	Specify both block cutting start interlock and cutting start interlock as the operation error or stop code. 0: Operation error 1: Stop code	0/1
	aux12 (bit5)	Select constant surface speed coordinates	Select constant surface speed coordinates. 0: Workpiece coordinate value 1: Absolute coordinate value	0/1
	aux12 (bit6)	Switch relative values displayed	Select whether to preset the relative coordinates with workpiece coordinate preset (G92.1) or counter preset (G92). 0: Preset relative coordinates. 1: Do not preset relative coordinates.	0/1

#	Items		Details	Setting range (unit)
	aux12 (bit7)	Protection with manual value command	Set up this option to protect a manual value command. 0: Does not protect the manual value command (same as before). 1: Protects the manual value command.	0/1
1229	set01 (bit0)	Subprogram interrupt	0: Specifies the user macro interrupt of macro type. 1: Specifies the user macro interrupt of sub-program type.	0/1
	set01 (bit1)	Accurate thread cutting E	0: Address E specifies the number of threads per inch for inch screw cutting. 1: Address E specifies precise reading for inch screw cutting.	0/1
	set01 (bit2)	Radius compen-sation type B (For M system only)	0: When the start-up and cancel commands are operated during radius compensation, their blocks are not handled by intersection operation processing; they are handled as offset vectors in the direction vertical to that of the commands. 1: When the start-up and cancel commands are operated during radius compensation, the intersection operation processing of the command block and the next block is executed.	0/1
	set01 (bit2)	Nose R compen-sation type B (For L system only)	0: When the start-up and cancel commands are operated during nose R and radius compensation, their blocks are not handled by intersection operation processing; they are handled as offset vectors in the direction vertical to that of the commands. 1: When the start-up and cancel commands are operated during nose R and radius compensation, the intersection operation processing of the command block and the next block is executed.	0/1
	set01 (bit3)	Initial constant surface speed	0: The initial state after power-ON is a constant surface speed control cancel mode. 1: The initial state after power-ON is a constant surface speed control mode.	0/1
	set01 (bit4)	Synchronous tap	0: Handles the G74 and G84 tap cycles as the tap cycles with a floating tap chuck. 1: Handles the G74 and G84 tap cycles as the tap cycles without a floating tap chuck.	0/1
	set01 (bit5)	Start point alarm	Select an operation when the operation start point cannot be found while moving the next block of G117. 0: Enables an auxiliary function after the block has been moved. 1: Outputs an program error (P33) when the operation start point is not found.	0/1

#	Items		Details	Setting range (unit)
	set01 (bit6)	Grid display selection	Select a grid type to be displayed on the servo monitor screen during dog type reference point return. 0: Selects the distance between dog OFF and zero point (including a grid mask amount). 1: Selects a value given by reducing a grid mask amount from the distance between dog OFF and zero point.	0/1
1230	set02 (bit7)	Macro interface input/output for each system	0: The macro interface input/output are shared by the systems. 1: The macro interface input/output are used independently by the systems.	0/1
1231	set03 (bit1)	Switch graphic coordinates	Select whether to draw graphics with the machine coordinate value or the tool position coordinate value (position being machined, obtained by subtracting the tool compensation amount from machine coordinate values) when displaying the trace function. 0: Machine coordinate value (same as conventional method) 1: Tool position coordinate value The counter display and counter name are sequenced with this.	0/1
	set03 (bit2)	Switch graphic check trace	Select whether to draw both the machine coordinate value (tool center path) and tool position coordinate value (program path) or draw only the coordinates selected with switch graphic coordinates (#1231 set03/ bit1) when using the program check function. 0: Both machine coordinates and tool position coordinates (same as conventional method) 1: Only coordinates designated with switch graphic coordinates.	0/1
	set03 (bit3)	Hold display range information	Select whether to hold the display range information (drawing position and scale value) for graphic displays. 0: Hold. 1: Do not hold. (Initialize each time ... same as conventional method)	0/1
	set03 (bit4)	Switch zero point mark display position	Select the position for displaying the zero point mark in the graphic display. 0: Machine coordinate zero point (same as conventional method) 1: Workpiece coordinate zero point	0/1

#	Items		Details	Setting range (unit)
1232	set04 (bit0)	Switch load monitor	Select whether to detect the load with the load monitor's load detection, excluding during acceleration/ deceleration. 0: Detect also during acceleration/deceleration. (Conventional) 1: Do not detect during acceleration/deceleration.	0/1
	set04 (bit1)	Program format (IC card)	Select the format of the file output during copying (NC → IC). 0: Add "%" to the head of the file. 1: The head of the file is No. 0.	0/1
1233	set05 (bit1)	Spindle clamp selection	Select whether to validate the spindle override for the spindle speed clamp command (G92 S?). 0: Spindle override invalid 1: Spindle override valid	0/1
1234	set06 (bit6)		Not used.	0/1
	set06 (bit7)	Enable/disable MELDASNET	Enable or disable the MELDASNET function. 0: Enable 1: Disable	0/1
1235	set07 (bit0)	Helical interpolation speed 2	0: Select normal speed designation also for 3rd axis 1: Select arc plane element speed designation	0/1 (MAGIC64)
	set07 (bit1)	File server selection for version upgrade	0: Set upper limit of program file size to 2 gigabytes. 1: Set upper limit of program file size to 16 megabytes.	0/1 (MAGIC64)
	set07 (bit2)	Fixed type chopping compensa-tion valid only at start	When the fixed type compensation value is selected, the method is changed to the compensation value sequential update type after the first four cycles. 0: Method changeover invalid 1: Method changeover valid	0/1
1236	set08 (bit0)	Manual rotation axis feedrate unit	Select the unit of manual rotation axis feedrate. 0: Fixed to [°/min] 1: Same speed as before	0/1
	set08 (bit1)	Spindle speed detection	Select the pulse input source of actual spindle rotation speed output (R18/19) when spindle encoder serial connection (#3025 enc-on: 2) is selected. 0: Serial input 1: Encoder input connector	0/1
	set08 (bit2)	Current limit droop cancel invalid	Set whether to cancel the position droop when the current limit changeover signal is canceled. 0: Cancel droop. 1: Do not cancel droop.	0/1
	set08 (bit7)		Not used.	0/1

#	Items		Details	Setting range (unit)
1237 (PR)	set09 (bit0)	External workpiece offset	Set up this function to use the external workpiece coordinates by shifting them to the Z axis. 0: Does not reverse the sign of external workpiece offsets (Z shift) (same as before). 1: Reverses the sign of external workpiece offsets (Z shift). Note: When the sign of external workpiece offsets (Z shift) has been reversed, do not measure those external workpiece offsets. However, the external workpiece offsets can be measured by tool pre-setter.	0/1
	set09 (bit1)	Switch PC I/F F modal	The feedrate display for the special display unit is changed. 0: Display as feed per minute. 1: Change between feed per minute and feed per rotation according to the modal state.	0/1
	set09 (bit2)	Switch PC I/F T modal	The T command display for the special display unit is changed. (Only L system) 0: Display tool No. (excluding low-order two digits). 1: Display including the compensation No.	0/1
	set09 (bit3)	Switch PC I/F remaining distance dwell time display	The dwell time display for the special display unit is changed. 0: Display at feedrate display position. 1: Display at remaining distance display position.	0/1
	set09 (bit4)	Switch PC I/F execution program display/ comment display	The display of the program being executed for the special display unit is displayed. 0: Display as searched state, regardless of operation mode. 1: If operation mode and searched program differ, program is not displayed. Comment is displayed for head block search.	0/1
	set09 (bit5)	Switch PC I/F modal S	This parameter is for the special display unit I/F. 0: The S command commanded last is returned. 1: When #1039 spinno is 1 The 1st spindle data is returned. When #1039 spinno is 2 If #1199 Sselect for 2nd system is set to 1 with 2nd system setting, the 2nd spindle data is returned. When another command is issued, the 1st spindle data is returned. Note: When using constant surface speed control (G96 modal), the actual rotation speed command is returned.	0/1

#	Items		Details	Setting range (unit)
1238 (PR)	set10 (bit0)	Switch G36 function	If a G code system containing the G36 (automatic tool length measurement X) function is selected, select whether to use G36 for the automatic tool length measurement or arc thread cutting (CCW) function. 0: Automatic tool length measurement 1: Arc thread cutting (CCW)	0/1
	set10 (bit6)		Not used.	0/1
	set10 (bit7)	Switch operation alarm	Select whether to validate the NC alarm 5 (AL5) signal output. 0: NC alarm 5 (AL5) invalid All operation alarms are output to NC alarm 4 (AL4). All operation alarms are recorded in the alarm history. 1: NC alarm 5 (AL5) valid The following operation alarms are not output to NC alarm 4 (AL4). These are output to NC alarm 5 (AL5). The operation alarms output to NC alarm 5 (AL5) are not recorded in the alarm history. • External interlock axis found • Cutting override zero • External feedrate zero • Block start interlock • Cutting block start interlock • Cutting interlock for spindle-spindle polygon (G51.2)	0/1 (Default: 0)
1239 (PR)	set11 (bit0)	Coil switching method	0: Via PLC. (Y2D7) 1: NC internal processing. (Y2D7 is invalid.)	0/1
	set11 (bit1)		Not used.	0/1
	set11 (bit2)		Not used.	0/1
	set11 (bit3)	Polygon machining mode at reset	Select whether to cancel the polygon machining mode when reset is applied. 0: Do not cancel. 1: Cancel.	0/1
	set11 (bit4)	Invalidate G51.1 phase command	Select whether to carry out phase control with the spindle-spindle polygon function. 0: Always validate phase control. * When R is not commanded, it is handled as R0. 1: Validate phase control only at R command	0/1

#	Items		Details	Setting range (unit)
	set11 (bit5)	Door interlock spindle speed clamp valid	Select whether to validate the spindle clamp speed changeover function by the PLC signal. 0: Invalid 1: Valid	0/1
	set11 (bit6)	External deceleration axis compliance valid	Designate the method for setting the external deceleration speed. 0: Set speed common for all axes (#1216 extdcc external deceleration speed) 1: Set speed for each axis (#2086 exdcax external deceleration speed)	0/1
	set11 (bit7)	APLC software working environment setting	0: Run the APLC software with the ROM. 1: Run the APLC software with the RAM.	0/1
1240 (PR)	set12 (bit0)	Handle input pulse	Select the handle input pulse. 0: MELDAS standard handle pulse 1: Handle 400 pulse	0/1
	set12 (bit1)	Megatorque motor handle feed magnification	Select the magnification of megatorque motor handle 1 pulse. 0: Double the handle 1 pulse magnification specified by the handle feed magnification signal (Y2C0 to Y2C2). 1: Use the handle 1 pulse magnification specified by the handle feed magnification signal (Y2C0 to Y2C2) as is.	0/1
	set12 (bit2)	Zero point shift amount magnification	If "1" is set, the following magnification will be applied on the #2027 G28sft reference point shift amount, #2057 zero point proximity + and #2058 zero point proximity – settings. For 0.1μm : 10-fold For 0.01μm : 100-fold	0/1

(SETUP PARAM 1. 9/15)

#	Items		Details	Setting range (unit)
1265 (PR)	ext01 (bit0)	Command format 1	Select the command format for the fixed cycle for compound lathe. 0: Conventional format 1: MELDAS special format (1 block command method)	0/1
	ext01 (bit1)	Command format 2	Select the command format for the lathe fixed cycle. 0: Conventional format 1: MELDAS special format	0/1
	ext01 (bit2)	Command format 3	Select the command format for the hole drilling fixed cycle. 0: Conventional format 1: MELDAS special format	0/1
1266 (PR)	ext02		Not used.	
1267 (PR)	ext03 (bit0)	G code type	Select the high-speed high-accuracy G code type. 0: Conventional format 1: F format	0/1
1268 (PR)	ext04		Not used.	
1269 (PR)	ext05		Not used.	
1270 (PR)	ext06 (bit7)	Handle C axis coordinate during cylindrical interpolation	Specify whether the rotary axis coordinate before the cylindrical interpolation start command is issued is kept during the cylindrical interpolation or not. 0: Do not keep 1: keep	0/1
1271 (PR)	ext07 (bit0)	Mirror image operation	Select the type of mirror image operation. (Applicable only to M65 and M66) 0: Type 1 - The program mirror image, external mirror image, and parameter mirror image are exclusive to each other. - An increment command moves the image to the position indicated by the move amount with the sign inverted. 1: Type 2 - Mirror image operation is enabled when the program mirror image (G51.1) command is issued or when the external signal or parameter is ON. - An increment command moves the image to the position determined by applying the mirror image to the absolute program coordinates.	0/1 (Default: 0)

#	Items		Details	Setting range (unit)
	ext07 (bit1)	Address specifying fixed cycle repetition count (For M system only)	Specify the address that specifies the fixed cycle repetition count. (Applicable only to M65 and M66) 0: Address L only 1: Addresses K and L If addresses K and L are specified simultaneously, the data at address K is used for operation.	0/1 (Default: 0)
	ext07 (bit2)	F-command unit	Specify the unit to be used if a thread cutting read command contains on decimal point. (Applicable only to M65 and M66) 0: Type 1 (conventional specifications) F1 → 1 mm/rev, 1 inch/rev 1: Type 2 F1 → 0.01 mm/rev, 0.0001 inch/rev	0/1 (Default: 0)
	ext07 (bit3)	G-code group for unidirectional positioning (for M system only)	Specify the G-code group for unidirectional positioning. (Applicable only to M65 and M66) 0: Unmodal G code (group 00) 1: Modal G code (group 01) Related parameter: #8209 G60 SHIFT (Set the last positioning direction and distance for each axis applicable when the unidirectional positioning command is issued.)	0/1
	ext07 (bit4)	Operation by independent G40 command	Specify the mode of canceling radius compensation vector by the independent G40 command. (Applicable only to M65 and M66) (Default: 0) 0: Type 1 (conventional specifications) The independent G40 command cancels the radius compensation vector. 1: Type 2 The radius compensation vector is not canceled by the independent G40 command but is canceled by the next move command for the radius compensation plane.	0/1 (Default: 0)
	ext07 (bit5)	Cut start position (For L system only)	Specify the position from where cutting begins in a fixed cycle for compound lathe. 0: Conventional specifications The cut start position is determined by the final shaping program. 1: Extended specifications The cut start position is determined from the cycle start point.	0/1 (Default: 0)

#	Items		Details	Setting range (unit)
	ext07 (bit6)	Nose R compensation (For L system only)	Specify whether to apply nose R compensation to shapes in a rough cutting cycle. 0: Conventional specifications If nose R compensation is enabled for the final shaping program, the shape obtained after applying nose R compensation to the final shaping program is used as the rough cutting shape. 1: Extended specifications The shape made by the final shaping program, without nose R compensation, is used as the rough cutting shape.	0/1 (Default: 0)
	ext07 (bit7)	Cut amount (For L system only)	Specify the operation to be performed when the program-specified cut amount exceeds the cut amount of the final shaping program. 0: Conventional specifications A program error occurs if the program-specified cut amount exceeds the cut amount of the final shaping program. 1: Extended specifications Rough cutting is performed by one cut if the program-specified cut amount exceeds the cut amount of the final shaping program.	0/1 (Default: 0)
1272 (PR)	ext08 (bit0)	Switch pocket machining operation	0: Conventional specifications Pocket machining is selected with the H designation. The pull direction when pocket machining is ON is the Z direction. 1: Extended specifications If there is an X and Z axis in the first movement block after the finished shape start block is started, pocket machining will start. The pull direction when pocket machining is ON is the X direction.	0/1
	ext08 (bit1)	M function synchronous tap cycle	Specify whether to enable the M function synchronous tap cycle. 0: Invalid 1: Valid	
	ext08 (bit2)	Spiral/conical interpolation command format 2	Select the command format for spiral interpolation and conical interpolation. 0: Type 1 (conventional specifications) 1: Type 2 (spiral speed L designation, increment designation)	0/1
	ext08 (bit3)	Switch macro call function	Select whether to shift the argument to the subprogram if nests are overlapped when per block call (G66.1) is commanded. 0: Shift argument even if nests are overlapped. 1: Do not shift arguments if nests differ. (Conventional specifications)	0/1

#	Items		Details	Setting range (unit)
	ext08 (bit4)	Tap cycle selection	Select the tap cycle. 0: Pecking tap cycle 1: Deep hole tap cycle	0/1
	ext08 (bit5)	Deep hole tap cycle override selection	Select whether to validate override on the pulling operation during synchronized tapping with the deep hole tap cycle. 0: Invalid 1: Valid	0/1
	ext08 (bit6)	Switch corner chamfering/ corner R command format	The corner chamfering/corner R command format is extended. 0: Command format I (conventional format) Issue a command with comma (,C and ,R). 1: Command format II In addition to command format I, commands can be issued with an address that does not have a comma. Corner chamfering: I/K or C, corner R: R	0/1
	ext08 (bit7)	Return position after macro interrupt in fixed cycle selection	Select the destination to return to after a macro interrupt in the fixed cycle. 0: Return to block in fixed cycle. 1: Return to block after fixed cycle.	0/1
1273 (PR)	ext09 (bit0)	Switch ASIN calculation results range	Select the ASIN calculation results range. 0: –90° to 90° 1: 90° to 270°	0/1
	ext09 (bit1)	Switch system variable unit	Select the unit for the system variable #3002 (time during automatic start). 0: 1ms unit 1: 1 hour unit	0/1
	ext09 (bit2)	Switch G71, G72, G73 cutting direction judgment	Select whether to determine the cutting direction with the finished shape, or according to the commanded finishing allowance and cutting allowance when the longitudinal rough cutting cycle (G71), face rough cutting cycle (G72) or closed loop cutting cycle (G73) is commanded. 0: Conventional specifications Determined according to the finished shape program. 1: Extended specifications Determined according to the finishing allowance and cutting allowance commanded in the program.	0/1
	ext09 (bit3)	Facing turret mirror image coordinate value type	Select the coordinate values of the axis for which facing turret mirror image is valid. 0: Move axis in same direction as machine value. 1: Move axis in direction opposite machine value.	0/1
	ext09 (bit4)	Facing turret mirror image valid axis selection	Select the axis for which facing turret mirror image is valid. 0: Fixed to 1st axis. 1: Determined according to plane selected when facing turret mirror image is commanded.	0/1

#	Items		Details	Setting range (unit)
1274 (PR)	ext10 (bit7)	Word range check	Select whether to check that the operation expression of the word date in the program is enclosed in brackets ([ ]) when the machine program is executed. This check is also applied to the 08000 to 09999 and the machine manufacture macro program. 0: Check valid 1: Check invalid	0/1
1275 (PR)	ext11		Not used.	
1276 (PR)	ext12		Not used.	
1277 (PR)	ext13 (bit0)	Tool life management II count type 2	Specify how and when the mount or use count is incremented in tool life management II. 0: Type 1 The count is incremented when the spindle is used for cutting. 1: Type 2 The count is incremented for the tool used or mounted for one program. The increment is enabled by resetting.	0/1 (Default: 0)
1278 (PR)	ext14 (bit0)	Program restart method selection	Select the program restart method. 0: Type A 1: Type B	0/1
1279 (PR)	ext15 (bit0)	System synchroniza-tion method	Select the system synchronization method. 0: If one system is not in automatic operation, ignore the synchronization command and execute the next block. 1: Operate according to the synchronization ignore signal. If the synchronization ignore signal is set to "1", the synchronization command will be ignored. When set to "0", synchronization will be applied.	0/1
	ext15 (bit1)	Interrupt amount during machine lock	Select the manner to handle the interruption amount during machine lock. 0: Cancel when reset. 1: Do not cancel when reset. Instead cancel during manual zero point return.	0/1
	ext15 (bit2)	Selection of cutting start interlock target block	Select whether the cutting start interlock is valid for successive cutting blocks. 0: Valid for successive cutting blocks. 1: Invalid for successive cutting blocks.	0/1

#	Items		Details	Setting range (unit)
1280 (PR)	ext16 (bit0)	I/F per axis during cross machining control	Set the handling of the following PLC I/F for axes interchanged with cross machining control. • Mirror image • Manual/automatic interlock • Manual/automatic machine lock 0: Follows axis configuration before cross machining control. 1: Follows axis configuration after cross machining control. (Example) Set as follows for the automatic interlock (+) device for X1 when carrying out cross machining with the 1st axis (X1) in the 1st system and 1st axis (X2) in the 2nd system. Setting value 0: Y1A8 (I/F for 1st axis in 1st system) Setting value 1: W28 (I/F for 1st axis in 2nd system) Note: If the number of axes in the system changes with cross machining, the I/F of the target axis may change when this parameter is set to "1". (Example) When 1st system's C axis is moved to 2nd system with a 1st system (X, Z, C, Y) and 2nd system (X, Z) configuration: When setting value is 1: W2A, W12 and W4A, etc., will be the I/F for the C axis moved to the 2nd system. However, Y192, Y1AA and Y1CA, etc., will change to the I/F of the Y axis in the 1st system because the axes following the removed C axis (third place) are shifted up.	0/1

#	Items		Details	Setting range (unit)
1280 (PR)	ext16 (bit1)	Cross machining control cancel with reset	Select whether to cancel the cross machining control when reset is applied. 0: Cancel cross machining control with reset. 1: Do not cancel cross machining control with reset	0/1
	ext16 (bit2)	Interchange coordinate value display	Set whether to interchange (or move) the coordinate values when displaying. This setting will be followed when the axes are interchanged and when the axes are moved. 0: Interchange (or move) coordinate values with cross machining control, and display. 1: Display coordinate values for cross machining control without interchanging (or moving). (Example) When 1st system's C axis is moved to 2nd system with a 1st system (X, Z, C, Y) and 2nd system (X, Z) configuration: 1st system: X, Z and Y coordinate values are displayed. 2nd system: X, Z and C coordinate values are displayed.	0/1
	ext16 (bit3)	Reset operation for synchroniza-tion/super-imposition control	Select whether to cancel synchronization/ superimposition control with resetting. 0: Cancel. 1: Do not cancel.	0/1

#	Items		Details	Setting range (unit)
1281 (PR)	ext17 (bit0)	Zero point return operation changeover parameter	(Zero point setting operation) The "Operation error 1036" will occur regardless of this parameter, and regardless of manual or automatic operation. (High-speed zero point return) 0: <During manual operation> The master axis and slave axis will simultaneously start zero point return. Even if one of the axes reaches the zero point, the other axis will continue to move until it reaches the zero point. Thus, if the difference of the master axis and slave axis feedback position before zero point return is larger than the tolerable synchronization error amount, the error "Operation error 0051" will occur during zero point return. <During automatic operation> The master axis and slave axis will simultaneously start zero point return. When the master axis reaches the zero point, the slave axis will stop. Thus, the positional relation of the master axis and slave axis established before zero point return is maintained. 1: <During manual operation> <During automatic operation> The master axis and slave axis will simultaneously start zero point return. When the master axis reaches the zero point, the slave axis will stop. Thus, the positional relation of the master axis and slave axis established before zero point return is maintained.	0/1
	ext17 (bit1)	Tool offset addition axis selection	0: Follows Tchg34 1: Plane selection Base J setting name is set as the 3rd axis compensation axis.	0/1
1282 (PR)	ext18		Not used.	
1283 (PR)	ext19		Not used.	
1284 (PR)	ext20 (bit0)	Spindle speed clamp check	Select whether to check the spindle speed clamp under the constant surface speed control. 0: Check the spindle speed clamp. 1: Not check the spindle speed clamp. (Note) This parameter is enabled when the parameter "#1146 Sclamp" is set to "1". (Applicable only to M65 V series and M64 C version series)	0/1

#	Items		Details	Setting range (unit)
1285 (PR)	ext21 (bit0)	Multi-system program generation and operation	0: When a machining program is newly registered, it is registered as a program for the selected system. 1: When a program is newly registered, a system common program No. is generated unconditionally. If there are no contents in the subprogram when a subprogram is called during automatic operation, the program will be searched for and executed from $1.	0/1
	ext21 (bit1)	Changeover of method to select operation program	0: Select the program in the selected system with operation search. 1: Select a common system program with operation search. (A common system program No. will be selected.)	0/1
1286 (PR)	ext22 (bit0)	Program input/output method selection	0: Only the programs in the selected system are input/output. 1: The designated programs are output for all systems. The systems are delimited with the "$" mark. The programs delimited with the $ mark are assigned and input into each system. (If the program does not have a $ mark, it will be handled as system 1.)	0/1
	ext22 (bit1)		Not used.	
	ext22 (bit2)	0 No. for program input No.	Select the action to be taken when the same program No. is input during data input. 0: The 0 No. when the same 0 No. is input successively is handled as a character string data. 1: The 0 No. is handled as a program No. when the same 0 No. is input successively. Whether to overwrite the program or cause an error is set with #1218 bit 7 "Input by program overwrite".	0/1
	ext22 (bit3)	No 0 No. at machining program input	This setting enables the machining program input even if there is no program No. (0 No.). The program No. is fixed to 01 in this case. 0: Input disabled 1: Input enabled	0/1
1287 (PR)	ext23 (bit0)	Workpiece coordinate display	Select the mode of displaying the workpiece coordinate counter. 0: Don’t update the display immediately after workpiece coordinate data is changed. 1: Update the display immediately after workpiece coordinate data is changed.	0/1

#	Items		Details	Setting range (unit)
	ext23 (bit3)	Counter display expanded function selection	0: Display the command value that does not consider the tool length offset amount or workpiece coordinate offset amount. 1: The counter display expanded function is validated. (bit4 to bit7)	0/1
	ext23 (bit4)	Relative coordinate display	(M system) 0: Display the actual position including tool length offset. 1: Display the machining position in terms of a program command excluding tool length offset. (L system) 0: Display the actual position including tool shape compensation. 1: Display the machining position in terms of a program command excluding tool shape compensation.	0/1
	ext23 (bit5)	Relative coordinate display	(M system) 0: Display the actual position including tool radius compensation. 1: Display the machining position in terms of a program command excluding tool radius compensation. (L system) 0: Display the actual position including nose R compensation. 1: Display the machining position in terms of a program command excluding nose R compensation.	0/1
	ext23 (bit6)	Absolute coordinate display [Special display unit compatible]	(M system) 0: Display the actual position including tool length offset. 1: Display the machining position in terms of a program command excluding tool length offset. (L system) 0: Display the actual position including tool shape compensation. 1: Display the machining position in terms of a program command excluding tool shape compensation.	0/1

#	Items		Details	Setting range (unit)
	ext23 (bit7)	Absolute coordinate display [Special display unit compatible]	(M system) 0: Display the actual position including tool radius compensation. 1: Display the machining position in terms of a program command excluding tool radius compensation. (L system) 0: Display the actual position including nose R compensation. 1: Display the machining position in terms of a program command excluding nose R compensation. With the L system, the effect onto the nose R compensation's absolute coordinate counter is also affected by the L system coordinate changeover parameter (#1227 aux11/bit 3 absolute coordinate changeover (nose R)). In actual use, if this parameter is set to 1, or if #1227 aux 11/bit 3 is set to 1, the position in the program commands will be displayed with the absolute coordinate counter.	0/1
1288 (PR)	ext24 (bit0)	MDI program clear	Select whether to initialize the MDI buffer when MDI operation ends, the power is turned ON again, reset is input, or emergency stop is canceled. 0: Do not clear programs registered with MDI. 1: Clear programs registered with MDI, and save only % programs.	0/1
1289 (PR)	ext25		Not used.	
1290 (PR)	ext26		Not used.	
1291 (PR)	ext27		Not used.	
1292 (PR)	ext28		Not used.	
1293 (PR)	ext29		Not used.	
1294 (PR)	ext30		Not used.	
1295 (PR)	ext31		Not used.	
1296 (PR)	ext32		Not used.	
1297 (PR)	ext33		Not used.	
1298 (PR)	ext34		Not used.	

#	Items		Details	Setting range (unit)
1299 (PR)	ext35		Not used.	
1300 (PR)	ext36 (bit0)	Multiple spindle control II	Select multiple spindle control I or II. 0: Multiple spindle control I 1: Multiple spindle control II (select from ladder)	0/1
	ext36 (bit7)	Spindle synchroniza-tion command method	Select the spindle synchronization command method. 0: Spindle synchronization with PLC I/F 1: Spindle synchronization with G command	0/1

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#	Items		Details	Setting range (unit)
1301	nrfchk	Origin neighboring check method	Select the high-speed check method of the origin neighboring signal. 0: Do not check positions near the origin at high speeds. (Conventional specifications) 1: Check positions near the origin at high speeds using command machine positions. 2: Check positions near the origin at high speeds using detector feedback positions.	0 to 2
1302	AutoRP	Automatic return by program restart	0: Return the system to the restart position manually and then restart the program. 1: For program restarting, the first activation automatically moves the system to the restart position.	0/1
1303 (PR)	V1comN	No. of #100 address system common variables	Set the number of common variables common for the system starting from address #100.	0 to 100
1304 (PR)	V0comN	No. of #500 address system common variables	Set the number of common variables common for the system starting from address #500.	0 to 500
1305	corjug	Corner deceleration tangent judgment	Select whether to judge corner deceleration with a polygon shape or tangent during helical interpolation and spiral interpolation. 0: Polygon judgment Helical interpolation is interpreted as polygonal, and the corner deceleration is judged with the approximate vector. 1: Tangent judgment The vector is calculated from the center of the helical interpolation, the start point and the end point, and corner deceleration is judged.	0/1
1306	InpsTyp	Deceleration check specification type	Select the parameter specification type for the G0 or G1 deceleration check. 0: Deceleration check specification type 1 G0 is specified with "#1193 inpos", and G1+G9 with "#1223 aux07/BIT1". 1: Deceleration check specification type 2 G0 or G1+G9 is specified with "#1193 inpos".	0/1
1310	WtMmin	Minimum value for synchroniza-tion M code	Set the minimum value for the M code. When "0" is set, the synchronization M code will be invalid.	0, 100 to 99999999

#	Items		Details	Setting range (unit)
1311	WtMmax	Maximum value for synchroniza-tion M code	Set the maximum value for the M code. When "0" is set, the synchronization M code will be invalid.	0, 100 to 99999999
1312	T_base	Tool life management standard number	When the T code command is issued while specifying a value that exceeds the value set in this parameter, the value obtained by subtracting the set value from the command value is used as the tool group number for tool life management. The value specified by the T code command is equal to or less than the value set in this parameter, the T code is handled as a normal T code and not subjected to tool life management. When 0 is set in this parameter, the T code command always specifies a group number. (This parameter is valid for M-system tool life management II.)	0 to 9999
1313	TapDw1	Synchronous tap hole bottom wait time	Specify the hole bottom wait time for synchronous tapping. When the P address is specified, the greater value is used as the hole bottom wait time. When an in-position check is performed at the hole bottom, dwelling for the specified time is completed after the in-position check is complete. (Applicable only to the M64 D version series) Note: This parameter is valid only when 1 is set in #1223 aux07 bit 3 (synchronous tap in-position check improvement).	0 to 999 (ms)
1314	TapInp	Synchronous tap in-position check width (tap axis)	Specify the hole bottom in-position check width for synchronous tapping. (Applicable only to the M64 D version series) Note: This parameter is valid only when 1 is set in #1223 aux07 bit 3 (synchronous tap in-position check improvement).	1 to 32767 (1μm steps)
1324	Chop_R	Chopping compensa-tion value fixing method	Head number of the R register used as the compensation amount save area during fixed compensation amount method.	1900 to 2782

(SETUP PARAM 1. 11/15)

#	Items		Details	Setting range (unit)
1501	polyax (For L system only)	Rotational tool axis number	Specify the number of the rotational tool axis (servo axis) used for polygon machining (G51.2). Set 0 when not using polygon machining (spindle-servo axis), or when using spindle-spindle polygon machining. A value exceeding the base specification parameter #1002 axisno cannot be specified. This parameter is valid when the G code system is 6 or 7 (7 or 8 is set in base specification parameter #1037 cmdtyp).	0 to controlled axis number
1502	G0Ipfg	G1 → G0 deceleration check	0: Do not perform a deceleration check when the move direction is changed from G1 to G0. 1: Perform a deceleration check when the move direction is changed from G1 to G0. (Applicable only to the M64 D version series)	0/1
1503	G1Ipfg	G1 → G1 deceleration check	0: Do not perform a deceleration check when the move direction is changed from G1 to G1. 1: Perform a deceleration check when the move direction is changed from G1 to G1. (Applicable only to the M64 D version series)	0/1
1505	ckref2	Second origin return check	Specify the trigger for a check at the specified position in manual second original return mode. 0: Completion of spindle orientation 1: Generation of second origin return interlock signal	0/1
1506	F1_FM	Upper limit of F1 digit feedrate	Specify the maximum value up to which the F1 digit feedrate can be changed. (Applicable only to M65 and M66)	0 to 60000 (mm/min)
1507	F1_K	F1 digit feedrate change constant	Specify the constant that determines the speed change rate per manual handle graduation in F1 digit feedrate change mode. (Applicable only to M65 and M66)	0 to 32767
1510	DOOR_H	Shorten door interlock II axis stop time	Specify whether to shorten the time during which the axis is stopped when the door is opened. 0: Use the conventional axis stop time. 1: Shorten the axis stop time. Note: When the door interlock II signal is input via a ladder, the conventional axis stop time is used.	0/1
1511	DOORPm	Signal input device 1 for door interlock II: for each system	Specify the fixed device number (X??) for door interlock II signal input for each system. A device number from X01 to XFF can be specified. Device number 000 is invalid. Specify device number 100 when using no fixed device number for door interlock II signal input. Related parameter: #1154 pdoor (Door interlock II for each system)	000 to 100 (hexadecimal)

#	Items		Details	Setting range (unit)
1512	DOORPs	Signal input device 2 for door interlock II: for each system	Specify the fixed device number (X??) for door interlock II signal input for each system. (Specify the same value as that of #1155.) Related parameter: #1154 pdoor (Door interlock II for each system)	000 to 100 (hexadecimal)
1513	stapM	M code for synchronous tap selection	Select the synchronous tap mode using the miscellaneous function code of the value set in this parameter. The M function command can be issued immediately before the tap command or in the same block. This function is valid only when 1 is set in #1272 ext08/bit 1 (Enable/disable M-function synchronous tap cycle). Note: Do not use M00, 01 02, 30, 98, and 99.	0 to 99999999
1514	expLinax	Exponential function interpolation linear axis	Set the axis address name for the linear axis used in exponential function interpolation.	A to Z
1515	expRotax	Exponential function interpolation rotary axis	Set the axis address name for the rotary axis used in exponential function interpolation.	A to Z
1516	mill_ax	Milling axis name	Set the name of the rotary axis used in milling interpolation. Only one rotary axis can be set. When there is no E command in issuing the G12.1 command, this parameter will be followed.	A to Z
1517	mill_C	Milling interpolation hypothetical axis name	Select the hypothetical axis command name for milling interpolation. When there is no D command in issuing the G12.1 command, this parameter will be followed. 0: Y axis command 1: Command rotary axis name.	0/1
1518	polm	Spindle-spindle polygon Workpiece spindle No.	Set the number of the workpiece spindle used in spindle-spindle polygon machining. Note: The 1st spindle will be selected when “0” is set.	0 to number of spindles
1519	pols	Spindle-spindle polygon Tool spindle No.	Set the number of the tool spindle used in spindle-spindle polygon machining. Note: The 2nd spindle will be selected when “0” is set.	0 to number of spindles
1520 (PR)	Tchg34	Additional axis tool compensa-tion operation	Select whether to carry out the additional axis' tool compensation function with the 3rd axis or 4th axis. 0: Select 3rd axis. 1: Select 4th axis.	0/1
1521	C_min	Minimum turning angle	Set the minimum turning angle of the normal line control axis at the block joint during normal line control.	0.000 to 360.000 (°)

#	Items		Details	Setting range (unit)
1522 (PR)	C_axis	Normal line control axis	Set the number of the axis for normal line control. Designate a rotary axis.	0: Normal line control disabled 1 to 6: Axis No. (number of control axes)
1523	C_feed	Normal line control axis turning speed	This is valid with normal line control type I. Designate the turning speed of the normal line control axis at the block joint during normal line control. Set a value that does not exceed the normal line control axis' clamp speed (#2002 clamp).	0 to 1000000 (°/min)
1524	C_type	Normal line control type	Set the normal line control type.	0: Normal line control type I 1: Normal line control type II
1525	laxlen	L axis length	Special function	
1526	raxlen	R axis length	Special function	
1527	flclen	Distance between support points	Special function	
1528	rflch	R point support point height	Special function	
1529	laxcmp	L axis compensa-tion amount	Special function	
1530	raxcmp	R axis compensa-tion amount	Special function	
1531	flccmp	Distance between support point compensa-tion amount	Special function	
1532	G01rsm	G00 L/R interpolation simultaneous reach	Special function	
1533	millPax	Pole coordinate linear axis name	Set the linear axis used for pole coordinate interpolation.	Control axis address such as X, Y or Z

<table>
<tr><th>#</th><th colspan="2">Items</th><th>Details</th><th>Setting range (unit)</th></tr>
<tr><td>1534</td><td>SnG44.1</td><td>Spindle No. for G44.1 command</td><td>Set the selected spindle No. for the G44.1 command.
<table>
<tr><th>#1199</th><th>#1534</th><th>Selected spindle</th></tr>
<tr><td>0:G43.1</td><td>Not used.</td><td>1st spindle</td></tr>
<tr><td>1:G44.1</td><td>0</td><td>2nd spindle</td></tr>
<tr><td></td><td>1</td><td>1st spindle</td></tr>
<tr><td></td><td>2</td><td>2nd spindle</td></tr>
<tr><td></td><td>3</td><td>3rd spindle</td></tr>
<tr><td></td><td>4</td><td>4th spindle</td></tr>
<tr><td>2:G47.1</td><td>Not used.</td><td>All spindles</td></tr>
</table></td><td>0: 2nd spindle
1: 1st spindle
2: 2nd spindle
3: 3rd spindle
4: 4th spindle
If a spindle that does not exist is set, the 2nd spindle will be used. Note that if there is only one spindle, the 1st spindle will be used.</td></tr>
<tr><td>1535</td><td>C_leng</td><td>Minimum turning movement amount</td><td>Set the minimum turning movement amount of the normal line control axis at the block joint during normal line control.</td><td>0.000 to 99999.999 (mm)</td></tr>
<tr><td>1537 to 1544</td><td>crsax[1] to crsax[8]</td><td>Cross machining control axis</td><td>Set the axis to be interchanged during cross machining control.
Using two digits, set the name of the axis interchanged with that where the cross machining control request signal is input, or that moves to the position where the signal is input.</td><td>Two digits between A to Z and 1 to 9
(Setting is cleared when 0 is set)</td></tr>
</table>

(SETUP PARAM 1. 12/15)

#	Items		Details	Setting range (unit)
1549	Iv0vr1	Override 1 start curvature radius	Set the override 1 start curvature radius for executing involute interpolation with the high-speed high-accuracy II mode.	0.001 to 99999.999 (mm)
1550	Iv0vr2	Override 2 start curvature radius	Set the override 2 start curvature radius for executing involute interpolation with the high-speed high-accuracy II mode.	0.001 to 99999.999 (mm)
1551	Iv0vr3	Override 3 start curvature radius	Set the override 3 start curvature radius for executing involute interpolation with the high-speed high-accuracy II mode.	0.001 to 99999.999 (mm)
1552	Iv0vr4	Override 4 start curvature radius	Set the override 4 start curvature radius for executing involute interpolation with the high-speed high-accuracy II mode.	0.001 to 99999.999 (mm)
1553	Iv0vr5	Override 5 start curvature radius	Set the override 5 start curvature radius for executing involute interpolation with the high-speed high-accuracy II mode.	0.001 to 99999.999 (mm)
1554	Iv0rd2	Involute interpolation override 2	Set the override value at the curvature radius Iv0vR2 for executing involute interpolation with the high-speed high-accuracy II mode. Note: If the override value is not set (setting value: 0), the setting will be invalid, and the override will be 100%.	1 to 100 (%)

#	Items		Details	Setting range (unit)
1555	Iv0rd3	Involute interpolation override 3	Set the override value at the curvature radius Iv0vR3 for executing involute interpolation with the high-speed high-accuracy II mode. Note: If the override value is not set (setting value: 0), the setting will be invalid, and the override will be 100%.	1 to 100 (%)
1556	Iv0rd4	Involute interpolation override 4	Set the override value at the curvature radius Iv0vR4 for executing involute interpolation with the high-speed high-accuracy II mode. Note: If the override value is not set (setting value: 0), the setting will be invalid, and the override will be 100%.	1 to 100 (%)
1557	Iv0rd5	Involute interpolation override 5	Set the override value at the curvature radius Iv0vR5 for executing involute interpolation with the high-speed high-accuracy II mode. Note: If the override value is not set (setting value: 0), the setting will be invalid, and the override will be 100%.	1 to 100 (%)
1558	Iv0Min	Involute interpolation override lower limit value	Set the lower limit value of the involute interpolation override. Note: If the override value is not set (setting value: 0), the setting will be invalid, and the override will be 100%.	1 to 100 (%)
1559	IvAMax	Involute interpolation maximum acceleration rate	Set the maximum acceleration rate of the constant acceleration control for executing involute interpolation with the high-speed high-accuracy II mode. Note: If this parameter is not set (setting value: 0), the setting will be invalid, and the normal acceleration rate (#1207 G1btL) will be applied.	1 to 32767 (ms)
1560	IvFMin	Involute interpolation minimum feedrate	Set the minimum feedrate of the constant acceleration control for executing involute interpolation with the high-speed high-accuracy II mode. (Valid when executing compensation with the accuracy coefficient.) Note: If this parameter is not set (setting value: 0), the feedrate will not be clamped.	1 to 32767 (ms)
1571	SSSdis	SSS control adjustment coefficient fixed value selection	The shape recognition range for SSS control is fixed.	0/1

#	Items		Details	Setting range (unit)
1572	Cirorp	Arc command overlap	Fluctuation of the speed at the arc and linear or arc and arc joints will be eliminated during the high-speed high-accuracy II mode. 0: Do not overlap arc command blocks. 1: Overlap arc command blocks. (Eliminate the speed fluctuation) Note: This parameter is invalid during SSS control.	0/1

(SETUP PARAM 1. 13/15)

#	Items	Details	Setting range (unit)
1801	Hacc_c	Arc radius clam acceleration	-99999999 to +99999999
1802	Macc_c	Acceleration check at middle speed	-99999999 to +99999999
1803	Lacc_c	Acceleration check at low speed	-99999999 to +99999999
1811	Hcof_A	X-axis high acceleration coefficient β	-99999999 to +99999999
1812	Hcof_B	X-axis high acceleration coefficient α	-99999999 to +99999999
1813	Mcof_A	X-axis middle acceleration coefficient β	-99999999 to +99999999
1814	Mcof_B	X-axis middle acceleration coefficient α	-99999999 to +99999999
1815	Lcof_A	X-axis low acceleration coefficient β	-99999999 to +99999999
1816	Lcof_B	X-axis low acceleration coefficient α	-99999999 to +99999999
1817	mag_C	X-axis change magnification θ [%] Set 0 when no compensation or change is executed.	-99999999 to +99999999
1821	Hcof_A	Y-axis high acceleration coefficient β	-99999999 to +99999999
1822	Hcof_B	Y-axis high acceleration coefficient α	-99999999 to +99999999
1823	Mcof_A	Y-axis middle acceleration coefficient β	-99999999 to +99999999
1824	Mcof_B	Y-axis middle acceleration coefficient α	-99999999 to +99999999
1825	Lcof_A	Y-axis low acceleration coefficient β	-99999999 to +99999999
1826	Lcof_B	Y-axis low acceleration coefficient α	-99999999 to +99999999
1827	mag_C	Y-axis change magnification θ [%] Set 0 when no compensation or change is executed.	-99999999 to +99999999

(SETUP PARAM 1. 14/15)

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

(SETUP PARAM 1. 15/15)

#	Items		Details	Setting range (unit)
1925	EtherNet	Start of service	Start or stop the Ethernet communication function. 0: Stop 1: Start	0/1
1926	IP address	IP address	Specify the NC IP address	Set these parameters in accordance with the network rules in the connection environment.
1927	Subnet mask	Subnet mask	Specify the subnet mask.	
1928	Gateway address	Gateway	Specify the gateway IP address.	
1929	Port number	Port No.	Set the port No. for the service function.	1 to 9999 (Set 2000 when not connected to the Ethernet.)
1930	Host address	Host address	Set the host's IP address.	1 to 255
1931	Host number	Host No.	Set the host's port No.	1 to 9999
1932	FTP Retry	FTP communica-tion retry times	Set the number of times to retry automatically when FTP communication fails.	0 to 999
1933	FTP Timeout	FTP communica-tion time-out interval	Set the communication time-out interval (seconds) when FTP communication automatic retry is set. If "0" is set, "10" seconds (default value) is applied.	0 to 99

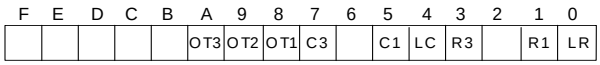
(Note) Always set #1925 to #1931 when the FCU6-EP203-1 is mounted.

6. Axis Specifications Parameters

6.1 Axis Specifications Parameters

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

(SETUP PARAM 2. 1/8)

#	Items		Details	Setting range (unit)
2001	rapid	Rapid traverse rate	Set up the rapid traverse feedrate for each axis. The maximum value to be set differs with mechanical systems.	1 to 999999 (mm/min)
2002	clamp	Cutting feedrate for clamp function	Define the maximum cutting feedrate for each axis. Even if the feedrate in G01 exceeds this value, the clamp will be applied at this feedrate.	1 to 999999 (mm/min)
2003 (PR)	smgst	Acceleration and deceleration modes	Specify acceleration and deceleration control modes.  Note: Set 0 in null bits. (Bit2 and bit6 when the acceleration/deceleration by software is selected are excluded.) Rapid traverse feed acceleration and deceleration types LR Linear acceleration/ deceleration R1 Primary delay R3 Exponential acceleration and linear deceleration bit0 to 3 ON Acceleration/ deceleration by software Cutting feed acceleration and deceleration types LC Linear acceleration/ deceleration C1 Primary delay C3 Exponential acceleration and linear deceleration bit4 to 7 ON Acceleration/ deceleration by software (To be continued to the next page)	Specify the modes in hexadecimal notation.

#	Items	Details	Setting range (unit)

(Continued from the previous page)

<Combination of acceleration and deceleration patterns and bit patterns>

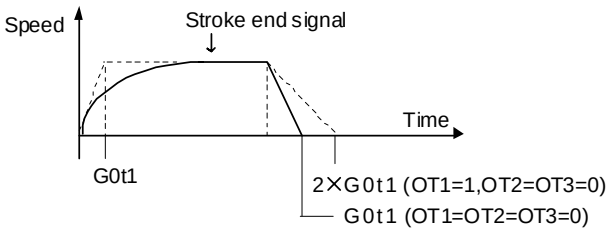
		Rapid traverse	R3(bit3)	-(bit2)	R1(bit1)	LR(bit0)
		Cutting feed	C3(bit7)	-(bit6)	C1(bit5)	LC(bit4)
Acceleration/deceleration types	Step		0	0	0	0
	Linear acceleration/ deceleration		0	0	0	1
	Primary delay		0	0	1	0
	Exponential acceleration and linear deceleration		1	0	0	0
	Acceleration/ deceleration by software		1	1	1	1

R1 > R3 when both R1 and R3 contain 1.

<Stroke end stop types>

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

OT1	0	Deceleration by G0t1
	1	Deceleration by 2 × G0t1

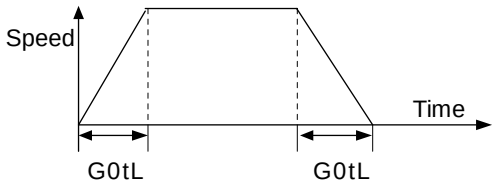
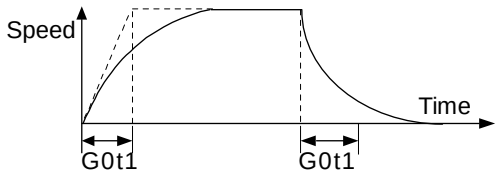
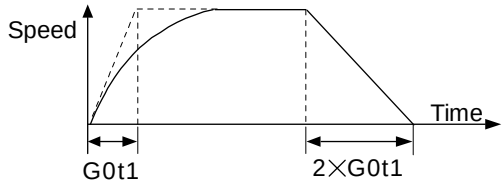


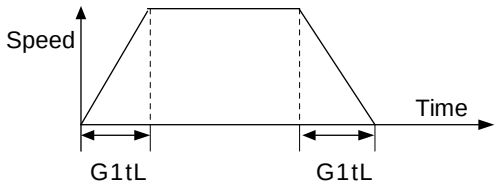
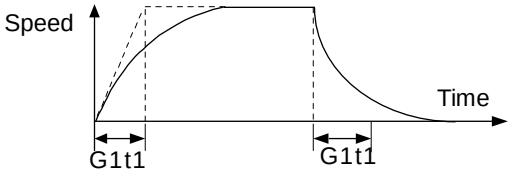
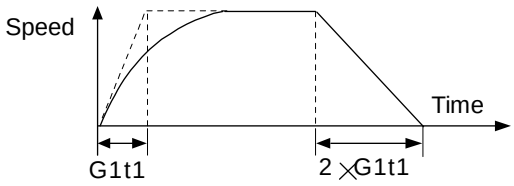
OT1 is valid under the following conditions (valid for dog type zero point return):

Stop type: Linear deceleration

Acceleration mode: Exponential

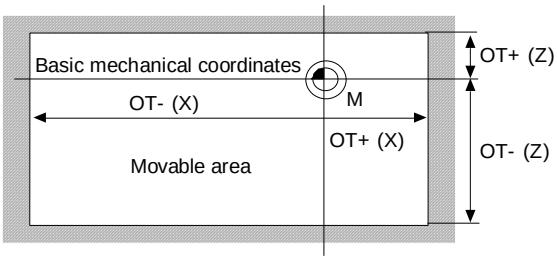
Deceleration mode: Linear

#	Items		Details	Setting range (unit)
2004	G0tL	G0 time constant (linear)	Set up a linear control time constant for rapid traverse acceleration and deceleration. The time constant is validated when LR (rapid traverse feed with linear acceleration or deceleration) or F (acceleration or deceleration by software) is selected in acceleration or deceleration mode "#2003 smgst".  	1 to 4000 (ms)
2005	G0t1	G0 time constant (primary delay) Second-step time constant for acceleration and deceleration by software	Set up a primary-delay time constant for rapid traverse acceleration and deceleration. The time constant is validated when R1 (rapid traverse feed with primary delay) or R3 (exponential acceleration and linear deceleration) is selected in acceleration or deceleration mode "#2003 smgst". When acceleration or deceleration by software is selected, the second-step time constant is used. <Rapid traverse feed with primary delay>  <Rapid traverse feed with exponential acceleration and linear deceleration>  	1 to 5000 (ms)
2006	G0t2		Not used.	0

#	Items		Details	Setting range (unit)
2007	G1tL	G1 time constant (linear)	Set up a linear control time constant for cutting acceleration and deceleration. The time constant is validated when LC (cutting feed with linear acceleration and deceleration) or F (acceleration and deceleration by software) is selected in acceleration or deceleration mode "#2003 smgst".  	1 to 4000 (ms)
2008	G1t1	G1 time constant (primary delay) Second stage time constant for acceleration and deceleration by software	Set up the primary delay time constant for cutting acceleration and deceleration. The time constant is validated when C1 (cutting feed with the primary delay) or C3 (cutting feed with exponential acceleration and linear deceleration) is selected in acceleration or deceleration mode "#2003 smgst". When acceleration or deceleration by software is selected, the second stage time constant is used. <Cutting feed with primary time constant>  <Cutting feed with exponential acceleration and linear deceleration>  	1 to 5000 (ms)
2009	G1t2		Not used.	0

#	Items		Details	Setting range (unit)
2010	fwd_g	Feed forward gain	Set up a feed forward gain for pre-interpolation acceleration and deceleration. The larger the set value, the smaller the theoretical control error will be. However, if a mechanical vibration occurs, the set value must be reduced.	0 to 100 (%)
2011	G0back	G0 backlash	Set up the backlash compensation amount when the direction is reversed with the movement command in rapid traverse feed mode or in manual mode.	-32768 to 32767
2012	G1back	G1 backlash	Set up the backlash compensation amount when the direction is reversed with the movement command in cutting mode.	-32768 to 32767

(SETUP PARAM 2. 2/8)

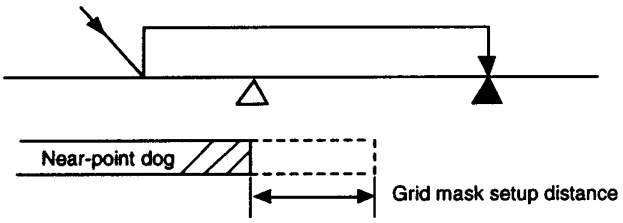
#	Items		Details	Setting range (unit)
2013 2014	0T - 0T +	Soft limit I - soft limit I +	Set up a soft limit area with reference to the zero point of the basic mechanical coordinates. For the movable area of stored stroke limit 1, set the coordinate in the negative direction in #2013 and the coordinate in the positive direction in #2014. To narrow the available range in actual use, use the parameters #8204 OT- and #8205 OT+. When the same value (other than 0) is set in #2013 and #2014, this function is disabled.  	±99999.999 (mm)
2015	t1m1-	Negative direction sensor of tool setter or TLM standard length	Set up a sensor position in the negative direction when using the tool setter. When the TLM is used, set up the distance of a tool replacement point (reference point) for measuring the tool length from the zero point to the measurement reference point (surface).	±99999.999 (mm)
2016	t1m1+	Positive direction sensor of tool setter	Set up the sensor position in the positive direction when using the tool setter.	±99999.999 (mm)
2017	tap_g	Axis servo gain	Set the position loop gain for special operations (synchronized tapping, interpolation with spindle C axis, etc.) The setting range is 1.00 to 200.00rad/s., in 0.25 increment units. The standard setting is 10.	1.00 to 200.00 (rad/s)
2018	no_srv	Operation with no servo control	Set when performing test operation without connecting the drive amplifier and motor. 0: Specify normal operation. 1: Operation is possible even if units are not connected as the drive system alarm will be ignored. This is for test operation during start up and is not used normally. If 1 is set during normal operation, errors will not be detected even if they occur.	0/1

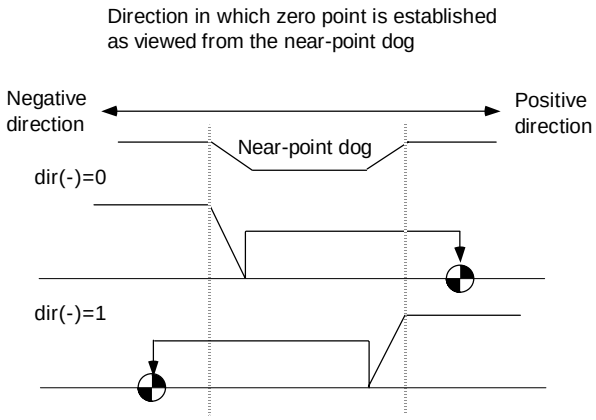
#	Items		Details	Setting range (unit)
2019	revnum	Return steps	Set up the steps required for reference point return for each axis. 0: Does not execute reference point return. 1 to max. number of NC axes: Sets up the steps required for reference point return.	0 to max. number of NC axes
2020	o_chkp	Spindle orientation completion check during second zero point return	Set up the distance from the second zero point to the position for checking that the spindle orientation has completed during second zero point return. If the set value is 0, the above check is omitted.	0 to 99999.999 (mm)
2021	out_f	Maximum speed outside soft limit range	Set up the maximum speed outside the soft limit range.	0 to 999999
2022	G30SLX	Validate soft limit (automatic and manual)	Set up this function to disable a soft limit check during the second to the fourth zero point return in both automatic and manual operation modes. 0: Enables soft limit check. 1: Disables soft limit check.	0/1
2023	ozfmin	Set up ATC speed lower limit	Set up the minimum speed outside the soft limit range during the second to the fourth zero point return in both automatic and manual operation modes.	0 to 999999
2024	synerr	Allowable error	Set up the following for the master axis: the maximum synchronization error that is allowed to check for synchronization errors When 0 is set up, the error check is not carried out.	0 to 99999.999 (mm) During spindle C axis synchronization control: 0 to 99999.999 (°)

6.2 Zero Point Return Parameters

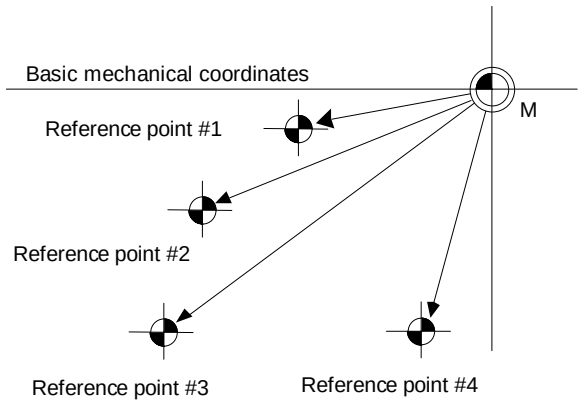
After setting up the parameter (PR) listed in the table, turn OFF the NC power. To validate the parameter, turn ON the power again.

(SETUP PARAM 2. 3/8)

#	Items		Details	Setting range (unit)
2025	G28rap	G28 rapid traverse rate	Set up a rapid traverse rate for dog type reference point return command.	1 to 999999 (mm/min)
2026	G28crp	G28 approach speed	Set up the speed of approach to the reference point in the reference point return command. This speed is attained after the system stops with deceleration by dog detection. Note) The G28 approach speed unit is (10°/min) only when using the Z-phase type encoder (#1226 aux10 bit3=1) for the spindle/C-axis reference point return type. The same unit is used for both the micron and sub-micron specifications.	1 to 60000 (mm/min)
2027	G28sft	Reference point shift distance	Set up the distance from the electrical zero-point detection position to the actual machine reference point during reference point return control. Note) When #1240 set12 (bit2) is ON, a magnification (C: 10-fold, D: 100-fold) corresponding to the input setting unit (#1003 iunit) will be applied on the setting value.	0 to 65535 (μm)
2028	grmask	Grip mask amount	Set up a distance where the grid point is ignored when near-point dog OFF signals are close to that grid point during reference point return.  The grid mask is valid by one grid.	0 to 65535 (μm) Even for the specifications in sub-microns, set up the value in units of μm.
2029	grspc	Grid interval	Set up a detector grid interval. Generally, set up the value equal to the ball screw pitch. However, if the detector grid interval is not equal to the screw pitch when measured with a linear scale, set up the detector grid interval. To reduce the grid interval, use its divisors. To use 0.001 mm as minimum setup units, set up the negative value. Example) Setup value 1 $\rightarrow$ 1.000 mm (°) -1 $\rightarrow$ 0.001 mm (°) Even when the specifications in sub-microns are used, 0.001 mm is specified for the minimum setup units.	-32767 to 999 (mm)

#	Items		Details	Setting range (unit)
2030 (PR)	dir (-)	Reference point direction (-)	Set which side of the near-point dog the reference point is at during reference point return. <For dog type reference point return>  	
2031	noref	Axis without reference point	Specify the axis that does not have a reference point. Before automatic operation starts, reference point return is not required.	0: Normal controlled axis 1: Axis without reference point
2032	nochk	Whether reference point return is completed not checked	The absolute and incremental commands can be executed even if dog type (or Z phase pulse system) reference point return is not completed. Specify whether to check that the reference point return is completed.	0: Reference point return completion is checked. 1: Reference point return completion is not checked.
2033	zp_no	Z phase pulse system reference point return spindle encoder No.	The reference point return is performed with the Z phase pulse of the spindle encoder. Set the spindle encoder No. to be used.	0: Dog type 1 to 4: Spindle No.

(SETUP PARAM 2. 4/8)

#	Items		Details	Setting range (unit)
2037 2038 2039 2040	G53ofs #2_rfp #3_rfp #4_rfp	Reference point #1 to #4	Set up the position of the first, second, third, and fourth reference points from the zero point of the basic mechanical coordinates.  	±999999.999 (mm)

6.3 Absolute Position Parameters

(SETUP PARAM 2. 5/8)

#	Items		Details	Setting range (unit)
2049 (PR)	type	Absolute position detection method	Specify the absolute position zero point alignment method. 0: Not absolute position detection 1: Stopper method (push with mechanical stopper) 2: Origin point alignment method (align with marked point) 3: Dog-type (align with dog and proximity switch) 4: Reference point alignment method II (align to alignment mark) (Type that does not return grid after reference alignment) 9: Simple absolute position (Not absolute position detection, but the position when the power is turned off is registered.) Automatic initial setting is valid only when the stopper method is selected.	0 to 9
2050	absdir	Base point of Z direction	Set the direction of the absolute position reference point (grid point immediately before) seen from the machine reference point for when using reference point alignment.	0: Positive direction 1: Negative direction
2051	check	Check	Set the tolerable range for the movement amount (deviation amount) when the power is turned OFF. 0: Not checked 1 to 99999.999mm: If the difference of the position when the power is turned OFF and turned ON again is larger than this value, an alarm will be output.	0 to 99999.999 (mm)
2052	absg28		Not used.	
2053	absm02		Not used.	
2054	clpush	Current limit (%)	Set up the current limit value for the initial setting when detecting an absolute position with a dog-less system. The setup value is the ratio of the current limit value to the rated value.	0 to 100 (%)
2055	pushf	Push speed	Set the feedrate for the automatic initial setting during stopper method.	1 to 999 (mm/min)
2056	aproch	Approach	Set the approach distance for the automatic initial setting in the push method. Approach distance: After using stopper once, the tool returns this distance, and then use stopper again. When set to 0, the reference point coordinates set in #2037 G53ofs will be used as the approach start position.	0 to 999.999 (mm)

#	Items		Details	Setting range (unit)
2057	nrefp	Near zero point +	Set the width where the near-reference-point signal is output. (Positive direction width) When set to 0, the width is equivalent to the grid width setting. Note: When #1240 set12 (bit2) is ON, a magnification (C: 10-fold, D: 100-fold) corresponding to the input setting unit (#1003 iunit) will be applied on the setting value.	0 to 32.767 (mm)
2058	nrefn	Near zero point -	Set the width where the near-reference-point signal is output. (Negative direction width) When set to 0, the width is equivalent to the grid width setting. Note: When #1240 set12 (bit2) is ON, a magnification (C: 10-fold, D: 100-fold) corresponding to the input setting unit (#1003 iunit) will be applied on the setting value.	0 to 32.767 (mm)
2059	zerbas	Select zero point parameter and reference point	Specify the position to be the zero point coordinate during absolute position initial setting. 0: Position that was stopped during stopper method Specify the coordinates of the alignment mark position when using the reference point method. 1: Grid point just before stopper Specify the coordinates of the grid point just before the alignment mark.	0/1

6.4 Axis Specification Parameters 2

(SETUP PARAM 2. 6/8)

#	Items		Details	Setting range (unit)
2061	OT_1B-	Soft limit IB-	Set up the coordinates of the lower limit of the inhibited area of stored stroke limit IB. Specify a value in the basic mechanical coordinates system. If the same value (non-zero) with the same sign as that of #2062 OT_IB+ is specified, the stored stroke limit IB function is disabled.	±99999.999 (mm)
2062	OT_1B+	Soft limit IB+	Set up the coordinates of the upper limit of the inhibited area of stored stroke limit IB. Specify a value in the basic mechanical coordinates system.	±99999.999 (mm)
2063	OT_1B type	Soft limit IB type	Select OT_IB or OT_IC in which OT_IB+/- is used in stored stroke limit I. 0: Soft limit IB valid 1: Soft limit IB and IC invalid 2: Soft limit IC valid 3: When using the inclined axis specifications, the soft limit is checked with the program coordinate system. Note: This is invalid for axes other than the inclined axis' base axis and inclined axis.	0/1/2/3
2064	rapid2	Speed 2	Specify the speed applicable to the speed area for 2-stage acceleration/deceleration. If the following conditions are not satisfied, inclination constant acceleration/deceleration is used for operation. (0 < rapid2 < rapid and rapid3 = 0 and 0 < G0tL2 <G0tL and G0tL3 = 0) (Applicable only to M64 D version series) Related parameters: #1223 aux07 bit 0 (Rapid traverse content multistage acceleration/deceleration) #2065 G0tL2 (Time constant 2)	0 to 999999 (mm/min) 0: No setting
2065	G0tL2	Time constant 2	Specify the time constant applicable to the speed area for 2-stage acceleration/deceleration. If the following conditions are not satisfied, inclination constant acceleration/deceleration is used for operation. (0 < rapid2 < rapid and rapid3 = 0 and 0 < G0tL2 <G0tL and G0tL3 = 0) (Applicable only to M64 D version series) Related parameters: #1223 aux07 bit 0 (Rapid traverse content multistage acceleration/deceleration) #2064 rapid2 (Speed 2)	1 to 4000 (ms) 0: No setting

#	Items		Details	Setting range (unit)
2066	rapid3	Speed 3	Specify the speed applicable to the speed area for 2-stage or 3-stage acceleration/deceleration. If the following conditions are not satisfied, inclination constant acceleration/deceleration is used for operation. (0 < rapid3 < rapid2 < rapid and 0 < G0tL3 <G0tL2 < G0tL) (Applicable only to M64 D version series) Related parameters: #1223 aux07 bit 0 (Rapid traverse content multistage acceleration/deceleration) #2067 G0tL3 (Time constant 3)	0 to 999999 (mm/min) 0: No setting
2067	G0tL3	Time constant 3	Specify the time constant applicable to the speed area for 2-stage or 3-stage acceleration/deceleration. If the following conditions are not satisfied, inclination constant acceleration/deceleration is used for operation. (0 < rapid3 < rapid2 < rapid and 0 < G0tL3 <G0tL2 < G0tL) (Applicable only to M64 D version series) Related parameters: #1223 aux07 bit 0 (Rapid traverse content multistage acceleration/deceleration) #2066 rapid3 (Speed 3)	1 to 4000 (ms) 0: No setting
2068	G0fwdg	G00 feed forward gain	Specify the feed forward gain applicable to acceleration/deceleration before G00 interpolation. The greater the set value, the shorter the positioning time during in-position checking. If machine vibration occurs, decrease the set value.	0 to 200 (%)
2069	Rcoeff	Axis arc radius error correction efficient	The amount of arc radius error correction can be increased or decreased between -100% to +100% for each axis.	-100.0 to +100.0 (%)
2070 (PR)	div_RT	Rotational axis division count	Specify the number of divisions of one turn of the rotational axis for purpose of control. Example: When 36 is set, one turn is supposed to be 36.000. Note 1: When 0 is set, the normal rotational axis (360.000 degrees for one turn) is assumed. Note 2: If this parameter is changed when the absolute position detection specification is used, absolute position data is lost. Initialization must be performed again.	0 to 999

#	Items		Details	Setting range (unit)
2071	s_axis (For L system only)	Inclined axis selection	Select the axis subjected to inclined-axis control or the base axis corresponding to the inclined axis. 0: Axis not subjected to inclined-axis control 1: Inclined axis 2: Base axis corresponding to inclined axis Note: Set 1 or 2 for only one axis. If it is set for two or more axes, inclined-axis control does not work.	0 to 2
2072	rslimt	Restart limit	If the machine is positioned on the minus (-) side of the set value in T-command restart mode, restart search in type 3 is disabled.	±9999.999 (mm)

(SETUP PARAM 2. 7/8)

#	Items		Details	Setting range (unit)
2073	zrn_dog	Origin dog	Under the standard specifications, the origin dog signal is assigned to a fixed device. When it is desired to assign the origin dog signal to a position other than the fixed device, specify the input device in this parameter. Note 1: This parameter is valid when 1 is set in #1226 aux10 bit 5. Note 2: When this parameter is valid, do not set the same device number. If the same device number exists, an emergency stop occurs. However, no device number check is performed for an axis to which a signal that ignores the near-point dog signal (R157) is input.	00 to FF (HEX)
2074	H/W_OT+	H/W OT+	Under the standard specifications, the OT (+) signal is assigned to a fixed device. When it is desired to assign the OT (+) g signal to a position other than the fixed device, specify the input device in this parameter. Note 1: This parameter is valid when 1 is set in #1226 aux10 bit 5. Note 2: When this parameter is valid, do not set the same device number. If the same device number exists, an emergency stop occurs. However, no device number check is performed for an axis to which a signal that ignores the OT signal (R156) is input.	00 to FF (HEX)
2075	H/W_OT-	H/W OT-	Under the standard specifications, the OT (-) signal is assigned to a fixed device. When it is desired to assign the OT (-) g signal to a position other than the fixed device, specify the input device in this parameter. Note 1: This parameter is valid when 1 is set in #1226 aux10 bit 5. Note 2: When this parameter is valid, do not set the same device number. If the same device number exists, an emergency stop occurs. However, no device number check is performed for an axis to which a signal that ignores the OT signal (R156) is input.	00 to FF (HEX)

#	Items		Details	Setting range (unit)
2076	index_x	Index table indexing axis	Specify the index table indexing axis. 0: Normal axis 1: Index table indexing axis Note: This parameter is valid only for the NC axis. The parameter is invalid if specified for the PLC axis.	0/1
2077	G0inps	G0 in-position width	When an in-position check is performed for G0, this parameter is valid. (Comparison of SV024 and this parameter, the parameter that the in-position width is wider is applied.) When 0 is set, this parameter is invalid. (Applicable only to SV024)	0 to 32767 (μm) M64 specifies a 0.5 μm unit.
2078	G1inps	G1 in-position width	When an in-position check is performed for G1, this parameter is valid. (Comparison of SV024 and this parameter, the parameter that the in-position width is wider is applied.) When 0 is set, this parameter is invalid. (Applicable only to SV024)	0 to 32767 (μm) M64 specifies a 0.5 μm unit.
2079	chcomp	Chopping compensation coefficient	Set the coefficient applied on the compensation amount for the insufficient amount caused by servo delay during chopping.	0 to 10 (standard value: 8)
2080	chwid	Bottom dead center position width	Set the tolerance between the commanded stroke and actual stroke. During chopping, if the (command width - maximum stroke of top/bottom dead center position /2) is within this tolerance, compensation will be applied.	Micron: 0 to 10000 (μm) Sub-micron: 0 to 10000 (0.1 μm)
2081	chclsp	Maximum chopping speed	Set the chopping axis clamp speed applied during chopping.	Micron: 0 to 60000 (mm/min) Sub-micron: 0 to 60000 (0.1 mm)/min
2082	a_rstax	Restart position return order	Designate the order for automatically returning to the restart position. 0: Do not return. When 0 is designated for all axes, all of the axes will return simultaneously.	0 to 6

#	Items		Details	Setting range (unit)
2083	rot_2	Linear type rotary axis II	The linear type rotary axis II is validated. 0: Invalidate linear type rotary axis II. 1: Validate linear type rotary axis II. Note that this is valid only when the power is turned ON, and the rotary axis parameters must be validated. The axis type is determined by the combination with the existing rotary axis parameters (#1017 rot rotary axis). If #1017 is set to 0, the linear axis will be applied. When #1017 is set to 1 and this parameter is set to 0, the rotary axis will be applied, and when set to 1, the linear type rotary axis II will be applied. <Related parameters> #1089: Cut_RT Short cut for rotary axis #1090: Lin_RT Linear type rotary axis #2070: div_RT Rotary axis division count #2076: index_x Index table indexing axis Note: These parameters are invalid when the linear type rotary axis II is set.	0/1
2084	G60_ax	Unidirectional positioning operation selection	Select the unidirectional positioning with G00. Select the axis for carrying out the positioning per time operation when the positioning command is issued regardless of the unidirectional positioning command and modal. 0: Carry out unidirectional positioning according to the command and modal. 1: When the positioning command (G00) is issued, carry out unidirectional positioning regardless of the command and modal. <Related parameters> #8209 G60 SHIFT: The final positioning direction and distance for the unidirectional positioning command is set for each axis. #2076 Index table indexing axis: Set the indexing axis for each axis.	0/1

(SETUP PARAM 2. 8/8)

#	Items		Details	Setting range (unit)
2086	exdcax	External deceleration speed	Set the upper limit of the feedrate for each axis when the external deceleration signal is valid. This parameter is valid when the #1239 set11/bit6 external deceleration axis compliance valid is set to 1.	1 to 999999 (mm/min)
2087	syncnt	Synchroniza-tion/super-imposition control setting for each axis	Set the polarity of synchronous axis in respect to basic axis to the bit corresponding to each axis. 0: Polarity with basic axis is positive 1: Polarity with basic axis is negative	0 to FF (hexadecimal)
2088	bsax_sy	Reference axis for synchronous control	Set the basic axis for synchronous control with the 2nd axis name (axname2). A numerical character cannot be set to the 1st character.	Axis name
2089	bsax_pl	Reference axis for superimposi-tion control	Set the basic axis for superimposition control with the 2nd axis name (axname2). A numerical character cannot be set to the 1st character.	Axis name
2090	plrapid	Rapid traverse rate for super-imposition control	Set the rapid traverse rate for superimposition control. (Equivalent to #2001 rapid (rapid traverse rate).)	1 to 999999 (mm/min)
2091	plclamp	Cutting feed clamp speed for super-imposition control	Set the cutting feed clamp speed for superimposition control. (Equivalent to #2002 clamp (cutting feed clamp speed).)	1 to 999999 (mm/min)
2092	plG0tL	G0 time constant for superimposi-tion control (linear)	Set the G0 time constant (linear) for superimposition control. (Equivalent to #2004 G0tL (G0 time constant (linear).)	1 to 4000 (ms)
2093	plG0t1	G0 time constant for superimposi-tion control (primary delay)	Set the G0 time constant (primary delay) for superimposition control. (Equivalent to #2005 G0t1 (G0 time constant (primary delay).)	1 to 5000 (ms)
2094	plG1tL	G1 time constant for superimposi-tion control (linear)	Set the G1 time constant (linear) for superimposition control. (Equivalent to #2007 G1tL (G1 time constant (linear).)	1 to 4000 (ms)

#	Items		Details	Setting range (unit)
2095	plG1t1	G1 time constant for superimposition control (primary delay)	Set the G1 time constant (primary delay) for superimposition control. (Equivalent to #2008 G1t1 (G1 time constant (primary delay).)	1 to 5000 (ms)
2096	crncsp	Minimum corner deceleration speed	Set the minimum clamp speed for corner deceleration during the high-accuracy control mode. Normally set "0". Note: This parameter is invalid during SSS control.	0 to 1000000 (mm/min)
2099	igConr	Axis excluded from corner angle calculation	Set the axis excluded from the corner angle calculation. For example, set this for the Cs axis during spring machining.	0/1
2102	skip_tL	Skip time constant linear	Set up a linear control time constant for variable speed skip acceleration and deceleration. The time constant is validated when LC (cutting feed with linear acceleration and deceleration) or F (acceleration and deceleration by software) is selected in acceleration or deceleration mode "#2003 smgst".	1 to 4000 (ms)
2103	skip_t1	Skip time constant primary delay acceleration and deceleration by software second stage	Set up a primary-delay time constant for variable speed skip acceleration and deceleration. The time constant is validated when C1 (cutting feed with primary delay) or C3 (exponential acceleration and linear deceleration) is selected in acceleration or deceleration mode "#2003 smgst". When acceleration or deceleration by software is selected, the second-step time constant is used.	1 to 5000 (ms)

7. Servo Parameters

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

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

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

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

7.1 MDS-B-SVJ2

(1) Details for servo parameters

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

⚠ CAUTION

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

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

No.	Items		Details	Setting range
2209	SV009 IQA	Current loop q axis lead compensation	Set the gain of current loop. As this setting is determined by the motor's electrical characteristics, the setting is fixed for each type of motor. Set the standard values for all the parameters depending on each motor type.	1 to 20480
2210	SV010 IDA	Current loop d axis lead compensation		1 to 20480
2211	SV011 IQG	Current loop q axis gain		1 to 2560
2212	SV012 IDG	Current loop d axis gain		1 to 2560
2213	SV013 ILMT	Current limit value	Set the normal current (torque) limit value. (Limit values for both + and - direction.) When the value is "500" (a standard setting), the maximum torque is determined by the specification of the motor.	0 to 500 (Stall [rated] current %)
2214	SV014 ILMTsp	Current limit value in special control	Set the current (torque) limit value in a special control (initial absolute position setting, stopper control, etc). (Limit values for both of the + and - directions.) Set to "500" when not using.	0 to 500 (Stall [rated] current %)
2215	SV015 FFC	Acceleration rate feed forward gain	When a relative error in the synchronous control is large, apply this parameter to the axis that is delaying. The standard setting value is "0". For the SHG control, set to "100". To adjust a relative error in acceleration/ deceleration, increase the value by 50 to 100 at a time.	0 to 999 (%)

No.	Items		Details	Setting range
2216	SV016 LMC1	Lost motion compensation 1	Set this when the protrusion (that occurs due to the non-sensitive band by friction, torsion, backlash, etc) at quadrant change is too large. This compensates the torque at quadrant change. This is valid only when the lost motion compensation (SV027 (SSF1/lmc)) is selected.	
			Type 1: When SV027 (SSF1)/ bit9, 8 (lmc)=01 Set the compensation amount based on the motor torque before the quadrant change. The standard setting is "100". Setting to "0" means the compensation amount is zero. Normally, use Type 2.	-1 to 200 (%)
			Type 2: When SV027 (SSF1)/ bit9, 8 (lmc)=10 Set the compensation amount based on the stall (rated) current of the motor. The standard setting is double of the friction torque. Setting to "0" means the compensation amount is zero.	-1 to 100 (Stall [rated] current %)
			When you wish different compensation amount depending on the direction When SV041 (LMC2) is "0", compensate with the value of SV016 (LMC1) in both of the + and -directions. If you wish to change the compensation amount depending on the command direction, set this and SV041 (LMC2). (SV016: + direction, SV041: -direction. However, the directions may be opposite depending on other settings.) When "-1" is set, the compensation won't be performed in the direction of the command.	

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>2217
(PR)</td><td>SV017
SPEC</td><td>Servo specification selection</td><td>
<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><td></td></tr>
<tr><td>2218
(PR)</td><td>SV018
PIT</td><td>Ball screw pitch</td><td>Set the ball screw pitch. Set to “360” for the rotary axis.</td><td>1 to 32767
(mm/rev)</td></tr>
<tr><td>2219
(PR)</td><td>SV019
RNG1</td><td>Position detector resolution</td><td rowspan="2">For both parameters, set the number of pulses per one revolution of the motor detector.
<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>2220
(PR)</td><td>SV020
RNG2</td><td>Speed detector resolution</td></tr>
<tr><td>2221</td><td>SV021
OLT</td><td>Overload detection time constant</td><td>Set the detection time constant of Overload 1 (Alarm 50). Set to "60" as a standard. (For machine tool builder adjustment.)</td><td>1 to 300
(s)</td></tr>
<tr><td>2222</td><td>SV022
OLL</td><td>Overload detection level</td><td>Set the current detection level of Overload 1 (Alarm 50) in respect to the stall (rated) current. Set to "150" as a standard. (For machine tool builder adjustment.)</td><td>50 to 180
(Stall [rated] current %)</td></tr>
</table>

No.	Items		Details	Setting range
2223	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)
2224	SV024 INP	In-position detection width	Set the in-position detection width. Set the accuracy required for the machine. The lower the setting is, the higher the positioning accuracy gets, however, the cycle time (setting time) becomes longer. The standard setting is "50".	0 to 32767 (μm)

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

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 mtyp 4 5 6 7	Set the motor type.

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>(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><td></td></tr>
<tr><td>2226</td><td>SV026
OD2</td><td>Excessive error detection width during servo OFF</td><td>Set the excessive error detection width when servo ON.
For the standard setting, refer to the explanation of SV023 (OD1).
When "0" is set, the excessive error detection will not be performed.</td><td>0 to 32767
(mm)</td></tr>
<tr><td>2227</td><td>SV027
SSF1</td><td>Servo function selection 1</td><td>
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td>aflt</td><td>zrn2</td><td></td><td></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></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><td></td></tr>
<tr><td>2228</td><td>SV028</td><td></td><td>Not used. Set to "0".</td><td>0</td></tr>
<tr><td>2229</td><td>SV029</td><td></td><td>Not used. Set to "0".</td><td>0</td></tr>
</table>

No.	Items		Details	Setting range
2230	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 (%)
2231	SV031 OVS1	Overshooting compensation 1	Set this if overshooting occurs during positioning. This compensates the motor torque during positioning. This is valid only when the overshooting compensation SV027 (SSF1/ovs) is selected.	-1 to 100 (Stall [rated] current %)
			Type 1: When SV027 (SSF1)/ bit11, 10 (ovs)=01 Set the compensation amount based on the motor's stall (rated) current. Increase by 1% and determine the amount that overshooting doesn't occur. In Type 1, compensation during the feed forward control during circular cutting won't be performed.	
			Type 2: When SV027 (SSF1)/ bit11, 10 (ovs)=10 Use this if you perform the overshooting compensation during the feed forward control during circular cutting. The setting method is the same in Type 1.	
			When you wish different compensation amount depending on the direction When SV042 (OVS2) is "0", compensate with the value of SV031 (OVS1) in both of the + and -directions. If you wish to change the compensation amount depending on the command direction, set this and SV042 (OVS2). (SV031: + direction, SV042: - direction. However, the directions may be opposite depending on other settings.) When "-1" is set, the compensation won't be performed in the direction of the command.	
2232	SV032 TOF	Torque offset	Set the unbalance torque of vertical axis and inclined axis.	-100 to 100 (Stall [rated] current %)

No.	Items		Details	Setting range
2233	SV033 SSF2	Servo function selection 2		

F	E	D	C	B	A	9	8
				afs			

7	6	5	4	3	2	1	0
		fhz2		nfd			

bit		Meaning when "0" is set	Meaning when "1" is set
0 1 2 3	nfd	Set the filter depth for Notch filter (SV038: FHz1). The control is stabilized by making the filter shallower. Value 0 2 4 6 8 A C E Depth (dB) Infntly deep -18.1 -12.0 -8.5 -6.0 -4.1 -2.5 -1.2 Deep← → Shallow	
4 5	fhz2	Set the operation frequency of Notch filter 2. 00: No operation 01:2250Hz 10:1125Hz 11:750Hz	
6			
7			
8 9 A B	afs	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.	
C			
D			
E			
F			

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

No.	Items		Details	Setting range
2234	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	mon	NC servo monitor MAX current display data changeover	
1			
2			
3			
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			

Set-ting	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
2235	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 D E	clG1	Collision detection method 1 Set the collision detection level during cutting feed (G1). The G1 collision detection level=SV060*clG1. When clG1=0, the collision detection method 1 during cutting feed won't function.	
F	cl2n	Collision detection method 2 valid	Collision detection method 2 invalid

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

No.	Items		Details	Setting range
2236 (PR)	SV036 PTYP	Regenera-tive resistor type		

F	E	D	C	B	A	9	8
amp				rtyp			

7	6	5	4	3	2	1	0
emgx							

bit		Explanation
0		Always set to "0(0000) ".
1		
2		
3		
4	emgx	Set the external emergency stop function. (Setting is prohibited for values with no description.)
5		
6		
7		
8	rtyp	Set the regenerative resistor type.
9		
A		
B		
C	amp	Always set to "0(0000) ".
D		
E		
F		

Set-ting	Explanation
0	External emergency stop invalid
4	External emergency stop valid

Set-ting	Explanation
0	Drive unit standard built-in resistor (SVJ2-01 doesn't have a built-in resistor)
1	Setting prohibited
2	MR-RB032
3	MR-RB12 or GZG200W390HMK
4	MR-RB32 or GZG200W1200HMK: 3 units connected in parallel
5	MR-RB30 or GZG200W390HMK: 3 units connected in parallel
6	MR-RB50 or GZG300W390HMK: 3 units connected in parallel
7 to F	Setting prohibited

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

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

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

(2) Initial setting value

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

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

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

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

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

(b) HA**N series

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

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

(c) HC-SF series

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

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

(d) HC-RF/HA-FF series

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

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

(e) HC-MF series

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

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

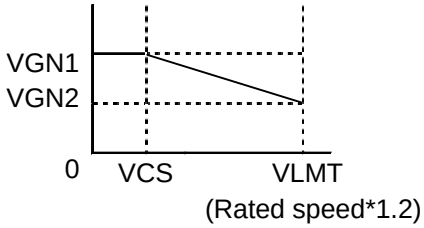
7.2 MDS-C1-Vx High-gain (MDS-B-Vx4 Compatible)

(1) Details for servo parameters

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

⚠ CAUTION

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

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

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

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

No.	Items		Details	Setting range
2217 (PR)	SV017 SPEC	Servo specification selection		

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

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

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

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>2218 (PR)</td><td>SV018 PIT</td><td>Ball screw pitch</td><td>Set the ball screw pitch. Set to “360” for the rotary axis.</td><td>1 to 32767 (mm/rev)</td></tr>
<tr><td rowspan="2">2219 (PR)</td><td rowspan="2">SV019 RNG1</td><td rowspan="2">Position detector resolution</td><td>In the case of the semi-closed loop control
Set the same value as SV020 (RNG2). (Refer to the explanation of SV020.)</td><td>1 to 9999 (kp/rev)</td></tr>
<tr><td>In the case of the semi-closed loop control
Set the same value as SV020 (RNG2). (Refer to the explanation of SV020.)</td><td>1 to 9999 (kp/pit)</td></tr>
<tr><td colspan="4">
<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>2220 (PR)</td><td>SV020 RNG2</td><td>Speed detector resolution</td><td>Set the number of pulses per one revolution of the motor end detector.
<table>
<tr><th>Detector model name</th><th>SV020 setting</th></tr>
<tr><td>OSE104, OSA104</td><td>100</td></tr>
<tr><td>OSE105, OSA105</td><td>1000</td></tr>
</table>
</td><td>1 to 9999 (kp/rev)</td></tr>
<tr><td>2221</td><td>SV021 OLT</td><td>Overload detection time constant</td><td>Set the detection time constant of Overload 1 (Alarm 50). Set to "60" as a standard. (For machine tool builder adjustment.)</td><td>1 to 999 (s)</td></tr>
<tr><td>2222</td><td>SV022 OLL</td><td>Overload detection level</td><td>Set the current detection level of Overload 1 (Alarm 50) in respect to the stall (rated) current. Set to "150" as a standard. (For machine tool builder adjustment.)</td><td>110 to 500 (Stall [rated] current %)</td></tr>
</table>

No.	Items		Details	Setting range
2223	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)
2224	SV024 INP	In-position detection width	Set the in-position detection width. Set the accuracy required for the machine. The lower the setting is, the higher the positioning accuracy gets, however, the cycle time (setting time) becomes longer. The standard setting is “50”.	0 to 32767 (μm)

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

F	E	D	C	B	A	9	8
pen				ent			

7	6	5	4	3	2	1	0
mtyp							

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

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

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

(Continued to the next page)

No.	Items	Details	Setting range

(Continued from the previous page)

bit: Explanation

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

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

8 9 A B ent / C D E F pen

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".

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

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

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

No.	Items		Details	Setting range
2233	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
nfd2			nf3	nfd1			zck

bit		Meaning when "0" is set	Meaning when "1" is set
0	zck	Z phase check valid (Alarm 42)	Z phase check invalid
1 2 3	nfd1	Set the filter depth for Notch filter 1 (SV038). 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	
4	nf3	Notch filter 3 stop	Notch filter 3 start (1125Hz)
5 6 7	nfd2	Set the operation frequency of Notch filter 2 (SV046). 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	
8 9	svx hvx	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	
A			
B			
C D E F	dos	Digital signal output selection 0 : MP scale absolute position detection, offset demand signal output 1 : Specified speed signal output 2 to F : Setting prohibited	

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

No.	Items		Details	Setting range
2234	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			mohn	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	mohn	MDS-B-HR motor thermal valid	MDS-B-HR motor thermal ignored
3			
4			
5	zeg	Z phase normal edge detection (Setting for normal use)	Z phase reverse edge detection (Valid only when SV027/bit6=1)
6	os2	Setting for normal use	Overspeed detection level changeover
7			
8			
9			
A			
B			
C D E F	ovsn	Set the non-sensitive band of the overshooting compensation type 3 in increments of 2µm at a time. In the feed forward control, the non-sensitive band of the model position droop is set, and overshooting of the model is ignored. Set the same value as the standard SV040.	

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

No.	Items		Details	Setting range
2235	SV035 SSF4	Servo function selection 4		

F	E	D	C	B	A	9	8
clt	clG1			cl2n	clet	cltq	
7	6	5	4	3	2	1	0
ckab	iup	tdt					

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

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

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>2236
(PR)</td><td>SV036
PTYP</td><td>Power supply 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="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><td></td></tr>
<tr><td>2237</td><td>SV037
JL</td><td>Load inertia scale</td><td>Set "the motor inertia + motor axis conversion load inertia" in respect to the motor inertia.
$SV037\ (JL) = \frac{Jl+Jm}{Jm} * 100$
Jm: Motor inertia
Jl: Motor axis conversion load inertia</td><td>0 to 5000
(%)</td></tr>
<tr><td>2238</td><td>SV038
FHz1</td><td>Notch filter frequency 1</td><td>Set the vibration frequency to suppress if machine vibration occurs.
(Valid at 36 or more) When not using, set to "0".</td><td>0 to 9000
(Hz)</td></tr>
</table>

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

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

No.	Items		Details	Setting range
2254	When SV035 (SSF4)/ bitF (ckab)=0			-1 to 32767 (mm)
	SV054 ORE	Overrun detection width in closed loop control	Set the overrun detection width in the full-closed loop control. If the gap between the motor end detector and the linear scale (machine end detector) exceeds the value set by this parameter, it is judged to be overrun and Alarm 43 will be detected. When "-1" is set, the alarm detection won't be performed. When "0" is set, overrun is detected with a 2mm width.	
	When SV035 (SSF4)/ bitF (ckab)=1 (Note) This applies to only MDS-C1-Vx. The higher order 8bits and lower order 8bits are used for different functions. "Setting value of SV054" =(NSE*256)+ORE			0 to 32767
	SV054 ORE (Low order)	Overrun detection-width in closed loop control	Set the overrun detection width in the full-closed loop control. If the gap between the motor end detector and the linear scale (machine end detector) exceeds the value set by this parameter, it is judged to be overrun and Alarm 43 will be detected. When "255" is set, the alarm detection won't be performed. When "0" is set, overrun is detected with a 2mm width.	0 to 255 (mm)
	SV054 NSE (High order)	Special detection width for No signal 2	When SV035 (SSF4)/ bitF (ckab) =1, this setting is valid. Set the special detection width for No signal 2 (Alarm 21). When "0" is set, overrun is detected with a 15µm width.	0 to 127 (µm)
2255	SV055 EMGx	Max. gate off delay time after emergency stop	Set a length of time from the point when the emergency stop is input to the point when READY OFF is compulsorily executed. Normally, set the same value as the absolute value of SV056. In preventing the vertical axis from dropping, the gate off is delayed for the length of time set by SV048 if SV055's value is smaller than that of SV048.	0 to 20000 (ms)
2256	SV056 EMGt	Deceleration time constant at emergency stop	In the vertical axis drop prevention time control, set the time constant used for the deceleration control at emergency stop. Set a length of time that takes from rapid traverse rate (rapid) to stopping. Normally, set the same value as the rapid traverse acceleration/deceleration time constant. When executing the synchronous operation, put the minus sign to the settings of both of the master axis and slave axis.	-20000 to 20000 (ms)
2257	SV057 SHGC	SHG control gain	When performing the SHG control, set this with S003 (PGN1) and SV004 (PGN2). When not performing the SHG control, set to "0".	0 to 1200 (rad/s)
2258	SV058 SHGCsp	SHG control gain in spindle synchronous control	Set this with SV049 (PGN1sp) and SV050 (PGN2sp) if you wish to perform the SHG control in the spindle synchronous control (synchronous tapping, synchronous control with spindle/C axis). When not performing the SHG control, set to "0".	0 to 1200 (rad/s)

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

(2) Initial setting value

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

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

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

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

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

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

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

(b) HA**N series

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

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

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

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

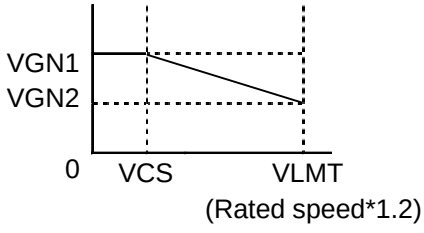
7.3 MDS-C1-Vx Standard Specification (MDS-B-Vx Compatible)

(1) Details for servo parameters

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

CAUTION

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

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

No.	Items		Details	Setting range
2207	SV007 VIL	Speed loop delay compensation	Set this when the limit cycle occurs in the full-closed loop, or overshooting occurs in positioning. Select the control method with SV027 (SSF1)/bit1, 0 (vcnt). Normally, use "Changeover type 2". When you set this parameter, make sure to set the torque offset (SV032 (TOF)). When not using, set to "0".	0 to 32767
			No changeover When SV027 (SSF1)/ bit1, 0 (vcnt)=00 The delay compensation control is always valid.	
			Changeover type 1 When SV027 (SSF1)/ bit1, 0 (vcnt)=01 The delay compensation control works when the command from the NC is "0". Overshooting that occurs during pulse feeding can be suppressed.	
			Changeover type 2 When SV027 (SSF1)/ bit1, 0 (vcnt)=10 The delay compensation control works when the command from the NC is "0" and the position droop is "0". Overshooting or the limit cycle that occurs during pulse feeding or positioning can be suppressed.	
2208	SV008 VIA	Speed loop lead compensation	Set the gain of the speed loop integration control. The standard setting is "1364". During the SHG control, the standard setting is "1900". Adjust the value by increasing/decreasing it by about 100 at a time. Raise this value to improve contour tracking precision in high-speed cutting. Lower this value when the position droop vibrates (10 to 20Hz).	1 to 9999
2209	SV009 IQA	Current loop q axis lead compensation	Set the gain of current loop. As this setting is determined by the motor's electrical characteristics, the setting is fixed for each type of motor. Set the standard values for all the parameters depending on each motor type.	1 to 20480
2210	SV010 IDA	Current loop d axis lead compensation		1 to 20480
2211	SV011 IQG	Current loop q axis gain		1 to 2560
2212	SV012 IDG	Current loop d axis gain		1 to 2560
2213	SV013 ILMT	Current limit value	Set the normal current (torque) limit value. (Limit values for both + and - direction.) When the value is "500" (a standard setting), the maximum torque is determined by the specification of the motor.	0 to 999 (Stall [rated] current %)
2214	SV014 ILMTsp	Current limit value in special control	Set the current (torque) limit value in a special control (initial absolute position setting, stopper control, etc). (Limit values for both of the + and - directions.) Set to "500" when not using.	0 to 999 (Stall [rated] current %)

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

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>2217
(PR)</td><td>SV017
SPEC</td><td>Servo specification selection</td><td>
<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>
<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>2218
(PR)</td><td>SV018
PIT</td><td>Ball screw pitch</td><td>Set the ball screw pitch. Set to "360" for the rotary axis.</td><td>1 to 32767
(mm/rev)</td></tr>
</table>

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

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

2225 (PR) SV025 MTYP Motor/ Detector type

F	E	D	C	B	A	9	8
pen				ent			

7	6	5	4	3	2	1	0
mtyp							

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

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

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

(To be continued to the next page)

(Continued from the previous page)

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

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

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

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

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

<table>
<tr><th>No.</th><th colspan="2">Items</th><th>Details</th><th>Setting range</th></tr>
<tr><td>2232</td><td>SV032
TOF</td><td>Torque offset</td><td>Set the unbalance torque of vertical axis and inclined axis.</td><td>-100 to 100
(Stall [rated] current %)</td></tr>
<tr><td>2233</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="4">fhz2</td><td colspan="2">nfd</td><td>zck</td></tr>
</table>
<table>
<tr><th colspan="2">bit</th><th>Meaning when "0" is set</th><th>Meaning when "1" is set</th></tr>
<tr><td>0</td><td>zck</td><td>Z phase check valid (Alarm 42)</td><td>Z phase check invalid</td></tr>
<tr><td>1
2
3</td><td>nfd1</td><td colspan="2">Set the filter depth for Notch filter 1 (SV038).
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</td></tr>
<tr><td>4
5
6
7</td><td>fhz2</td><td colspan="2">Set the operation frequency of Notch filter 2.
0: Invalid 3: 750Hz 6: 375Hz
1: 2250Hz 4: 563Hz 7: 321Hz
2: 1125Hz 5: 450Hz 8 to F: 281Hz</td></tr>
<tr><td>8
9</td><td>svx
hvx</td><td colspan="2">Set the performance mode of the servo control. (Only for MDS-C1-Vx)
00: By current loop gain
01: MDS-B-Vx compatible mode selected
10: High gain mode selected
11: High gain mode selected</td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C
D
E
F</td><td>dos</td><td colspan="2">Digital signal output selection
0 : MP scale absolute position detection, offset demand signal output
1 : Specified speed signal output
2 to F : Setting prohibited</td></tr>
</table>
(Note) Set to "0" for bits with no particular description.
</td><td></td></tr>
</table>

No.	Items		Details	Setting range
2234	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
2235	SV035 SSF4	Servo function selection4		

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

7	6	5	4	3	2	1	0
	iup	tdt					

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

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

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

F	E	D	C	B	A	9	8
amp				rtyp			

7	6	5	4	3	2	1	0
ptyp							

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

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

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

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

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

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

No.	Items		Details	Setting range
2246	SV046		Not used. Set to “0”.	0
2247	SV047 EC	Inductive voltage compensation gain	Set the inductive voltage compensation gain. Set to "100" as a standard. If the current FB peak exceeds the current command peak, lower the gain.	0 to 200 (%)
2248	SV048 EMGrt	Vertical axis drop prevention time	Input a length of time to prevent the vertical axis from dropping by delaying Ready OFF until the brake works when the emergency stop occurs. Increase the setting by 100ms at a time and set the value where the axis does not drop.	0 to 20000 (ms)
2249	SV049 PGN1sp	Position loop gain 1 in spindle synchronous control	Set the position loop gain during the spindle synchronous control (synchronous tapping, synchronous control with spindle/C axis). Set the same value as the value of the spindle parameter, position loop gain in synchronous control. When performing the SHG control, set this with SV050 (PGN2sp) and SV058 (SHGCsp).	1 to 200 (rad/s)
2250	PGN2sp	Position loop gain 2 in spindle synchronous control	Set this with SV049 (PGN1sp) and SV058 (SHGCsp) if you wish to perform the SHG control in the spindle synchronous control (synchronous tapping, synchronous control with spindle/C axis). When not performing the SHG control, set to "0".	0 to 999 (rad/s)
2251	SV051 DFBT	Dual feed back control time constant	Set the control time constant in dual feed back. When "0" is set, the actual value that is set is 1ms. The higher the time constant is, the closer it gets to the semi-closed control, so the limit of the position loop gain is raised.	0 to 9999 (ms)
2252	SV052 DFBN	Dual feedback control non-sensitive band	Set the non-sensitive band in the dual feedback control. Set to "0" as a standard.	0 to 9999 (μm)
2253	SV053 OD3	Excessive error detection width in special control	Set the excessive error detection width when servo ON in a special control (initial absolute position setting, stopper control, etc.). If "0" is set, excessive error detection won't be performed when servo ON during a special control.	0 to 32767 (mm)
2254	SV054 ORE	Overrun detection width in closed loop control	Set the overrun detection width in the full-closed loop control. If the gap between the motor end detector and the linear scale (machine end detector) exceeds the value set by this parameter, it is judged to be overrun and Alarm 43 will be detected. When "-1" is set, the alarm detection won't be performed. When "0" is set, overrun is detected with a 2mm width.	-1 to 32767 (mm)
2255	SV055 EMGx	Max. gate off delay time after emergency stop	Set a length of time from the point when the emergency stop is input to the point when READY OFF is compulsorily executed. Normally, set the same value as the absolute value of SV056. In preventing the vertical axis from dropping, the gate off is delayed for the length of time set by SV048 if SV055's value is smaller than that of SV048.	0 to 20000 (ms)

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

(2) Initial setting value

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

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

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

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

Motor		HC 53	HC 103	HC 153	HC 203	HC 353	HC 453	HC 703	HC 103R	HC 153R	HC 203R	HC 353R
Drive unit capacity		05	10	20	35	45	70	90	10	10	20	35
SV033	SSF2	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV034	SSF3	0003	0003	0003	0003	0003	0003	0003	0000	0000	0000	0000
SV035	SSF4	0000	0000	0040	0040	0040	0040	0040	0000	0000	0000	0000
SV036	PTYP	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
SV037	JL	0	0	0	0	0	0	0	0	0	0	0
SV038	FHz1	0	0	0	0	0	0	0	0	0	0	0
SV039	LMCD	0	0	0	0	0	0	0	0	0	0	0
SV040	LMCT	0	0	0	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

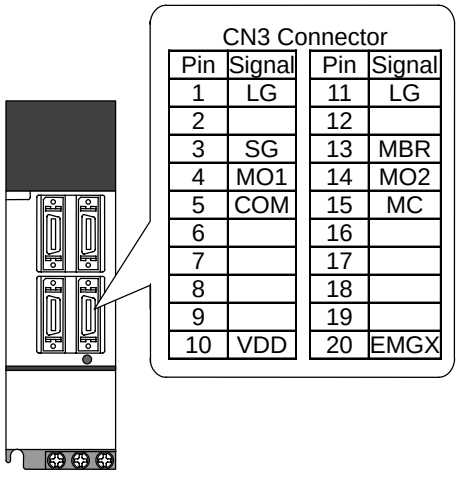
7.4 Supplement

7.4.1 D/A Output Specifications

(1) MDS-B-SVJ2

(a) D/A output specifications

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



(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 (FΔT)	10000(mm/min) / V	888µs
15	Feedrate (FΔT 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

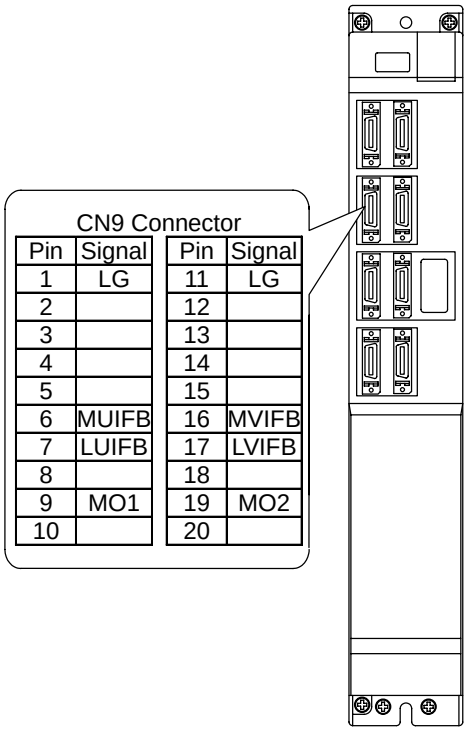
(Example 1) When SV061 = 5, SV063 = 2560
The V-phase current value will be output with 1 A/V unit to D/A output ch.1.

(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".



(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)

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

(c) Setting the output scale

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

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

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

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

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

7.4.2 Electronic Gears

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:

$$\frac{RNG1 \times PC2}{PIT \times PC1 \times IUNIT}$$

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

For closed loop:

$$\frac{PGN1 \times RNG2 \times PC2}{30 \times RNG1 \times PC1}$$

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.

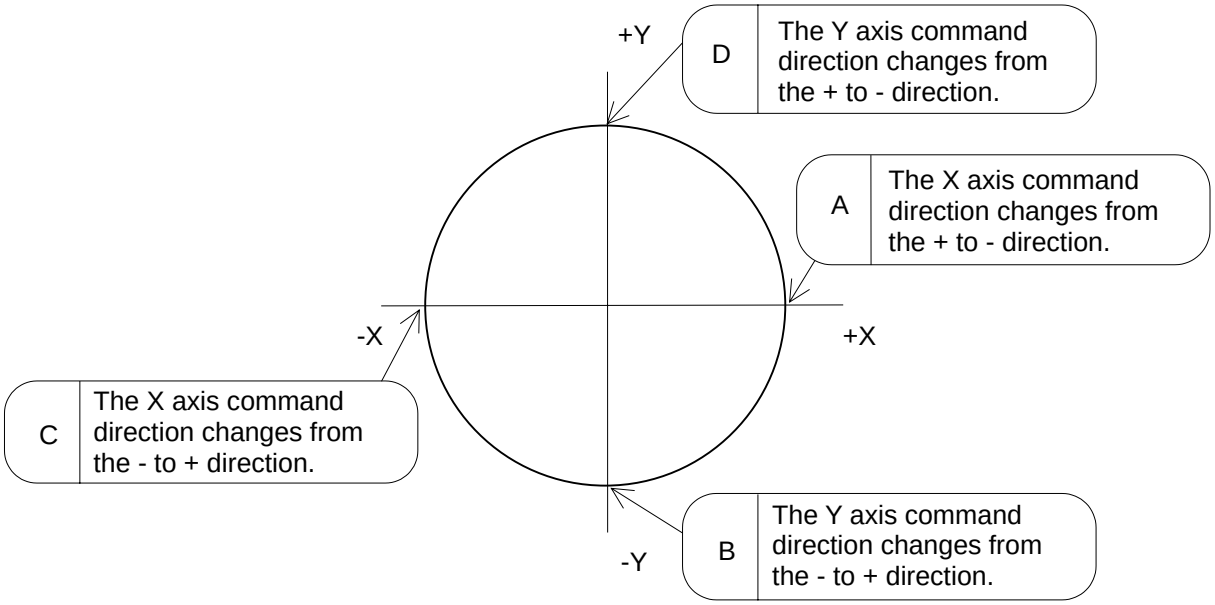
7.4.3 Lost Motion Compensation

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

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

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

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



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

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

8. 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 Instruction Manual for each CNC and the following spindles.

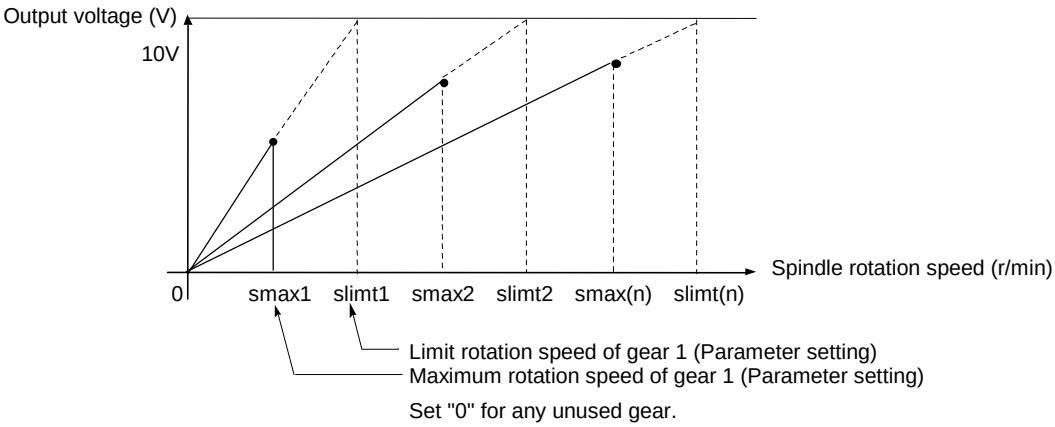
MELDAS AC Servo and Spindle MDS-A Series MDS-B Series Specifications Manual BNP-B3759

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

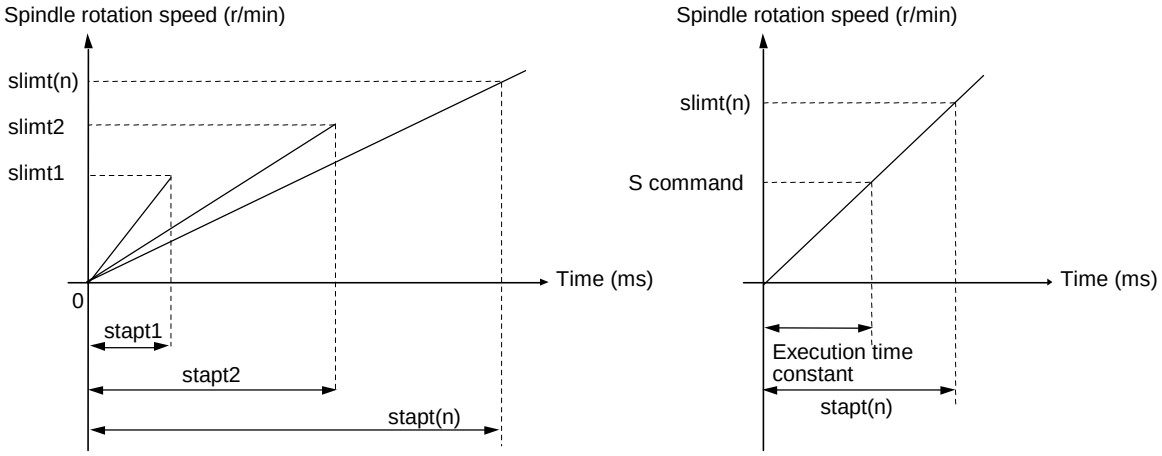
For parameters indicated with a (PR) in the table, turn the NC power OFF after setting. The setting is validated after the power is turned ON again.

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

Relationship between spindle limit rotation speed and maximum spindle rotation speed



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



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

#	Items		Details	Setting range (Unit)
3029	tapsel	Asynchronous tap gear selection	Specify whether to use the tap rotation speed or maximum rotation speed for the gear that is selected when an asynchronous tap command is issued. 0: Tap rotation speed 1: Maximum rotation speed This parameter is valid only when the M-function synchronous tap cycle enable parameter (#1272 ext08 bit1) is ON.	0/1
3030 (PR)	mbsel	Selection of magnetic bearings	Select whether to use magnetic bearings. 0: Magnetic bearings invalid 1: Magnetic bearings valid	0/1
3031 (PR)	smcp_no	Amplifier I/F channel No. (spindle)	Using a 4-digit number, set the amplifier interface channel No. and which axis in that channel is to be used when connecting a spindle amplifier. High-order two digits : Amplifier interface channel No. Low-order two digits : Axis No. When using the conventional fixed layout, set all axes to "0000". Set "0000" when using an analog spindle.	0000 0101 to 0107 0201 to 0207
3032 (PR)	mbmcp_no	Amplifier I/F channel No. (magnetic bearing)	Using a 4-digit number, set the amplifier interface channel No. and which axis in that channel is to be used when connecting a magnetic bearing amplifier. High-order two digits : Amplifier interface channel No. Low-order two digits : Axis No. When using the conventional fixed layout, set all axes to "0000".	0000 0101 to 0107 0201 to 0207
3036	tap_errm	Synchronous tap tolerable error width	Set the tolerable value for synchronous tap error width. When "0" is set, synchronous tap error monitoring will not be executed.	0 to 1000 (µs)
3037 3038 3039 3040	taps21 22 23 24	Synchronous tap switching spindle speed 2	Set the spindle rotation speed at which the step-2 acceleration/deceleration time constant is to be switched at gear 00, 01, 10, or 11.	0 to 99999 (r/min)
3041 3042 3043 3044	tapt 21 22 23 24	Synchronous tap switching time constant 2	Set the time constant to reach synchronous tap switching spindle rotation speed 2 (#3037 to #3040) at gear 00, 01, 10, or 11.	1 to 5000 (ms)
3045 3046 3047 3048	tapt 31 32 33 34	Synchronous tap switching time constant 3	Set the time constant to reach the maximum rotation speed (#3005 to #3008) at gear 00, 01, 10, or 11.	1 to 5000 (ms)

#	Items		Details	Setting range (Unit)
3049	spt	Spindle synchroniza-tion acceleration/ deceleration time constant	Set the acceleration/deceleration time constant for when the spindle synchronization command's rotation speed changes during spindle synchronous control.	0 to 9999 (ms)
3050	sprlv	Spindle synchroniza-tion rotation speed attainment level	The spindle rotation speed synchronization complete signal will turn ON when the difference of the reference spindle and synchronous spindle actual rotation speeds is less than the level set for the synchronous spindle rotation speed command value during spindle synchronous control.	0 to 4095 (pulse) (1 pulse = 0.088°)
3051	spplv	Spindle phase synchroniza-tion attainment level	The spindle phase synchronization complete signal will turn ON when the phase difference of the reference spindle and synchronous spindle is less than the set level during spindle phase synchronization control.	0 to 4095 (pulse) (1 pulse = 0.088°)
3052	spplr	Spindle motor spindle relative polarity	Set the spindle motor and spindle's relative polarity. Spindle CW rotation at motor CW rotation: Positive polarity Spindle CCW rotation at motor CW rotation: Negative polarity	0: Positive polarity 1: Negative polarity
3053	sppst	Spindle encoder Z -phase position	Set the deviation amount from the spindle's reference position to the spindle encoder's Z phase. The deviation amount is obtained using the clockwise direction looking from the front of the spindle as the positive direction.	0 to 359999 (1/1000°)
3054	sptc1	Spindle synchroniza-tion multi-step acceleration/ deceleration changeover speed 1	Set the spindle speed for changing the 1st step's acceleration/deceleration time constant.	0 to 99999 (r/min)

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

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

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

8.2 MDS-B-SPJ2

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

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

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

⚠ CAUTION

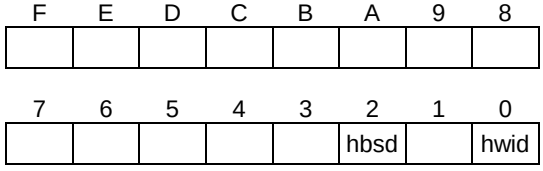
⚠ Do not make remarkable adjustments or changes of the parameters as the operation may become unstable.

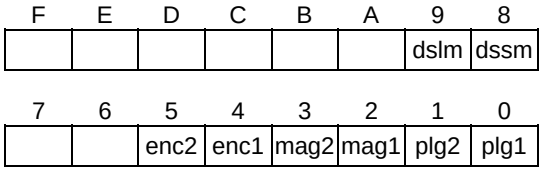
⚠ In the explanation on bits, set all bits not used, including blank bits, to “0”.

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

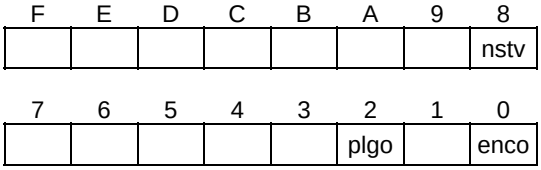
No.	Items			Details	Setting range	Standard setting
3210	SP010	PGS	Spindle synchronous position loop gain	Set the spindle position loop gain in spindle synchronization mode.	1 to 100 (1/s)	15
3211 to 3216	SP011 to SP016			Use not possible.	0	0
3217 (PR)	SP017	TSP	Maximum motor speed	Set the maximum motor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

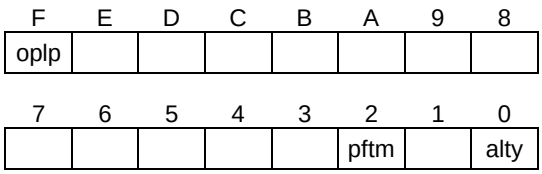
<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3233
(PR)</td><td>SP033</td><td>SFNC1</td><td>Spindle function 1</td><td>Set the spindle function 1 in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td>poff</td><td>hzs</td><td></td><td>ront</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>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="6">This is a fixed control bit.</td><td rowspan="6"></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>3234
(PR)</td><td>SP034</td><td>SFNC2</td><td>Spindle function 2</td><td>Set the spindle function 2 in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></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></td><td></td><td></td></tr>
<tr><td>2</td><td></td><td></td><td></td></tr>
<tr><td>3</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td></td><td></td><td></td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td></td><td></td><td></td></tr>
<tr><td>9</td><td></td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td></td><td></td><td></td></tr>
<tr><td>E</td><td></td><td></td><td></td></tr>
<tr><td>F</td><td></td><td></td><td></td></tr>
</table>
(Note1) To validate bit3(mkc2), NC side needs to prepare.
(Note1) Always turn the bit2 at the same time to use bit3.</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>3235
(PR)</td><td>SP035</td><td>SFNC3</td><td>Spindle function3</td><td>Set the spindle function 3 in bit units.
 

(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>hwid</td><td>H-coil wide-range constant output invalid</td><td>H-coil wide-range constant output valid</td></tr>
<tr><td>1</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>hbsd</td><td>H-coil base slide invalid</td><td>H-coil base slide valid</td></tr>
<tr><td>3</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td></td><td></td><td></td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td></td><td></td><td></td></tr>
<tr><td>9</td><td></td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td></td><td></td><td></td></tr>
<tr><td>E</td><td></td><td></td><td></td></tr>
<tr><td>F</td><td></td><td></td><td></td></tr>
</table></td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
<tr><td>3236
(PR)</td><td>SP036</td><td>SFNC4</td><td>Spindle function 4</td><td>Set the spindle function 4 in bit units.
 

(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>3237
(PR)</td><td>SP037</td><td>SFNC5</td><td>Spindle function 5</td><td>Set the spindle function 5 in bit units.
 

(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>
<tr><td>3238
(PR)</td><td>SP038</td><td>SFNC6</td><td>Spindle function 6</td><td>Set the spindle function 6 in bit units.
 

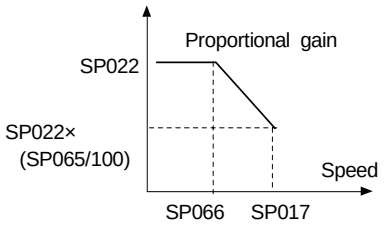
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>alty</td><td>Deceleration stop during special alarm invalid</td><td>Deceleration stop during special alarm valid</td></tr>
<tr><td>1</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>pftm</td><td>Thread cutting position data invalid</td><td>Thread cutting position data 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>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>
</table>

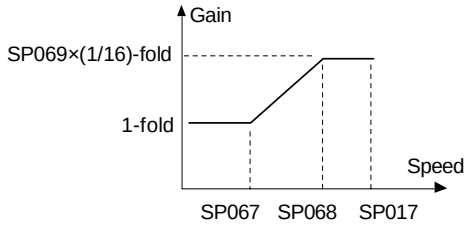
<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3239
(PR)</td><td>SP039</td><td>ATYP</td><td>Amplifier type</td><td>Set the amplifier type.
Set each amplifier type or "0".
This parameter corresponds to MDS-B-SPJ2.

<table><tr><th>Parameter setting</th><th>Amplifier type</th></tr><tr><td>0000</td><td>--</td></tr><tr><td>0001</td><td>SPJ2-02</td></tr><tr><td>0002</td><td>SPJ2-04</td></tr><tr><td>0003</td><td>SPJ2-075</td></tr><tr><td>0004</td><td>SPJ2-15</td></tr><tr><td>0005</td><td>SPJ2-22</td></tr><tr><td>0006</td><td>SPJ2-37</td></tr><tr><td>0007</td><td>SPJ2-55</td></tr><tr><td>0008</td><td>SPJ2-75</td></tr><tr><td>0009</td><td>SPJ2-110/110C</td></tr></table></td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
<tr><td>3240
(PR)</td><td>SP040</td><td>MTYP</td><td>Motor type</td><td>This is valid when SP034 (SFNC2) bit 0 is set to 0.
Refer to the following standard motors, and set the applicable motor number.

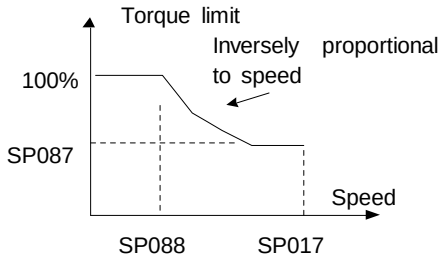
<table><tr><th>Parameter setting</th><th>Motor type</th><th>Maximum speed</th><th>Corresponding amplifier</th></tr><tr><td>1000</td><td></td><td></td><td></td></tr><tr><td>1001</td><td>SJ-P0.2A</td><td>10000 r/min</td><td>SPJ2-02</td></tr><tr><td>1002</td><td>SJ-P0.4A</td><td>10000 r/min</td><td>SPJ2-04</td></tr><tr><td>1003</td><td>SJ-P0.75A</td><td>10000 r/min</td><td>SPJ2-075</td></tr><tr><td>1004</td><td>SJ-P1.5A</td><td>10000 r/min</td><td>SPJ2-15</td></tr><tr><td>1005</td><td>SJ-P2.2A</td><td>8000 r/min</td><td>SPJ2-22</td></tr><tr><td>1006</td><td>SJ-P3.7A</td><td>8000 r/min</td><td>SPJ2-37</td></tr><tr><td>1007</td><td>SJ-PF5.5-01</td><td>8000 r/min</td><td>SPJ2-55</td></tr><tr><td>1008</td><td>SJ-PF7.5-01</td><td>8000 r/min</td><td>SPJ2-75</td></tr><tr><td>1009</td><td>SJ-PF11-01</td><td>6000 r/min</td><td>SPJ2-110/110C</td></tr></table></td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
</table>

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

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

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

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

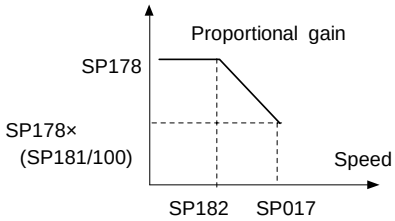
No.	Items			Details	Setting range	Standard setting
3276	SP076			Not used. Set to "0".	0	0
3277	SP077	TDSL	Fixed control constant	Set by Mitsubishi. Set "0" unless designated in particular.	0	0
3278 (PR)	SP078	FPWM				
3279 (PR)	SP079	ILMT				
3280	SP080					
3281	SP081	LMCA				
3282	SP082	LMCB				
3283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

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3296
(PR)</td><td>SP096</td><td>EGAR</td><td>Encoder gear ratio</td><td>Set the gear ratio between the spindle end and the encoder end (except for the motor-built-in encoder) as indicated below.
<table>
<tr><th>Setting value</th><th>Gear ratio (deceleration)</th><th>Setting value</th><th>Gear ratio (Acceleration)</th></tr>
<tr><td>0</td><td>1 : 1</td><td>–1</td><td>1 : 2</td></tr>
<tr><td>1</td><td>1 : 1/2</td><td>–2</td><td>1 : 4</td></tr>
<tr><td>2</td><td>1 : 1/4</td><td>–3</td><td>1 : 3</td></tr>
<tr><td>3</td><td>1 : 1/8</td><td></td><td></td></tr>
<tr><td>4</td><td>1 : 1/16</td><td></td><td></td></tr>
</table></td><td>-3 to 4</td><td>0</td></tr>
<tr><td>3297
(PR)</td><td>SP097</td><td>SPECO</td><td>Orientation specifica-tion</td><td>Set the orientation specifications in bit units.
<table>
<tr><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>tlet</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>dmin</td><td>odi2</td><td>odi1</td></tr>
</table>
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>odi1</td><td colspan="2" rowspan="2">Orientation rotation direction
00: Previous (the direction in which the motor has so far rotated under speed control)
01: Forward rotation
10: Backward rotation
11: Prohibited (Same as setting value = 10)</td></tr>
<tr><td>1</td><td>odi2</td></tr>
<tr><td>2</td><td>dmin</td><td>Dummy in-position invalid</td><td>Dummy in-position valid</td></tr>
<tr><td>3</td><td>pyfx</td><td>Excitation min. (50%) during orientation servo lock invalid</td><td>Excitation min. (50%) during orientation servo lock valid</td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td>fdir</td><td>Encoder detector polarity: +</td><td>Encoder detector polarity: -</td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td></tr>
<tr><td>8</td><td>tlet</td><td>Turret indexing invalid</td><td>Turret indexing valid</td></tr>
<tr><td>9</td><td></td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td><td></td></tr>
<tr><td>D</td><td></td><td></td><td></td></tr>
<tr><td>E</td><td></td><td></td><td></td></tr>
<tr><td>F</td><td></td><td></td><td></td></tr>
</table></td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
<tr><td>3298
(PR)</td><td>SP098</td><td>VGOP</td><td>Speed loop gain propor-tional term in orientation mode</td><td>Set the speed loop proportional gain in orientation mode.
When the gain is increased, rigidity is improved in the orientation stop but vibration and sound become larger.</td><td>0 to 1000 (1/s)</td><td>63</td></tr>
<tr><td>3299
(PR)</td><td>SP099</td><td>VGOI</td><td>Orientation mode speed loop gain integral term</td><td>Set the speed loop integral gain in orientation mode.</td><td>0 to 1000 (0.1 1/s)</td><td>60</td></tr>
<tr><td>3300
(PR)</td><td>SP100</td><td>VGOD</td><td>Orientation mode speed loop gain delay advance term</td><td>Set the a loop gain delay advance gain in orientation mode.
When this parameter is set to "0", PI control is exercised.</td><td>0 to 1000 (0.1 1/s)</td><td>15</td></tr>
</table>

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

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

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

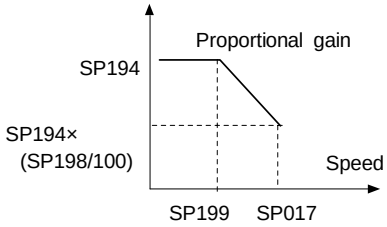
No.	Items			Details	Setting range	Standard setting
3382 (PR)	SP182	VCSS	Change starting speed of variable speed loop proportional gain at spindle synchroniza-tion	Set the speed for starting change of speed loop proportional gain at spindle synchronization.  	0 to 32767 (r/min)	0
3383	SP183	SYNV	Sync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

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3393
(PR)</td><td>SP193</td><td>SPECT</td><td>Synchronous tapping specifications</td><td>Set the synchronous tapping specifications in bit units.

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

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

(Note) Always set "0" for the empty bits.
<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></td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
<tr><td>3394
(PR)</td><td>SP194</td><td>VGTP</td><td>Synchronous tapping speed loop gain propor-tional 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>3395
(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>3396
(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>3397</td><td>SP197</td><td></td><td></td><td>Not used. Set to "0".</td><td>0</td><td>0</td></tr>
<tr><td>3398
(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
3399 (PR)	SP199	VCST	Change starting speed of variable speed loop proportional gain at synchronous tapping	Set the speed for starting change of speed loop proportional gain at synchronous tapping.  	0 to 32767 (r/min)	0
3400 (PR)	SP200	FFC1	Synchronous tapping acceleration feed forward gain (gear 1)	Set the acceleration feed-forward gain for selection of gear 000 at synchronous tapping. This parameter should be used when an error of relative position to Z-axis servo is large.	0 to 1000 (%)	0
3401 (PR)	SP201	FFC2	Synchronous tapping acceleration feed forward gain (gear 2)	Set the acceleration feed-forward gain for selection of gear 001 at synchronous tapping.	0 to 1000 (%)	0
3402 (PR)	SP202	FFC3	Synchronous tapping acceleration feed forward gain (gear 3)	Set the acceleration feed-forward gain for selection of gear 010 at synchronous tapping.	0 to 1000 (%)	0
3403 (PR)	SP203	FFC4	Synchronous tapping acceleration feed forward gain (gear 4)	Set the acceleration feed-forward gain for selection of gear 011 at synchronous tapping.	0 to 1000 (%)	0
3404 to 3413	SP204 to SP213			Not used. Set to "0".	0	0
3414	SP214	TZRN	Synchronous tapping zero point return speed	This parameter is valid when SP193 (SPECT) bitE is set to "0". Set the zero point return speed used when the speed loop changes to the position loop.	0 to 500 (r/min)	50
3415	SP215	TPDT	Synchronous tapping zero point return deceleration rate	This parameter is valid when SP193 (SPECT) bitE is set to "0". Set the deceleration rate where the machine starts to decelerate when it returns to the target stop point during synchronous tapping zero point return. When the machine tends to overshoot at the stop point set a smaller value.	1 to 10000 (pulse)	1
3416	SP216	TPST	Synchronous tapping zero point return shift amount	This parameter is valid when SP193 (SPECT) bitE is set to "0". Set the synchronous tapping zero point position.	0 to 4095	0

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

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

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

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

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

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

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

⚠ CAUTION

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

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

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

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

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

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3233
(PR)</td><td>SP033</td><td>SFNC1</td><td>Spindle function 1</td><td>
Set the spindle function 1 in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td>poff</td><td>hzs</td><td></td><td>ront</td><td></td><td></td><td>pycal</td><td>pychg</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>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>
</table>

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

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

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3238
(PR)</td><td>SP038</td><td>SFNC6</td><td>Spindle function 6</td><td>
Set the spindle function 6 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>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><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>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.
For MDS-C1-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</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>
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</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 rowspan="2">Fixed control bit</td><td rowspan="2"></td></tr>
<tr><td>5</td><td>adin</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 rowspan="7">Fixed control bit</td><td rowspan="7"></td></tr>
<tr><td>8</td><td>sdt2</td></tr>
<tr><td>9</td><td>pl80</td></tr>
<tr><td>A</td><td>lmnp</td></tr>
<tr><td>B</td><td>dcsn</td></tr>
<tr><td>C</td><td>XFzs</td></tr>
<tr><td>D</td><td>iqsv</td></tr>
<tr><td>E</td><td>lmx</td><td></td><td></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>
</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>3239
(PR)</td><td>SP039</td><td>ATYP</td><td>Amplifier type</td><td>Set the amplifier type.
Set each amplifier type or "0"
<table><tr><th>Parameter setting</th><th>Amplifier type</th></tr><tr><td>0000</td><td>——</td></tr><tr><td>0001</td><td>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>

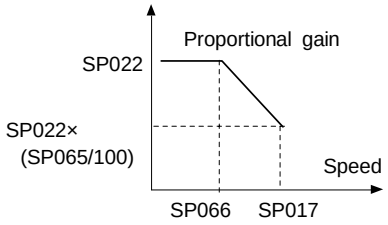
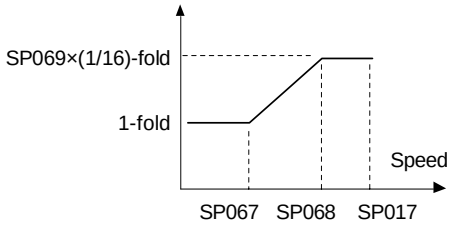
<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3240
(PR)</td><td>SP040</td><td>MTYP</td><td>Motor type</td><td>This parameter is valid when SP034 (SFNC2) bit0 is set to "0".
Set the appropriate motor number from the standard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

<table>
<tr><th>Parameter setting</th><th>Motor type</th><th>Maximum speed</th><th>Corre-spo nding 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>3241
(PR)</td><td>SP041</td><td>PTYP</td><td>Power supply type</td><td>
Power supply type
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td colspan="4">amp</td><td colspan="4">rtyp</td></tr>
</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>Explanation</th></tr>
<tr><td>0
1
2
3
4
5
6
7
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
rtyp</td><td>Set the regenerative resistor type when MDS-A-CR is used.
<table>
<tr><th>Set-ting</th><th>Regenerative resistor model name</th><th>Resistance value</th><th>Capacity</th></tr>
<tr><td>0</td><td colspan="3">MDS-C1-CV (Setting when using power supply regeneration)</td></tr>
<tr><td>1</td><td>GZG200W260HMJ</td><td>26Ω</td><td>80W</td></tr>
<tr><td>2</td><td>GZG300W130HMJ×2</td><td>26Ω</td><td>150W</td></tr>
<tr><td>3</td><td>MR-RB30</td><td>13Ω</td><td>300W</td></tr>
<tr><td>4</td><td>MR-RB50</td><td>13Ω</td><td>500W</td></tr>
<tr><td>5</td><td>GZG200W200HMJ×3</td><td>6.7Ω</td><td>350W</td></tr>
<tr><td>6</td><td>GZG300W200HMJ×3</td><td>6.7Ω</td><td>500W</td></tr>
<tr><td>7</td><td>R-UNIT-1</td><td>30Ω</td><td>700W</td></tr>
<tr><td>8</td><td>R-UNIT-2</td><td>15Ω</td><td>700W</td></tr>
<tr><td>9</td><td>R-UNIT-3</td><td>15Ω</td><td>2100W</td></tr>
<tr><td>A to D</td><td colspan="3">No setting</td></tr>
<tr><td>E</td><td colspan="3">Large capacity + ready ON high-speed sequence</td></tr>
<tr><td>F</td><td colspan="3">Ready ON high-speed sequence</td></tr>
</table></td></tr>
<tr><td>C
D
E
F
amp</td><td>Always set to “0”.</td></tr>
</table>
</td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
<tr><td>3242
(PR)</td><td>SP042</td><td>CRNG</td><td>C-axis detector range</td><td>This parameter is used to set the C-axis detector range.
Set "0" for this parameter.
"2" is used by Mitsubishi for testing.</td><td>0 to 7</td><td>0</td></tr>
</table>

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

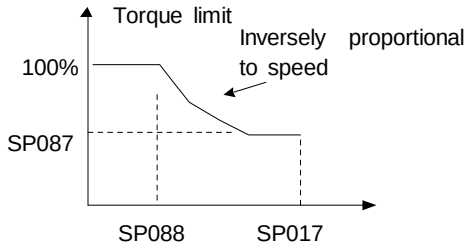
No.	Items			Details	Setting range	Standard setting
3255 (PR)	SP055	SETM	Excessive speed deviation timer	Set the timer value until the excessive speed deviation alarm is output. The value of this parameter should be longer than the acceleration/deceleration time.	0 to 60 (s)	12
3256	SP056	PYVR	Variable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

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

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

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

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

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

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3296
(PR)</td><td>SP096</td><td>EGAR</td><td>Encoder gear ratio</td><td>Set the gear ratio between the spindle end and the encoder end (except for the motor-built-in encoder) as indicated below.
<table>
<tr><th>Setting value</th><th>Gear ratio (deceleration)</th><th>Setting value</th><th>Gear ratio (acceleration)</th></tr>
<tr><td>0</td><td>1 : 1</td><td>-1</td><td>1 : 2</td></tr>
<tr><td>1</td><td>1 : 1/2</td><td>-2</td><td>1 : 4</td></tr>
<tr><td>2</td><td>1 : 1/4</td><td>-3</td><td>1 : 3</td></tr>
<tr><td>3</td><td>1 : 1/8</td><td></td><td></td></tr>
<tr><td>4</td><td>1 : 1/16</td><td></td><td></td></tr>
</table></td><td>-3 to 4</td><td>0</td></tr>
<tr><td>3297
(PR)</td><td>SP097</td><td>SPECO</td><td>Orientation specifica-tion</td><td>Set the orientation specifications in bit units.
<table>
<tr><th>F</th><th>E</th><th>D</th><th>C</th><th>B</th><th>A</th><th>9</th><th>8</th></tr>
<tr><td>ostp</td><td>orze</td><td>ksft</td><td>gchg</td><td></td><td>ips2</td><td>zdir</td><td></td></tr>
</table>
<table>
<tr><th>7</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th>0</th></tr>
<tr><td>vg8x</td><td>mdir</td><td>fdir</td><td>osc1</td><td>pyfx</td><td>dmin</td><td>odi2</td><td>odi1</td></tr>
</table>
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>odi1</td><td colspan="2">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><td colspan="2"></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">This is used by Mitsubishi.
Set to "0" unless particularly designated.</td></tr>
<tr><td>F</td><td>ostp</td><td colspan="2"></td></tr>
</table>
<table>
<tr><td></td><td></td><td colspan="2">In-position advance (bit 2)</td></tr>
<tr><td></td><td></td><td>0 (invalid)</td><td>1 (valid)</td></tr>
<tr><td rowspan="2">Second in-position</td><td>0 (Invalid)</td><td rowspan="2">In-position signal in OINP width=1
Control output 4/ bit 4=1
Second in-position signal=0
Control output 4/ bit F=1</td><td>In-position signal in OINP width=1
Control output 4/ bit 4=1
Second in-position signal=0
Control output 4/ bit F=0</td></tr>
<tr><td>1 (Valid)</td><td>In-position signal in DINP width=1
Control output 4/ bit 4=1
Second in-position signal in OINP width = 0
Control output 4/ bit F=1</td></tr>
</table></td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
</table>

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

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

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

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

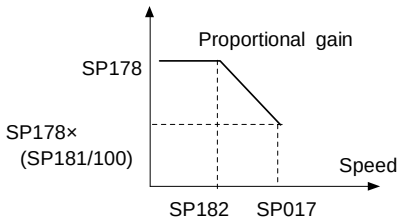
No.	Items			Details	Setting range	Standard setting
3332	SP132	PGC3	Third position loop gain for cutting on C-axis	Set the position loop gain when the third gain is selected for C-axis cutting.	1 to 100 (1/s)	15
3333	SP133	PGC4	Stop position loop gain for cutting on C-axis	Set the position loop gain for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

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

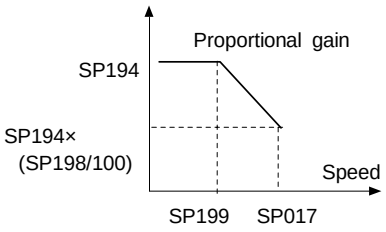
No.	Items			Details	Setting range	Standard setting
3349	SP149	CZRN	C-axis zero point return speed	This parameter is valid when SP129 (SPECC) bitE is set to "0". Set the zero point return speed used when the speed loop changes to the position loop.	1 to 500 (r/min)	50
3350	SP150	CPDT	C-axis zero point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

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

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

No.	Items			Details	Setting range	Standard setting
3380 (PR)	SP180	VGSD	Spindle synchronous speed loop gain delay advance term	Set the speed loop delay advance gain in spindle synchronous mode. When this parameter is set to "0", PI control is applied.	0 to 1000 (0.1 1/s)	15
3381 (PR)	SP181	VCGS	Spindle synchronous Target value of variable speed loop proportional gain	Set the magnification of speed loop proportional gain with respect to SP178 (VGSP) at the maximum speed defined in SP017 (TSP) in spindle synchronous mode.	0 to 100 (%)	100
3382 (PR)	SP182	VCSS	Spindle synchronous Change starting speed of variable speed loop proportional gain	Set the speed when the speed loop proportional gain change starts in the spindle synchronous mode.  	0 to 32767 (r/min)	0
3383	SP183	SYNV	Spindle synchronous Sync match-ing speed	For changeover from the speed loop to the position loop in the spindle synchronous mode, set a speed command error range for output of the synchronous speed matching signal.	0 to 1000 (r/min)	20
3384 (PR)	SP184	FFCS	Spindle synchronous Acceleration rate feed forward gain	Set the acceleration rate feed forward gain in the spindle synchronous mode. This parameter is used only with the SPJ2.	0 to 1000 (%)	0
3385	SP185	SINP	Spindle synchronous In-position width	Set the position error range for output of the in-position signal in the spindle synchronous mode.	1 to 2880 (1/16°)	16
3386 (PR)	SP186	SODR	Spindle synchronous Excessive error width	Set the excessive error width in the spindle synchronous mode.	1 to 32767 (pulse) (1 pulse =0.088°)	32767
3387 (PR)	SP187	IQGS	Spindle synchronous Current loop gain magnifi-cation1	Set the magnification of current loop gain (torque component) in the spindle synchronous mode.	1 to 1000 (%)	100

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

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

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

No.	Items			Details	Setting range	Standard setting
3421	SP221	PG2T	Synchronized tapping position loop gain 2	Set the second position loop gain when high-gain control is applied during synchronized tapping. When this parameter is not used, set to "0".	0 to 999 (1/s)	0
3422	SP222	PG3T	Synchronized tapping position loop gain 3	Set the third position loop gain when high-gain control is applied during synchronized tapping. When this parameter is not used, set to "0".	0 to 999 (1/s)	0
3423	SP223	SPDV	Speed monitor speed	Set the spindle limit speed in the door open state. (Invalid when 0 is set.) If the spindle end speed exceeds this setting value when the door is open, the speed monitor error (5E) will occur.	0 to 800 (r/min)	0
3424	SP224	SPDF	Speed monitor time	Set the time (continuous) to detect alarms. (Detected instantly when 0 is set.)	0 to 2813 (3.5ms)	0
3425	SP225	OXKPH	Position loop gain 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
3426	SP226	OXKPL	Position loop gain magnification after orientation gain changeover (L coil)		0 to 2560 (1/256-fold)	0
3427	SP227	OXVKP	Speed loop proportional gain magnification after orientation gain changeover		0 to 2560 (1/256-fold)	0
3428	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
3429	SP229	OXSFT	Orientation virtual target shift amount	Set the amount to shift the target position when orientation virtual target position is valid (SP097: SPEC0-bitD=1).	0 to 2048 (360°/4096)	0
3430 to 3432	SP230 to SP232			Use not possible.		

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

No.	Items			Details	Setting range	Standard setting
3453	SP253	DA1NO	D/A output channel 1 data number	Set the output data number for channel 1 of the D/A output function. When set to "0", the output is speedometer. Refer to "8.5 Supplement".	-32768 to 32767	0
3454	SP254	DA2NO	D/A output channel 2 data number	Set the output data number for channel 2 of the D/A output function. When set to "0", the output is load meter. Refer to "8.5 Supplement".	-32768 to 32767	0
3455	SP255	DA1MPY	DA output channel 1 magnifica-tion	Set the data magnification for channel 1 of the D/A output function. The output magnification is the setting value divided by 256. When set to "0", the output magnification becomes 1-fold, in the same manner as when "256" is set. Refer to "8.5 Supplement".	-32768 to 32767 (1/256-fold)	0
3456	SP256	DA2MPY	DA output channel 2 magnifica-tion	Set the data magnification for channel 2 of the D/A output function. The output magnification is the setting value divided by 256. When set to "0", the output magnification becomes 1-fold, in the same manner as when "256" is set. Refer to "8.5 Supplement".	-32768 to 32767 (1/256-fold)	0
3457 (PR) to 3520 (PR)	SP257 to SP320	RPM BSD	Motor constant (H coil)	This parameter is valid only in the following two conditional cases: (a) In case that SP034 (SFNC2) bit0=1 and SP034 (SFNC2) bit2=0 Set the motor constants when using a special motor, not described in the SP040 (MTYP) explanation and when not using the coil changeover motor. (b) In case that SP034 (SFNC2) bit0=1 and SP034 (SFNC2) bit2=1 Set the motor constant of the H coil of the coil changeover motor. **(Note)** It is not allowed for the user to change the setting.	0000 to FFFF HEX setting	0000

<Details for Motor constant>

No.	Items			Details	Setting range	Standard setting
3494	SP294	Kt	Torque constant for disturbance observer	Set the torque constant for disturbance observer. $\text{Setting (0.01kg•m)} = \frac{\text{30-minute rated output} \times 1000}{\text{Base speed} \times 1.026} \times 100$	0000 to FFFF HEX setting	-
3495	SP295	GDM	Motor inertia for disturbance observer	Set the motor inertia for disturbance observer. Setting $(0.001kg•m^2) = GD_M^2 \times 1000$	0000 to FFFF HEX setting	-

No.	Items			Details	Setting range	Standard setting
3521 (PR) to 3584 (PR)	SP321 to SP384	RPML to 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

<Details for Motor constant>

No.	Items			Details	Setting range	Standard setting
3558	SP358	KtL	Torque constant 2 for disturbance observer	Set the torque constant for disturbance observer. $\text{Setting (0.01kg•m)} = \frac{\text{30-minute rated output} \times 1000}{\text{Base speed} \times 1.026} \times 100$	0000 to FFFF HEX setting	-
3559	SP359	GDML	Motor inertia 2 for disturbance observer	Set the motor inertia for disturbance observer. Setting $(0.001kg•m^2) = GD_M^2 \times 1000$	0000 to FFFF HEX setting	-

8.4 MDS-C1-SPM

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

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

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

⚠ CAUTION

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

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

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

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

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

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

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3235
(PR)</td><td>SP035</td><td>SFNC3</td><td>Spindle 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>
<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="9">(Used with SPJ.)</td><td rowspan="9"></td></tr>
<tr><td>9</td><td></td></tr>
<tr><td>A</td><td></td></tr>
<tr><td>B</td><td></td></tr>
<tr><td>C</td><td></td></tr>
<tr><td>D</td><td></td></tr>
<tr><td>E</td><td></td></tr>
<tr><td>F</td><td></td></tr>
</table></td><td>0000 to FFFF HEX setting</td><td>0000</td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3236</td><td>SP036</td><td></td><td></td><td>Not used. Set to "0".</td><td></td><td></td></tr>
<tr><td>3237
(PR)</td><td>SP037</td><td>SFNC5</td><td>Spindle function 5</td><td>Set the spindle function 5 in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>nsno</td><td>nosg</td></tr>
</table>
<table>
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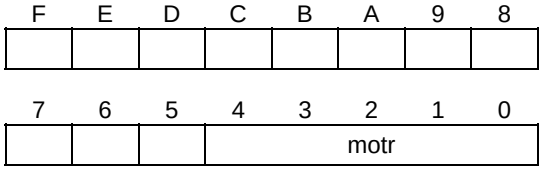
<tr><td></td><td></td><td></td><td></td><td></td><td>plgo</td><td></td><td>enco</td></tr>
</table>
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>enco</td><td>Encoder orientation invalid</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>
</table>

No.	Items			Details	Setting range	Standard setting
3238 (PR)	SP038	SFNC6	Spindle function 6	Set the spindle function 6 in bit units. F E D C B A 9 8 [ ][ ][ ]XFzs[ ][ ]pl80 sdt2 7 6 5 4 3 2 1 0 hzrn orm[ ]tdn plg2 pftm[ ] alty **(Note)** Always set "0" for the empty bits.	0000 to FFFF HEX setting	0000

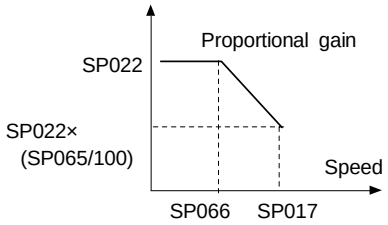
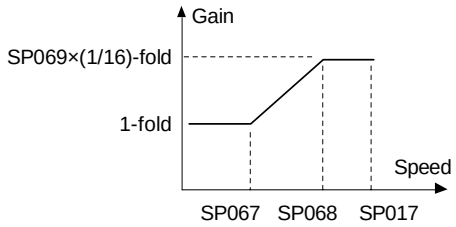
bit	Name	Meaning when set to 0	Meaning when set to 1
0	alty	Deceleration stop during special alarm invalid	Deceleration stop during special alarm valid
1			
2	pftm	Encoder feedback serial communication invalid	Encoder feedback serial communication valid
3	plg2	Semi-closed pulse output signal ×2 invalid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

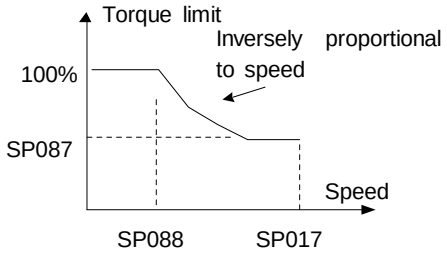
<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3239
(PR)</td><td>SP039</td><td>ATYP</td><td>Amplifier type</td><td>Set the amplifier type.
Set each amplifier type or "0"
<table><tr><th>Parameter setting</th><th>Amplifier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

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

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

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

No.	Items			Details	Setting range	Standard setting
3266 (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
3267 (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
3268 (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
3269 (PR)	SP069	VIGN	Target value of variable current loop gain	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.  **SP017 (TSP) Maximum motor speed** / **SP067 (VIGWA)** / **SP068 (VIGWB)** / **SP069 (VIGN)** 0 to 6000 / 0 / 0 / 0 6001 to 8000 / 5000 / 8000 / 45 8001 or more / 5000 / 10000 / 64	0 to 32767 (1/16-fold)	0
3270	SP070	FHz	Machine resonance suppression filter frequency	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.	0 to 3000 (Hz)	0
3271 to 3275	SP071 to SP075			Use not possible.	0	0

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

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

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

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

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

<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3329
(PR)</td><td>SP129</td><td>SPECC</td><td>C-axis specifica-tions</td><td>Set the C-axis specifications in bit units.
<table>
<tr><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td></tr>
<tr><td>zrtn</td><td>ptyp</td><td>fb9x</td><td>zrtd</td><td>zrn2</td><td></td><td>zdir</td><td>ztyp</td></tr>
</table>
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>vg8x</td><td></td><td>fdir</td><td></td><td>phos</td><td>rtrn</td><td></td><td>fclx</td></tr>
</table>
(Note) Always set "0" for the empty bits.
<table>
<tr><th>bit</th><th>Name</th><th>Meaning when set to 0</th><th>Meaning when set to 1</th></tr>
<tr><td>0</td><td>fclx</td><td>Closed loop</td><td>Semi-closed loop (Gear 1 : 1 only)</td></tr>
<tr><td>1</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>rtrn</td><td>Position monitor during ready OFF invalid</td><td>Position monitor during ready OFF valid</td></tr>
<tr><td>3</td><td>phos</td><td>Normal (no compensation)</td><td>Vx4 synchronization compensation valid</td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td>fdir</td><td>Position detector polarity (+)</td><td>Position detector polarity (–)</td></tr>
<tr><td>6</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td>vg8x</td><td>Speed gain × 1/8 during torque limit valid</td><td>Speed gain × 1/8 during torque limit invalid</td></tr>
<tr><td>8</td><td>ztyp</td><td>Z-phase type: Normal start up</td><td>Z-phase type: Start up only</td></tr>
<tr><td>9</td><td>zdir</td><td>Z-phase rising polarity (+)</td><td>Z-phase rising polarity (–)</td></tr>
<tr><td>A</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td>zrn2</td><td colspan="2" rowspan="2">This is used by Mitsubishi.
Set to "0" unless particularly designated.</td></tr>
<tr><td>C</td><td>zrtd</td></tr>
<tr><td>D</td><td>fb9x</td><td>Speed feedback Standard (PLG)</td><td>Speed feedback 90,000 pulse detector</td></tr>
<tr><td>E</td><td>ptyp</td><td>Position control switch type: After zero point return</td><td>Position control switch type: After deceleration stop</td></tr>
<tr><td>F</td><td>zrtn</td><td>Zero point return direction: CCW</td><td>Zero point return direction: CW</td></tr>
</table></td><td></td><td>0000</td></tr>
<tr><td>3330</td><td>SP130</td><td>PGC1</td><td>First position loop gain for cutting on C-axis</td><td>Set the position loop gain when the first gain is selected for C axis cutting.</td><td>1 to 200
(1/s)</td><td>15</td></tr>
</table>

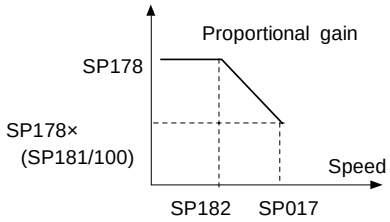
No.	Items			Details	Setting range	Standard setting
3331	SP131	PGC2	Second position loop gain for cutting on C-axis	Set the position loop gain when the second gain is selected for C axis cutting.	1 to 200 (1/s)	15
3332	SP132	PGC3	Third position loop gain for cutting on C-axis	Set the position loop gain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

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

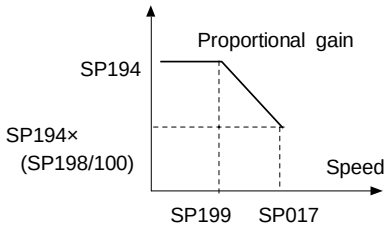
No.	Items			Details	Setting range	Standard setting
3353	SP153	CINP	C-axis in-position width	Set the position error range in which the in-position signal is output on the C-axis.	0000 to FFFF (1/1000°) HEX setting	03E8
3354 (PR)	SP154	CODRL	Excessive error width on C-axis (low byte)	Set the excessive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

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

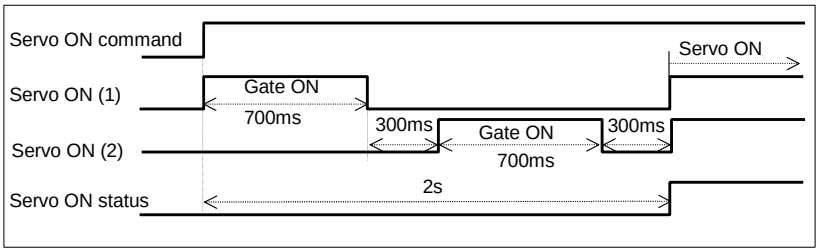
<table>
<tr><th>No.</th><th colspan="3">Items</th><th>Details</th><th>Setting range</th><th>Standard setting</th></tr>
<tr><td>3377 (PR)</td><td>SP177</td><td>SPECS</td><td>Spindle synchronous specifica-tions</td><td>Set the spindle synchronous specifications in bit units.
<table>
<tr><td>F</td><td>E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

No.	Items			Details	Setting range	Standard setting
3382 (PR)	SP182	VCSS	Spindle synchronous Change starting speed of variable speed loop proportional gain	Set the speed when the speed loop proportional gain change starts in the spindle synchronous mode. 	0 to 32767 (r/min)	0
3383	SP183	SYNV	Spindle synchronous Sync match-ing speed	For changeover from the speed loop to the position loop in the spindle synchronous mode, set a speed command error range for output of the synchronous speed matching signal.	0 to 1000 (r/min)	20
3384 (PR)	SP184	FFCS	Spindle synchronous Acceleration rate feed forward gain	Set the acceleration rate feed forward gain in the spindle synchronous mode. This parameter is used only with the SPJ2.	0 to 1000 (%)	0
3385	SP185	SINP	Spindle synchronous In-position width	Set the position error range for output of the in-position signal in the spindle synchronous mode.	1 to 2880 (1/16°)	16
3386 (PR)	SP186	SODR	Spindle synchronous Excessive error width	Set the excessive error width in the spindle synchronous mode.	1 to 32767 (pulse) (1 pulse =0.088°)	32767
3387 (PR)	SP187	IQGS	Spindle synchronous Current loop gain magnifi-cation1	Set the magnification of current loop gain (torque component) in the spindle synchronous mode.	1 to 1000 (%)	100
3388 (PR)	SP188	IDGS	Spindle synchronous Current loop gain magnifi-cation 2	Set the magnification of current loop gain (excitation component) in the spindle synchronous mode.	1 to 1000 (%)	100
3389	SP189	PG2S	Spindle synchronous Position loop gain 2	Set the second position loop gain when high-gain control is carried out in the spindle synchronous mode. When this parameter function is not used, set to "0".	0 to 999 (1/s)	0

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

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

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

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

No.	Items			Details	Setting range	Standard setting
3417	SP217	TINP	Synchronized tapping in-position width	Set the position error range for output of the in-position during synchronized tapping.	1 to 2880 (1/16°)	16
3418 (PR)	SP218	TODR	Synchronized tapping excessive error width	Set the excessive error width during synchronized tapping.	1 to 32767 (pulse) (1 pulse =0.088°)	32767
3419 (PR)	SP219	IQGT	Synchronized tapping current loop gain magnifi-cation 1	Set the magnification of current loop gain (torque component) during synchronized tapping.	1 to 1000 (%)	100
3420 (PR)	SP220	IDGT	Synchronized tapping current loop gain magnifi-cation 2	Set the magnification of current loop gain (excitation component) during synchronized tapping.	1 to 1000 (%)	100
3421	SP221	PG2T	Synchronized tapping position loop gain 2	Set the second position loop gain when high-gain control is applied during synchronized tapping. When this parameter is not used, set to "0".	0 to 999 (1/s)	0
3422	SP222	PG3T	Synchronized tapping position loop gain 3	Set the third position loop gain when high-gain control is applied during synchronized tapping. When this parameter is not used, set to "0".	0 to 999 (1/s)	0
3423	SP223	SPDV	Speed monitor speed	Set the spindle limit speed in the door open state. (Invalid when 0 is set.) If the spindle end speed exceeds this setting value when the door is open, the speed monitor error (5E) will occur.	0 to 800 (r/min)	0
3424	SP224	SPDF	Speed monitor time	Set the time (continuous) to detect alarms. (Detected instantly when 0 is set.)	0 to 2813 (3.5ms)	0

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

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

No.	Items			Details	Setting range	Standard setting
3453	SP253	DA1NO	D/A output channel 1 data number	Set the output data number for channel 1 of the D/A output function. When set to "0", the output is speedometer. Refer to "8.5 Supplement".	-32768 to 32767	0
3454	SP254	DA2NO	D/A output channel 2 data number	Set the output data number for channel 2 of the D/A output function. When set to "0", the output is load meter. Refer to "8.5 Supplement".	-32768 to 32767	0
3455	SP255	DA1MPY	DA output channel 1 magnifica-tion	Set the data magnification for channel 1 of the D/A output function. The output magnification is the setting value divided by 256. When set to "0", the output magnification becomes 1-fold, in the same manner as when "256" is set. Refer to "8.5 Supplement".	-32768 to 32767 (1/256-fold)	0
3456	SP256	DA2MPY	DA output channel 2 magnifica-tion	Set the data magnification for channel 2 of the D/A output function. The output magnification is the setting value divided by 256. When set to "0", the output magnification becomes 1-fold, in the same manner as when "256" is set. Refer to "8.5 Supplement".	-32768 to 32767 (1/256-fold)	0
3457 (PR) to 3520 (PR)	SP257 to SP320	RPM BSD	Motor constant (H coil)	This parameter is valid only in the following two conditional cases: (a) In case that SP034 (SFNC2) bit0=1 and SP034 (SFNC2) bit2=0 Set the motor constants when using a special motor, not described in the SP040 (MTYP) explanation and when not using the coil changeover motor. (b) In case that SP034 (SFNC2) bit0=1 and SP034 (SFNC2) bit2=1 Set the motor constant of the H coil of the coil changeover motor. **(Note)** It is not allowed for the user to change the setting.	0000 to FFFF HEX setting	0000

<Details for Motor constant>

No.	Items			Details	Setting range	Standard setting
3494	SP294	Kt	Torque constant for disturbance observer	Set the torque constant for disturbance observer. $\text{Setting (0.01kg•m)} = \frac{\text{30-minute rated output} \times 1000}{\text{Base speed} \times 1.026} \times 100$	0000 to FFFF HEX setting	-
3495	SP295	GDM	Motor inertia for disturbance observer	Set the motor inertia for disturbance observer. Setting ($0.001kg•m^2$)$=GD_M^2 \times 1000$	0000 to FFFF HEX setting	-

No.	Items			Details	Setting range	Standard setting
3521 (PR) to 3584 (PR)	SP321 to SP384	RPML BSDL	Motor constant (L coil)	This parameter is valid only in the following conditional case: (a) In case that SP034 (SFNC2) bit0=1 and SP034 (SFNC2) bit2=1 Set the motor constant of the L coil of the coil changeover motor. **(Note)** It is not allowed for the user to change the setting.	0000 to FFFF HEX setting	0000

<Details for Motor constant>

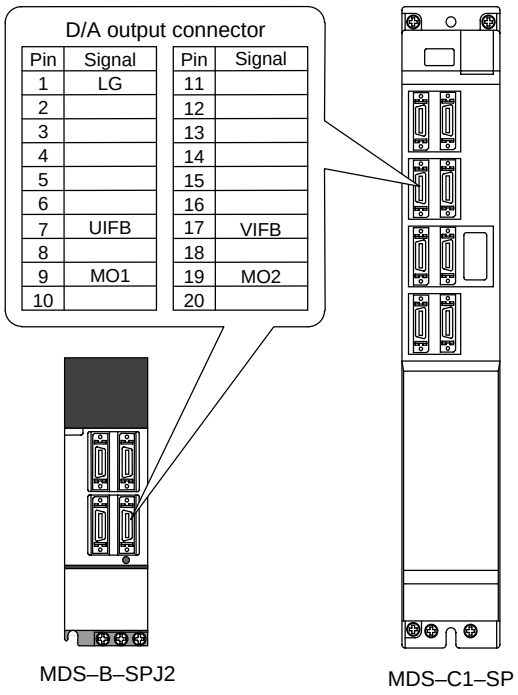
No.	Items			Details	Setting range	Standard setting
3558	SP358	KtL	Torque constant 2 for disturbance observer	Set the torque constant for disturbance observer. $\text{Setting (0.01kg•m)} = \frac{\text{30-minute rated output} \times 1000}{\text{Base speed} \times 1.026} \times 100$	0000 to FFFF HEX setting	-
3559	SP359	GDML	Motor inertia 2 for disturbance observer	Set the motor inertia for disturbance observer. Setting $(0.001kg•m^2) = GD_M^2 \times 1000$	0000 to FFFF HEX setting	-

8.5 Supplement

8.5.1 D/A Output Specifications

(1) D/A output specifications

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



(2) Setting the output data

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

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

No.	Output data	Original data unit	Standard setting value for output scale (Setting values in SP255, SP256)	Standard output unit
0	ch1: Speed meter output	10V=max. speed (0=0V)	0	Depends on the max. speed
	ch2: Load meter output	10V=120% load (0=0V)	0	Rated 12%/V
1	-			
2	Current command	Rated 100% = 4096	8	Rated 20%/V
3	Current feedback	Rated 100% = 4096	8	Rated 20%/V
4	Speed feedback	r/min	13	500(r/min)/V
5	-			
6	Position droop	1° = (64000/65536)	671	10°/V
7	-			
8	Feedrate (F∆T)	1° = (64000/65536)	629 (When communicating by 3.5ms)	500(r/min)/V
9	-			
10	Position command	1° = (64000/65536)	19 (18.64)	360°/V
11	-			
12	Position feedback	1° = (64000/65536)	19 (18.64)	360°/V
13	-			
80	Control input 1	HEX	Bit correspondence	
81	Control input 2			
82	Control input 3			
83	Control input 4			
84	Control output 1	HEX	Bit correspondence	
85	Control output 2			
86	Control output 3			
87	Control output 4			

(3) Setting the output scale

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

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

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

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

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

9. Machine Error Compensation

9.1 Function Outline

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

(1) Memorized pitch error compensation

According to the specified parameters, this method compensates an axis feed error caused by a ball screw pitch error, etc.

With the reference point defined as the base, set the compensation amount in the division points obtained by equally dividing the machine coordinates. (See Fig. 1. 1)

The compensation amount can be set by either the absolute or incremental system.

Select the desired method with the #4000:Pinc. Machine position is compensated between division points n and n+1 as much as compensation amount between them by linear approximation.

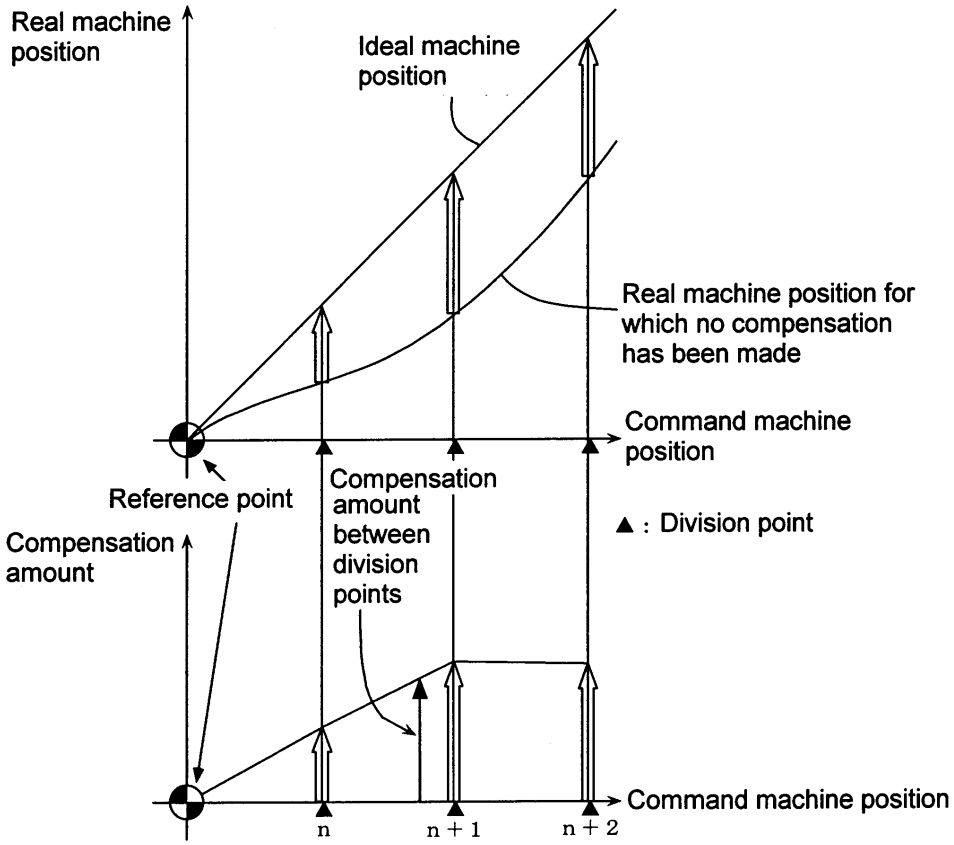


Fig. 1. 1 Relationship between the compensation amount and machine position

(2) Memorized relative position compensation

This method, according to the parameters specified in advance, compensates the relative position error between two orthogonal axes caused by deflection of the moving stand.

For this, as shown in Fig. 1. 2, specify the compensation amount in the compensation axis direction in the division points obtained by equally dividing the machine coordinates of the base axis.

The base axis is one of the two orthogonal axes to which relative position compensation applies. This axis is used as the criterion for relative-error measurement. The compensation axis is the coordinate axis that is orthogonal to the base axis. The compensation is actually made for this coordinate axis.

The section between division points n and n+1 is compensated smoothly by linear approximation.

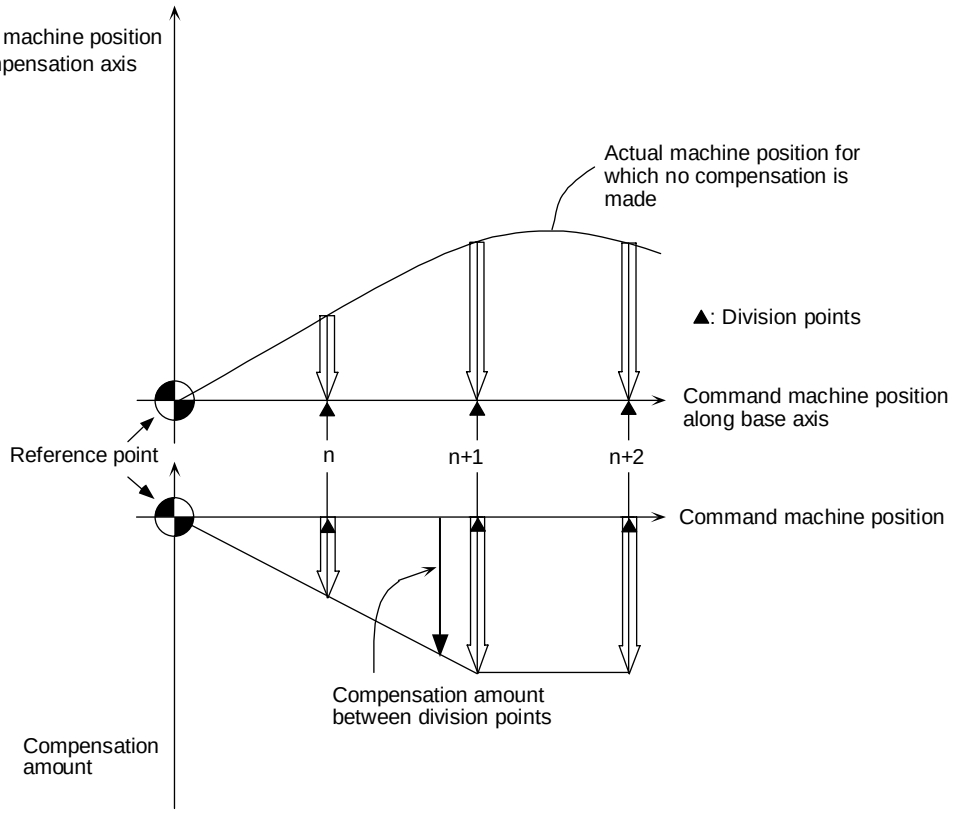


Fig. 1. 2 Relationship between base and compensation axes

(SETUP PARAM 5. 1/15)

#	Item		Details	Setting range
4000 (PR)	Pinc	Machine error offset increment method	Specify whether to use the incremental amount method or absolute amount method when setting the machine error compensation data.	0: Absolute volume method 1: Incremental volume method

<1st axis>

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

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

(SETUP PARAM 5. 3/15) to (SETUP PARAM 5. 15/15)

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

9.2 Setting Compensation Data

Compensation data can be set according to either absolute or incremental system.

"#4000:Pinc" 0: Absolute system
1: Incremental system

(1) Absolute system

Feed from the reference point to each division point is executed as shown in Fig. 2. 1. The following is obtained at this time. Set it as the compensation amount.

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

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

(100000 - 99990) × 2 = 20 pulses

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

(-100000 - (-99990)) × 2 = -20 pulses

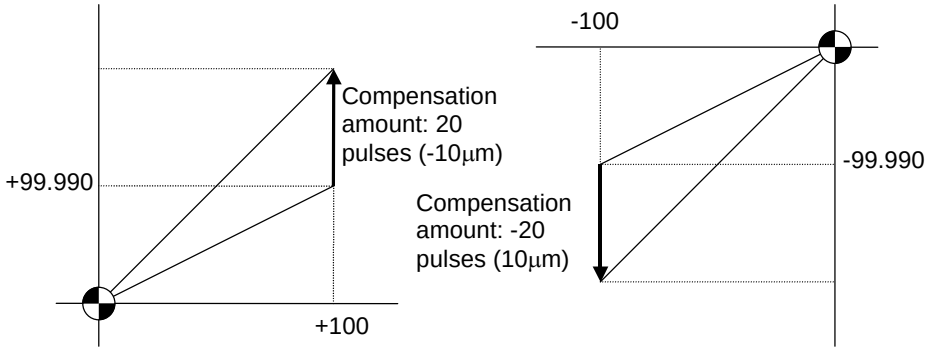


Fig. 2. 1

(2) Incremental system

Fig. 2. 2 contains a machine position that is placed in the positive direction with respect to the reference point. Assume that feed from division n-1 to n (division interval) is executed. In this case, the following value is defined as the compensation amount:

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

(3) Fig. 2. 3 contains a machine position that is placed in the negative direction with respect to the reference point. Assume that feed from division point n+1 to n by the division interval is executed. In this case, the following value is defined as the compensation amount:

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

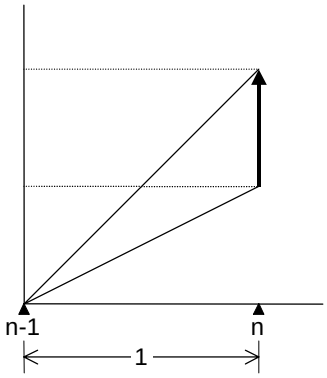


Fig. 2. 2

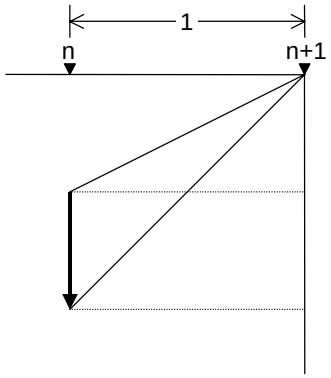


Fig. 2. 3

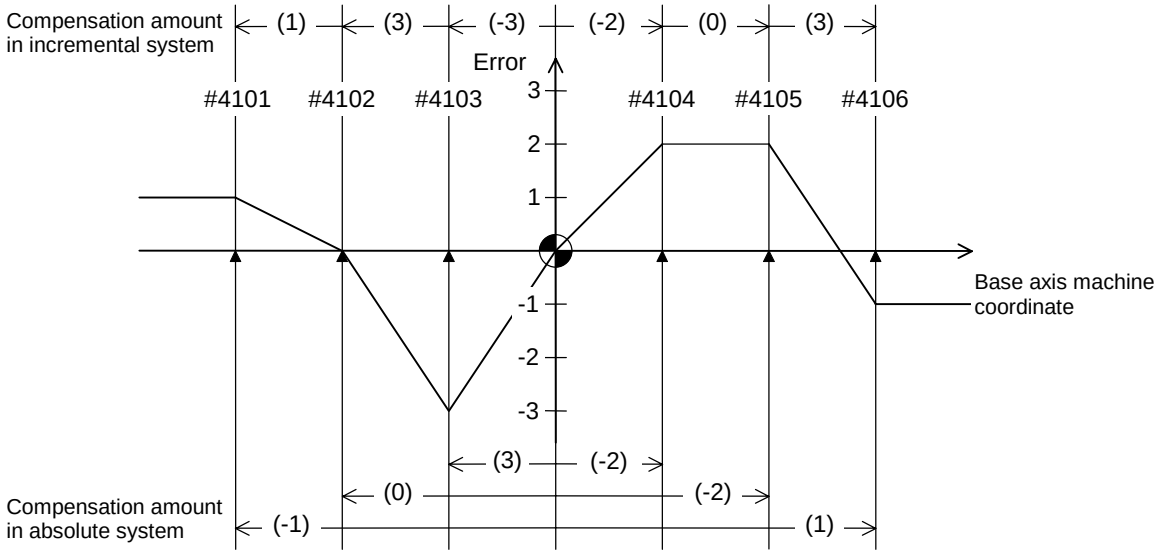
n: Division point compensation number
1: Division interval

Unit : Unit of output
Range : -128 to 127

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

9.3 Example in Using a Linear Axis as the Base Axis

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

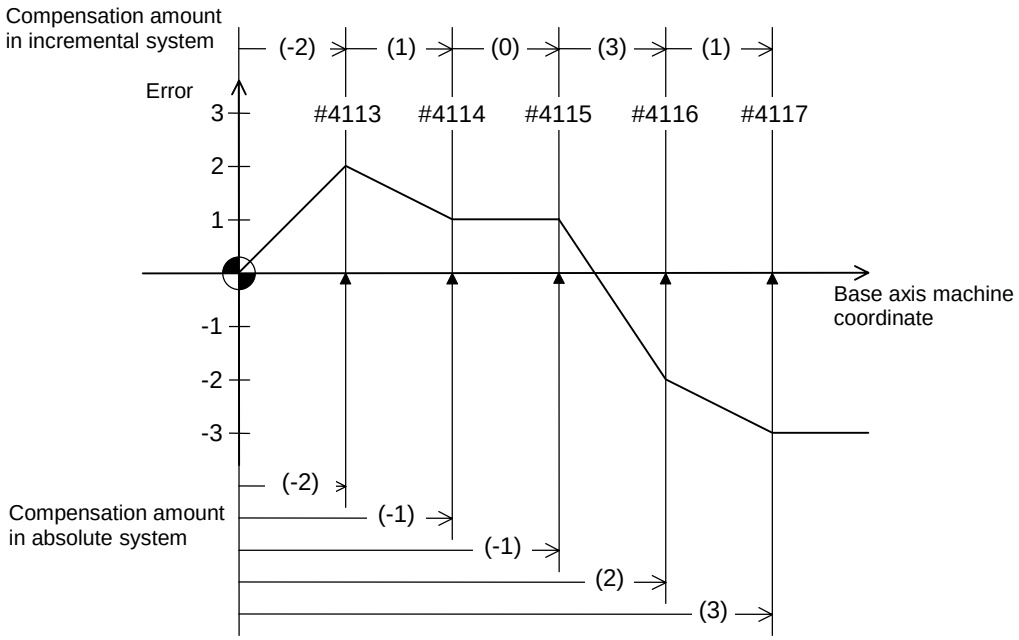


Division point number		#4101	#4102	#4103	#4104	#4105	#4106
Specified machine position		-300.000	-200.000	-100.000	100.000	200.000	300.000
Real machine position		-299.999	-200.000	-100.003	100.002	200.002	299.999
Compensation amount	Incremental	2	6	-6	-4	0	6
	Absolute	-2	0	6	-4	-4	2

rdvno	4103
mdvno	4101
pdvno	4106

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

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

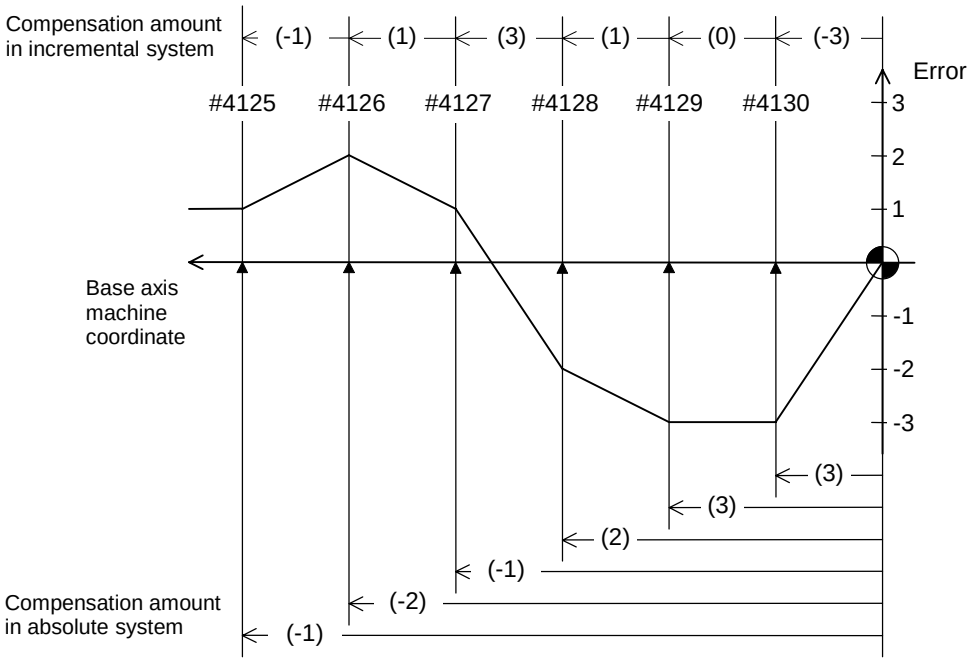


Division point number		#4113	#4114	#4115	#4116	#4117
Compensation amount	Incremental	-4	2	0	6	2
	Absolute	-4	-2	-2	4	6

rdvno	4112
mdvno	4113
pdvno	4117

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

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

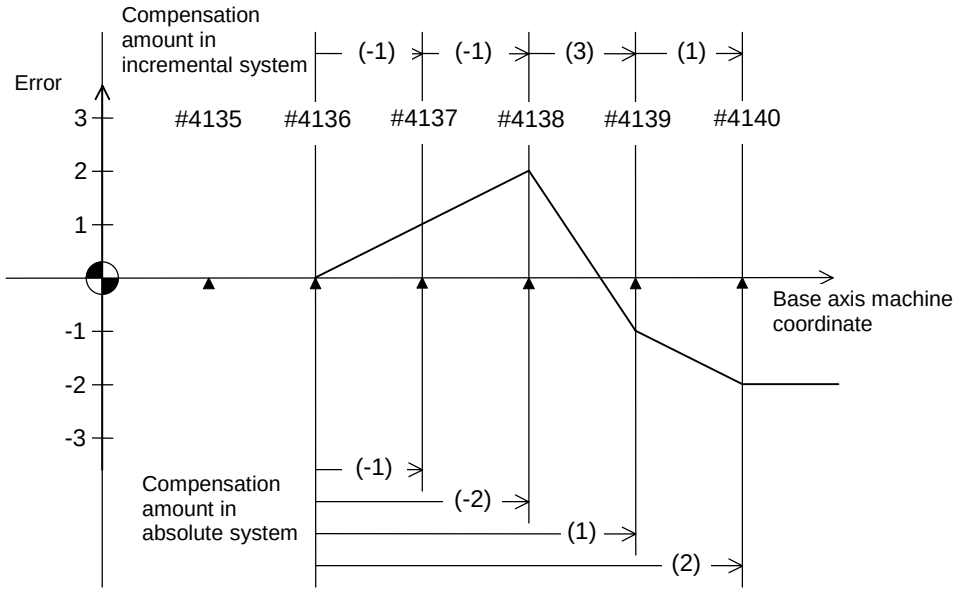


Division point number		#4125	#4126	#4127	#4128	#4129	#4130
Compensation amount	Incremental	-2	2	6	2	0	-6
	Absolute	-2	-4	-2	4	6	6

rdvno	4130
mdvno	4125
pdvno	4130

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

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

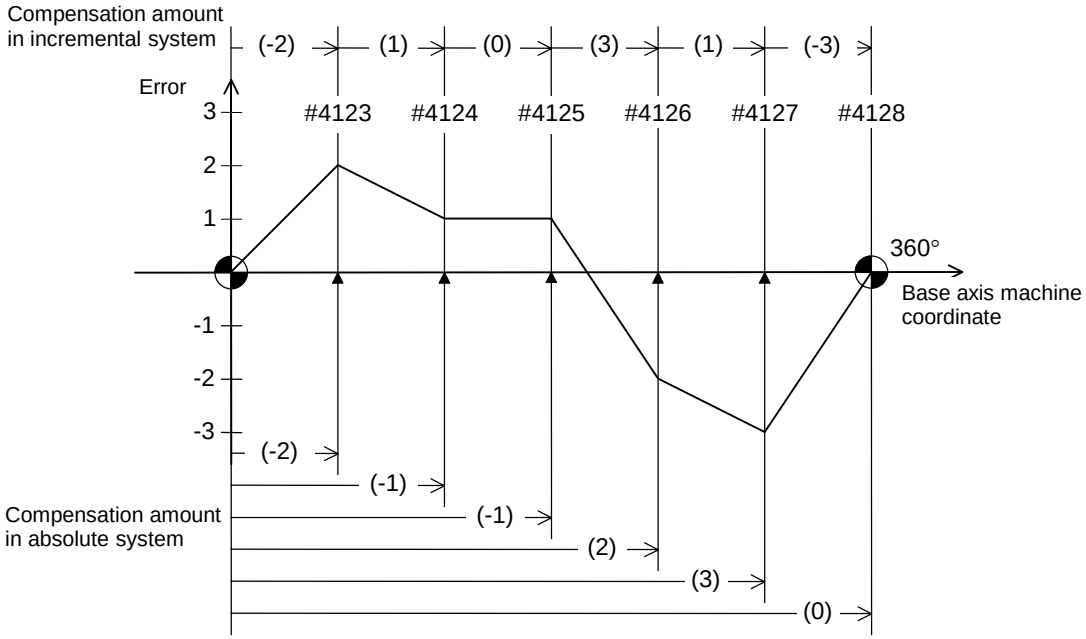


Division point number		#4135	#4136	#4137	#4138	#4139	#4140
Compensation amount	Incremental			-2	-2	6	2
	Absolute			-2	-4	2	4

rdvno	4134
mdvno	4136
pdvno	4140

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

9.4 Example in Using a Rotation Axis as the Base Axis



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

rdvno	4122
mdvno	4123
pdvno	4128

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

10. PLC Constants

10.1 PLC Timer

(SETUP PARAM 6. 1/14) to (SETUP PARAM 6. 2/14)

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

(SETUP PARAM 6. 10/14) to (SETUP PARAM 6. 14/14)

#	PLC device	Item	Details	Setting range
6600 ⋮ 6999	R1200/bit0 R1250/bit0 ⋮ R1224/bitF R1274/bitF	PLC timer expansion 10ms adding timer <10ms>	Set the time for the expanded PLC timer This is set for the timer coils: R1200 to R1224, and timer contacts: R1250 to R1274. A timer command can be issued to a contact other than the existing timer contacts (T0 to T103, Q0 to Q151).	0 to 32767 (×10ms)

10.2 PLC Counter

(SETUP PARAM 6. 3/14)

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

10.3 PLC Constants

(SETUP PARAM 6. 4/14)

#	PLC device	Item	Details	Setting range
6301 ⏐ 6348	R2800,2801 ⏐ R2894,2895	PLC constant	Set the value to be set in the data type R register used in the PLC program (ladder). Even if the data is set in the R register that corresponds to the PLC side when this parameter is displayed, the screen will not change. Enter a different screen once, and then select this screen again.	-99999999 to 99999999

(SETUP PARAM 6. 5/14)

#	PLC device	Item	Details	Setting range
6349 ⏐ 6396	R4900,4901 ⏐ R4994,4995	PLC constant	Set the value to be set in the data type R register used in the PLC program (ladder). Even if the data is set in the R register that corresponds to the PLC side when this parameter is displayed, the screen will not change. Enter a different screen once, and then select this screen again.	-99999999 to 99999999

10.4 Selecting the PLC Bit

(SETUP PARAM 6. 6/14) to (SETUP PARAM 6. 7/14)

#	PLC device	Item	Details	Setting range
6401 6402 ⏐ 6495 6496	R2900-Low R2900-High ⏐ R2947-Low R2947-High	Bit selection	This is the bit type parameter used in the PLC program (ladder). Even if the data is set in the R register that corresponds to the PLC side when this parameter is displayed, the screen will not change. Enter a different screen once, and then select this screen again. Some of the parameters following #6449 may be fixed according to the usage purpose. Refer to the PLC Program Development On-board Instruction Manual.	0: OFF 1: ON

(SETUP PARAM 6. 7/14) to (SETUP PARAM 6. 9/14)

#	PLC device	Item	Details	Setting range
6497 6498 ⏐ 6595 6596	R4400-Low R4400-High ⏐ R4449-Low R4449-High	Bit selection expansion	This is the bit type parameter (expansion) used in the PLC program (ladder). Even if the data is set in the R register that corresponds to the PLC side when this parameter is displayed, the screen will not change. Enter a different screen once, and then select this screen again.	0: OFF 1: ON

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

	Symbol name	7	6	5	4	3	2	1	0
0	#6449 R2924 L	NC card Controller thermal alarm on	Setting display unit thermal alarm on	-		Counter C retention	Integrating timer T retention	PLC counter program on	PLC timer program on
1	#6450 R2924 H		External alarm message display	Alarm/ operator change	Full screen display of message	-	Operator message on	1: R system / 0: F system	Alarm message on
2	#6451 R2925 L	-	-	GX-Developer communi-cation on	PLC development environment selection		Onboard editing not possible	APLC custom release	Onboard on
3	#6452 R2925 H	-		GOT communi-cation connection		Counter (fixed) retention	Integrating timer (fixed) retention		-
4	#6453 R2926 L	-	-	-	-	-		Message language change code	
5	#6454 R2926 H								
6	#6455 R2927 L	-	-	-	-	-	-	-	-
7	#6456 R2927 H	-	-	-	-	-	-	-	-
8	#6457 R2928 L	High-speed input specification 1							
9	#6458 R2928 H	High-speed input specification 2							
A	#6459 R2929 L	High-speed input specification 3 (Spare)							
B	#6460 R2929 H	High-speed input specification 4 (Spare)							
C	#6461 R2930 L	High-speed output specification 1							
D	#6462 R2930 H	High-speed output specification 2							
E	#6463 R2931 L	High-speed output specification 3 (Spare)							
F	#6464 R2931 H	High-speed output specification 4 (Spare)							

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

(Note 1) Be sure to set the bits indicated - and blanks to 0.
(Note 2) Parameters #6481 to #6496 are reserved for debugging by Mitsubishi.

11. Macro List

(SETUP PARAM 7. 1/3)

#	Item	Details	Setting range (unit)
7001 to 7091	M [01] to M [10]	<Code> Set the M code used for calling out the macro with the M command. This is valid when #1195 Mmac is set to 1.	1 to 9999
7002 to 7092		<Type> Set the macro call out type. 0: M98 PΔΔΔΔ; and equivalent value call 1: G65 PΔΔΔΔ; and equivalent value call 2: G66 PΔΔΔΔ; and equivalent value call 3: G66.1 PΔΔΔΔ; and equivalent value call others: M98 PΔΔΔΔ; and equivalent value call	0 to 3
7003 to 7093		<Program No.> Set the No. of the program to be called out.	1 to 99999999
	M2mac	Set the type and program No. for when calling out the macro with the 2nd miscellaneous command. The macro will be called out with the #1170 M2name address command when #1198 M2mac is set to 1.	
7102		<Type> Same as the M call macro.	0 to 3
7103		<Program No.> Same as the M call macro.	0 to 99999999

(SETUP PARAM 7. 2/3)

#	Item	Details	Setting range (unit)
7201 to 7291	G [01] to G [10]	<Code> Set the G code to be used when calling the macro with a G command. Do not set a G code used in the system.	1 to 255
7202 to 7292		<Type> Same as the M call Marco.	0 to 3
7203 to 7293		<Program No.> Same as the M call Marco.	1 to 99999999
	Smac	Set the type and program No. for when calling the macro with an S command. This is valid when #1196 Smac is set to 1.	
7302		<Type> Same as the M call Marco.	0 to 3
7303		<Program No.> Same as the M call Marco.	1 to 99999999
	Tmac	Set the type and program No. for when calling the macro with a T command. This is valid when #1197 Tmac is set to 1.	
7312		<Type> Same as the M call macro.	0 to 3
7313		<Program No.> Same as the M call macro.	0 to 99999999

(SETUP PARAM 7. 3/3)

#	Item		Details	Setting range
7401	ASCII [01]	Valid	The ASCII code macro parameters (#7402 to 7405) are validated. 0: Invalid 1: Valid	0/1
7402		Code	Set the ASCII code used to call macros with the ASCII code.	L system: A, B, D, F, H, I, J, K, M, Q, R, S, T M system: A, B, F, H, I, K, M, Q, R, S, T
7403		Type	Set the macro call type. 0: M98, 1: G65, 2: G66, 3: G66.1	0 to 3
7404		Program No.	Set the number of the program called with macro call.	0 to 99999999
7405		Variable	When the call type is "0", set the variable number set after the ASCII code.	100 to 149
7411	ASCII [02]	Valid	The ASCII code macro parameters (#7412 to 7415) are validated. 0: Invalid 1: Valid	0/1
7412		Code	Set the ASCII code used to call macros with the ASCII code.	L system: A, B, D, F, H, I, J, K, M, Q, R, S, T M system: A, B, F, H, I, K, M, Q, R, S, T
7413		Type	Set the macro call type. 0: M98, 1: G65, 2: G66, 3: G66.1	0 to 3
7414		Program No.	Set the number of the program called with macro call.	0 to 99999999
7415		Variable	When the call type is "0", set the variable number set after the ASCII code.	100 to 149

12. Position Switch

12.1 Outline of Function

The position switch (PSW) is used as an alternate switch for the dog switch provided on an axis of the machine. The position switch uses parameters by which the names of axes and their corresponding coordinates indicating imaginary dog positions are defined in advance. When the machine reaches the imaginary dog position, a signal is output to the PLC interface. The position switch thus works as an imaginary dog switch.

(SETUP PARAM 8. 1/1)

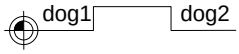
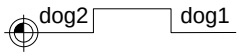
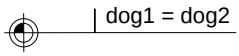
#	Item		Details	Setting range (unit)
7500	Pcheck	High-speed switching of position switch	Specify whether to perform position switch area checking at high speeds. 0: Do not perform position switch area checking at high speed (do it the same as before). 1: Perform position switch area checking at high speed.	0/1
75□1	<axis>	Axis name	Specify the name of the axis for which a position switch is provided.	X, Y, Z, U, V, W, A, B, or C axis address
75□2	<dog1>	Imaginary dog position 1	When the machine enters the range between imaginary dog positions 1 and 2, a signal is output to the PLC. System 1 device X 270 System 2 device U0F0	-99999.999 to 99999.999 (0.001mm)
75□3	<dog2>	Imaginary dog position 2		
75□4	<check>	Selection of area check method	When position switch area checking at high speed is selected, specify the mode of area checking, i.e., whether to use the command type machine position or detector feedback position, for each position switch point. 0: Use the command type machine position as the machine position for position switch area checking. 1: Use the detector feedback position as the machine position for position switch area checking. Note: This parameter is valid only when 1 set in "#7500 Pcheck".	0/1

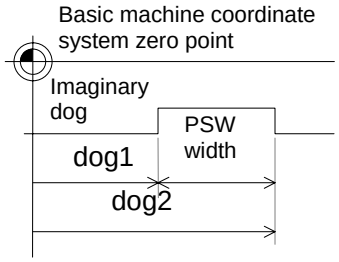
Position switch numbers of PSW1 to PSW8 and signal devices

	<axis>	<dog1>	<dog2>	System 1 device	System 2 device
PSW1	#7501	#7502	#7503	X270	U0F0
PSW2	#7511	#7512	#7513	X271	U0F1
PSW3	#7521	#7522	#7523	X272	U0F2
PSW4	#7531	#7532	#7533	X273	U0F3
PSW5	#7541	#7542	#7543	X274	U0F4
PSW6	#7551	#7552	#7553	X275	U0F5
PSW7	#7561	#7562	#7563	X276	U0F6
PSW8	#7571	#7572	#7573	X277	U0F7

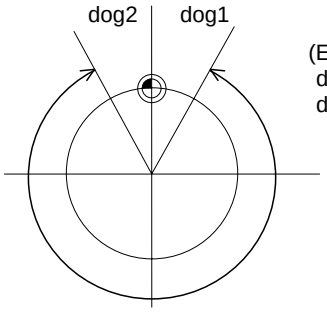
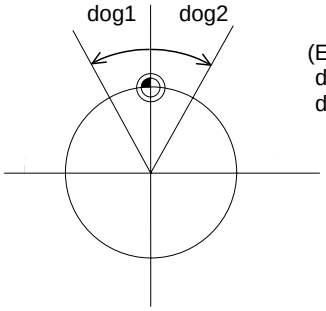
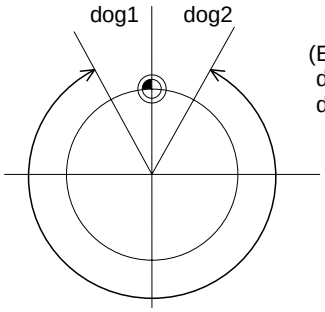
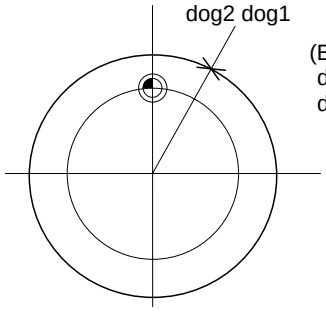
Instead of the dog switch provided on the machine axis, the coordinate values indicating imaginary dog positions (dog1 and dog2) on the coordinate axis of the axis name preset with axis are set with the position switches (PSW1 - PSW8). When the machine reaches the position, the signal is output to the device corresponding to the PLC interface.

Example of settings of dog1 and dog2 and operation

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



Rotation axis

Setting of dog1 and dog2	dog1, dog2 position	Description
dog1 < dog2	 (Example) dog1 = 30.000 dog2 = 330.000	A signal is output between dog1 and dog2.
	 (Example) dog1 = -30.000 dog2 = 30.000	A signal is also output when dog1 is negative.
dog1 > dog2	 (Example) dog1 = 330.000 dog2 = 30.000	A signal is output between dog2 and dog1.
|dog1 - dog2| ≥ 360	 (Example) dog1 = 30.000 dog2 = 390.000	A signal is kept output when the difference between dog1 and dog2 exceeds 360 degrees.

12.2 Canceling the Position Switch

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

13. Auxiliary Axis Parameter

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

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

0 0 0 0 (Default value)

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

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

0 1 0 2 (Default setting value)

<table>
<tr><th>Setting value</th><th>Details</th></tr>
<tr><td>1</td><td>Low response (low-rigidity loads, loads which easily vibrate)</td></tr>
<tr><td>2</td><td>Standard setting value</td></tr>
<tr><td>3</td><td>Standard setting value</td></tr>
<tr><td>4</td><td>Standard setting value</td></tr>
<tr><td>5</td><td>High response (high-rigidity loads, loads which do not easily vibrate)</td></tr>
</table>
<table>
<tr><th>Setting value</th><th>Details</th></tr>
<tr><td>0</td><td>Standard</td></tr>
<tr><td>2</td><td>Large friction amount (set the position loop gain slightly lower)</td></tr>
</table>
<table>
<tr><th>Setting value</th><th>Details</th></tr>
<tr><td>0</td><td>Only auto-tuning PG2, VG2, VIC, and GD2.</td></tr>
<tr><td>1</td><td>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></td><td></td></tr>
<tr><td>8</td><td>PG1</td><td>Position loop gain 1</td><td>Set the position loop gain for the model loop.
Determine the tracking ability regarding the position commands.</td><td>4 to 1000 (1/s)</td><td>70</td></tr>
<tr><td>9</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>10</td><td>EMGt</td><td>Deceleration control time constant</td><td>Set the deceleration time from the clamp speed (Aspeed1). For normal rapid traverse, set the same value as the acceleration/deceleration time constant.</td><td>0 to 32768 (ms)</td><td>500</td></tr>
<tr><td>11</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>12</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>13</td><td>MBR</td><td>Vertical axis drop prevention time</td><td>Input the time the servo OFF is delayed during servo OFF command. Increase the setting by 100ms at a time and set the minimum value where the axis does not drop.</td><td>0 to 1000 (ms)</td><td>100</td></tr>
<tr><td>14</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><td>Setting value</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr>
<tr><td>Frequency (Hz)</td><td>No start</td><td>1125</td><td>563</td><td>375</td><td>282</td><td>225</td><td>188</td><td>161</td></tr>
</table>
</td><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>15</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>16</td><td>JIT</td><td>Jitter compensation</td><td>Set the No. of ignored jitter compensation pulses. Do not set values without a description.
<table><tr><td>Setting value</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>Number of ignore pulses</td><td>No start</td><td>1</td><td>2</td><td>3</td></tr></table></td><td></td><td></td></tr>
<tr><td>17</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>18</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>19</td><td>PG2</td><td>Position loop gain 2</td><td>Set the position loop gain of the actual loop.
Determine the position responsiveness for external disturbance.</td><td>1 to 500 (1/s)</td><td>25</td></tr>
<tr><td>20</td><td>VG1</td><td>Speed loop gain 1</td><td>Set the speed loop gain of the model loop.
Determine the tracking ability regarding the speed commands.</td><td>20 to 5000 (1/s)</td><td>1200</td></tr>
<tr><td>21</td><td>VG2</td><td>Speed loop gain 2</td><td>Set the speed loop gain of the actual loop.
Determine the speed responsiveness for external disturbance.</td><td>20 to 8000 (1/s)</td><td>600</td></tr>
<tr><td>22</td><td>VIC</td><td>Speed integral compensation</td><td>Determine the characteristics of the speed low-frequency region.</td><td>1 to 1000 (ms)</td><td>20</td></tr>
<tr><td>23</td><td>VDC</td><td>Speed differential compensation</td><td>PI control normally results from a default value of 1000.
Adjust the overshoot amount by lowering in increments of 20.</td><td>0 to 1000</td><td>1000</td></tr>
<tr><td>24</td><td>DG2</td><td>Load inertia ratio</td><td>Set the load inertia ratio for the motor inertia.</td><td>0.0 to 50.0 (fold)</td><td>2.0</td></tr>
<tr><td>25</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>30 (PR)</td><td>MTY</td><td>Motor type</td><td>Set the motor type. This is automatically judged by the system when the default value (0000) is set.</td><td>0000 to FFFF (hexadecimal)</td><td>0000</td></tr>
</table>

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

<table>
<tr><th>No.</th><th colspan="2">Name</th><th>Details</th><th>Setting range</th><th>Default value</th></tr>
<tr><td>101
(PR)</td><td>Cont1</td><td>Control parameter 1</td><td>This is a HEX setting parameter. Set bits without a description to their default values.
<table>
<tr><td>bit</td><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>Default value</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table>
<table>
<tr><th>bit</th><th>Meaning when "0" is set</th><th>Meaning when "1" is set</th></tr>
<tr><td>0</td><td></td><td></td></tr>
<tr><td>1</td><td>High-speed zero point return after establishment of zero point.</td><td>Dog-type return for each zero point return operation.</td></tr>
<tr><td>2</td><td></td><td></td></tr>
<tr><td>3</td><td></td><td></td></tr>
<tr><td>4</td><td></td><td></td></tr>
<tr><td>5</td><td></td><td></td></tr>
<tr><td>6</td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td></tr>
<tr><td>8</td><td>Reference point return direction (+)</td><td>Reference point return direction (-)</td></tr>
<tr><td>9</td><td>Rotation direction determined by operation control signal (DIR)</td><td>Rotation direction in the shortcut direction</td></tr>
<tr><td>A</td><td>Machine basic position becomes the origin point</td><td>Electrical zero point becomes the origin point</td></tr>
<tr><td>B</td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td></tr>
<tr><td>D</td><td>Coordinate zero point creation valid</td><td>Zero point established at power supply ON position</td></tr>
<tr><td>E</td><td>Rotation direction in operation control signal (DIR) or in the shortcut direction</td><td>Rotation direction in the random position command sign direction</td></tr>
<tr><td>F</td><td>Stopper direction is positioning direction</td><td>Stopper direction is in the sign direction of the stopper amount</td></tr>
</table>
</td><td></td><td></td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Name</th><th>Details</th><th>Setting range</th><th>Default value</th></tr>
<tr><td>102
(PR)</td><td>Cont2</td><td>Control parameter 2</td><td>This is a HEX setting parameter. Set bits without a description to their default values.
<table>
<tr><td>bit</td><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>Default value</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>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>0</td><td></td><td></td></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>6</td><td>2-wire detector communication</td><td>4-wire detector communication</td></tr>
<tr><td>7</td><td>Incremental detection</td><td>Absolute position detection</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></td><td></td></tr>
<tr><td>103
(PR)</td><td>EmgCont</td><td>Emergency stop control</td><td>This is a HEX setting parameter. Set bits without a description to their default values.
<table>
<tr><td>bit</td><td>F</td><td>E</td><td>D</td><td>C</td><td>B</td><td>A</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>Default value</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>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>
<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></td><td></td></tr>
</table>

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

<table>
<tr><th>No.</th><th colspan="2">Name</th><th>Details</th><th>Setting range</th><th>Default value</th></tr>
<tr><td>120</td><td>ABS Type</td><td>Absolute position detection parameter</td><td>This parameter is set as a hexadecimal. Set the default value for bits that have no description.

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

<table>
<tr><th>bit</th><th>Meaning when "0" is set</th><th>Meaning when "1" is set</th></tr>
<tr><td>0</td><td></td><td></td></tr>
<tr><td>1</td><td>Dogless-type method initializing</td><td>Dog-type method initializing</td></tr>
<tr><td>2</td><td>Mechanical stopper method initializing</td><td>Origin point alignment method initializing</td></tr>
<tr><td>3</td><td>Electrical zero point direction (+)</td><td>Electrical zero point direction (-)</td></tr>
<tr><td>4</td><td></td><td></td></tr>
<tr><td>5</td><td></td><td></td></tr>
<tr><td>6</td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td></tr>
<tr><td>8</td><td></td><td></td></tr>
<tr><td>9</td><td></td><td></td></tr>
<tr><td>A</td><td></td><td></td></tr>
<tr><td>B</td><td></td><td></td></tr>
<tr><td>C</td><td></td><td></td></tr>
<tr><td>D</td><td></td><td></td></tr>
<tr><td>E</td><td></td><td></td></tr>
<tr><td>F</td><td></td><td></td></tr>
</table>
</td><td></td><td></td></tr>
<tr><td>123</td><td>ABS check</td><td>Absolute position power OFF tolerable movement value</td><td>Set the value for the tolerable amount of movement for a machine that moved during power OFF in an absolute position detection system. The "Absolute position power OFF movement exceeded (ABS)" signal will turn ON if the machine moves more than this setting value during power OFF.
The movement amount is not checked when this parameter is set to 0.000.</td><td>0.000 to 99999.999
(° or mm)</td><td>0.000</td></tr>
<tr><td>130</td><td>backlash</td><td>Backlash compensa-tion amount</td><td>Set the backlash compensation amount.</td><td>0 to 9999
(1/1000° or μm)</td><td>0</td></tr>
<tr><td>132</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>133</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>134</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
<tr><td>135</td><td></td><td></td><td>(Not used.)</td><td></td><td>0</td></tr>
</table>

< Operation parameter group 1 >

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

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

< Operation parameter group 2 >

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

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

< Operation parameter group 3 >

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

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

< Operation parameter group 4 >

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

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

<table>
<tr><th>No.</th><th colspan="2">Name</th><th>Details</th><th>Setting range</th><th>Default value</th></tr>
<tr><td>190</td><td>stpos2</td><td>Station 2 coordinate value</td><td rowspan="8">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 rowspan="8">-99999.999 to 99999.999
(° or mm)</td><td rowspan="8">0.000</td></tr>
<tr><td>191</td><td>stpos3</td><td>Station 3 coordinate value</td></tr>
<tr><td>192</td><td>stpos4</td><td>Station 4 coordinate value</td></tr>
<tr><td>193</td><td>stpos5</td><td>Station 5 coordinate value</td></tr>
<tr><td>194</td><td>stpos6</td><td>Station 6 coordinate value</td></tr>
<tr><td>195</td><td>stpos7</td><td>Station 7 coordinate value</td></tr>
<tr><td>196</td><td>stpos8</td><td>Station 8 coordinate value</td></tr>
<tr><td>197</td><td>stpos9</td><td>Station 9 coordinate value</td></tr>
<tr><td>200</td><td>PSWcheck</td><td>PSW detection method</td><td colspan="3">This is a HEX setting parameter. Set bits without a description to their default values.

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

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

Revision History

Date of revision	Manual No.	Revision details
Jul. 1997	BNP-B2201*	First edition created.
May 2000	BNP-B2201B(C)	Addition (modification) • Addition or modification of M64 additional parameters and alarms • Addition of M65 and M66 parameters and alarms • Correction of parameter names
Sept. 2001	BNP-B2201D	• The contents revised to correspond to M64AS, M64S, M65S and M66S. • Miswrite is corrected • Design of the cover and the back cover were changed. • Manual name changed from "MELDAS 64/65/66 Alarm/Parameter Manual" to "MELDAS 60/60S Series Alarm/Parameter Manual". • MODEL, MODEL CODE, and Manual No. were added on the back cover.
Apr. 2002	BNP-B2201E	• Revisions to comply with M60S Series Version B0 • Mistakes corrected
Feb. 2003	BNP-B2201G	• Servo alarm and spindle alarm names were standardized. • Servo parameters were overall reviewed. (Chapter 7 to 9 → Chapter 7) • Revisions to comply with M60S Series Version B3 • Mistakes corrected.
May 2004	BNP-B2201H	• Revised to comply with M60S system software versions C0, C1.
Jun. 2005	BNP-B2201J	• Revised to comply with M60S system software versions C5.
Dec. 2009	BNP-B2201L	• Corrected the items below. -#1284 ext20 bit0: Spindle speed clamp check -P134 G96 G96 Clamp Err. -M01 1043 No spindle speed clamp • Corrected the mistakes.

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Notice

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

Duplication Prohibited

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MODEL	M60/60S Series
MODEL CODE	008—095
Manual No.	BNP-B2201L(ENG)

(0912) MEE