

General-Purpose AC Servo

MITSUBISHI SERVO AMPLIFIERS & MOTORS
MELSERVO-J4

Parameter Unit

MODEL

MR-PRU03

INSTRUCTION MANUAL (MR-J4)

● Safety Instructions ●

Please read the instructions carefully before using the equipment.

To use the equipment correctly, do not attempt to install, operate, maintain, or inspect the equipment until you have read through this Instruction Manual, Installation guide, and appended documents carefully. Do not use the equipment until you have a full knowledge of the equipment, safety information and instructions. In this Instruction Manual, the safety instruction levels are classified into "WARNING" and "CAUTION".







Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.



Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight injury to personnel or may cause physical damage.

Note that the CAUTION level may lead to a serious consequence according to conditions. Please follow the instructions of both levels because they are important to personnel safety. What must not be done and what must be done are indicated by the following diagrammatic symbols.

 Indicates what must not be done. For example, "No Fire" is indicated by .

 Indicates what must be done. For example, grounding is indicated by .

In this Instruction Manual, instructions at a lower level than the above, instructions for other functions, and so on are classified into "POINT".

After reading this Instruction Manual, keep it accessible to the operator.

● DISPOSAL OF WASTE ●

Please dispose a parameter unit according to your local laws and regulations.

«U.S. customary units»

U.S. customary units are not shown in this manual. Convert the values if necessary according to the following table.

Quantity	SI (metric) unit	U.S. customary unit
Mass	1 [kg]	2.2046 [lb]
Length	1 [mm]	0.03937 [inch]
Torque	1 [N·m]	141.6 [oz·inch]
Moment of inertia	1 [$(\times 10^{-4} \text{ kg}\cdot\text{m}^2)$]	5.4675 [oz·inch ²]
Load (thrust load/axial load)	1 [N]	0.2248 [lbf]
Temperature	N [$^{\circ}\text{C}$] $\times 9/5 + 32$	N [$^{\circ}\text{F}$]

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1. INTRODUCTION

1. INTRODUCTION

POINT
<ul style="list-style-type: none"> ● The parameter unit cannot be used with MR Configurator2. ● When using the parameter unit, set [Pr. PF34] to "1 _ _ _". ● The point table mode can be used when the servo amplifier is set to the positioning mode (point table method). ● The MR-PRU03 parameter unit cannot be used with MR-J4-03A6(-RJ) servo amplifier.

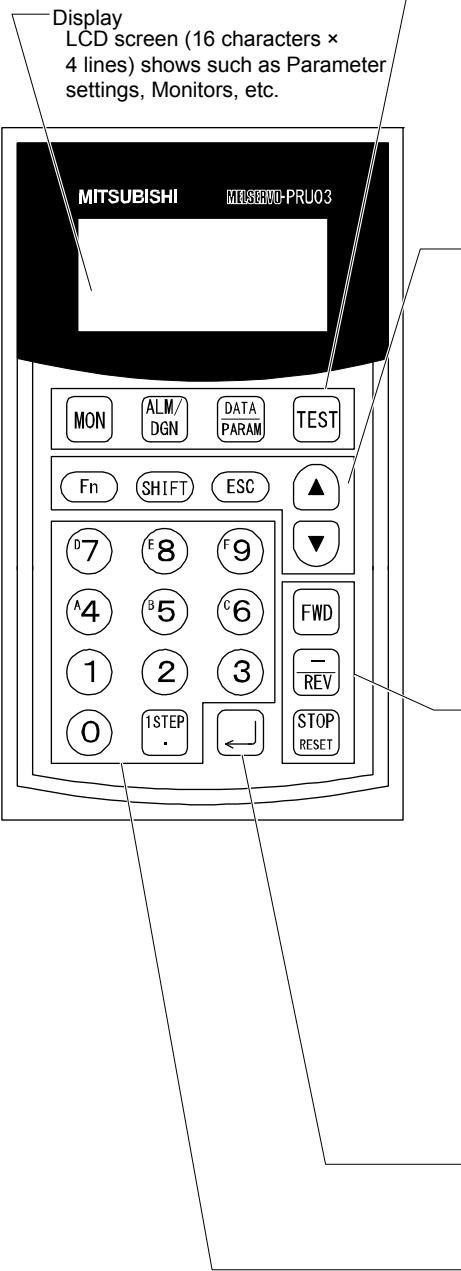
This instruction manual explains a case where the MR-PRU03 parameter unit is used with MELSERVO-J4 series. When using it with MELSERVO-J3 series, refer to each servo amplifier instruction manual. Connecting the parameter unit to the servo amplifier enables simple execution of such as data setting, test operation, and parameter setting without using MR Configurator2. The following shows combinations with servo amplifiers.

		MR-J4-_A(-RJ) MR-J4-_A4(-RJ) MR-J4-_A1(-RJ)		MR-J4-DU_A(-RJ) MR-J4-DU_A4(-RJ)
		Software version B2 or earlier	Software version B3 or later	
MR-PRU03	Software version A3 or earlier	○	○	○
	Software version B0 or later	○	○	○

2. EXTERNAL APPEARANCE AND KEY EXPLANATIONS

2. EXTERNAL APPEARANCE AND KEY EXPLANATIONS

The following shows the external appearance and how to set the keys.



Display LCD screen (16 characters x 4 lines) shows such as Parameter settings, Monitors, etc.

	Key	Key explanation
Mode key	MON	Monitor mode key • Displays the monitor screen.
	ALM/DGN	Alarm/diagnosis mode key • Displays the alarm/output signal (DO) forced output/diagnosis selection screen.
	DATA PARAM	Parameter mode key • Displays parameter selection screen. • Pressing this key with pressing down the "SHIFT" key displays the point table setting screen.
	TEST	Test operation mode key • Displays the selection screen for the test operation mode.
Operation key	Fn	Function key • Used to operate the test operation mode. • Displays the parameter range and point table setting range.
	SHIFT	SHIFT key • When entering hexadecimal values, pressing the "4" to "9" keys with pressing down this key will enter A to F. • Pressing the "▲▼" keys with pressing down this key will switch the screen to the previous or next screen.
	ESC	ESC key • Switches the screen to the upper hierarchy. (not to the previous screen) • Displays the setting selection screen (initial screen) in the monitor mode, etc.
	▲	Scroll key • Moves the cursor across the screen or scrolls the screen. Pressing this key with pressing down the "SHIFT" key will switch the screen to the previous or next screen. • Changes the parameter No. or point table No.
	▼	
Test operation key	FWD	Forward rotation key • Starts the forward rotation during the test operation (JOG operation/positioning operation).
	- REV	Symbol key/reverse rotation key • Starts the reverse rotation during the test operation (JOG operation/positioning operation). • Used together with the "SHIFT" key to enter negative numbers. To exit the negative number mode, press the "SHIFT" key with this key again. ("- disappears.)
	STOP RESET	Stop/reset key • Stops temporarily in the JOG operation/Positioning operation/Single-step feed. • Used as the "RESET" key while the "Fn" key is not pressed (i.e. at a stop). • Resets alarms or alarm history, or clears cumulated monitor data or inputs. • This key is not for stopping normal operation.
Enter key	↵	Enter key • Determines the selection, numerical values. • Determines to exit the test operation mode. • Switches outputs on/off of the output signal (DO) forced output.
Numerical key	0 to 9	Numerical key • Enters numbers such as the parameter Nos., setting values. • Pressing the "4" to "9" keys with pressing down the "SHIFT" key will enter A to F.
	1STEP .	Decimal point key • Used to enter a decimal point. • Starts the single-step feed.

3. SPECIFICATIONS

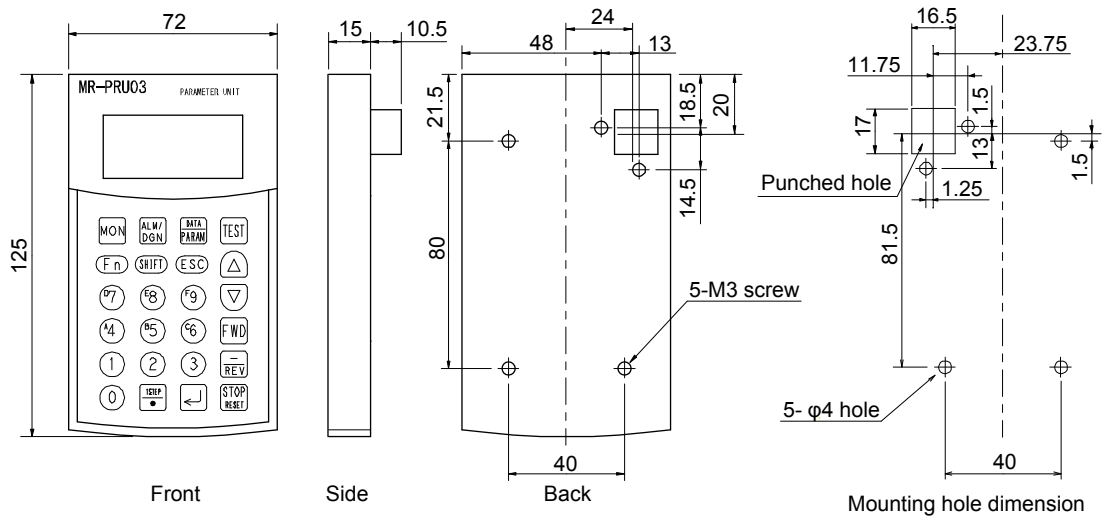
3. SPECIFICATIONS

Item		Description	
Model		MR-PRU03	
Power supply		Supplied from servo amplifier	
Function	Parameter mode	Refer to section 6.5.	
	Monitor mode (status display)	Refer to section 6.3.	
	Diagnostic mode	External I/O signal (DIDO) display, software No. VC automatic offset, motor information, cumulative power-on	
	Alarm mode	Current alarm, alarm history	
	Test operation mode	JOG operation, positioning operation, output signal (DO) forced output, single-step feed	
	Point table mode	Position data, speed, acceleration time constant, deceleration time constant, dwell, sub function, M code	
Display		LCD (16 characters × 4 lines)	
Environment	Ambient temperature	Operation	-10 °C to 55 °C (non-freezing)
		Storage	-20 °C to 65 °C (non-freezing)
	Ambient humidity	Operation	90 %RH or less (non-condensing)
		Storage	
Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust	
Mass [g]		130	

4. DIMENSIONS

4. DIMENSIONS

[Unit: mm]



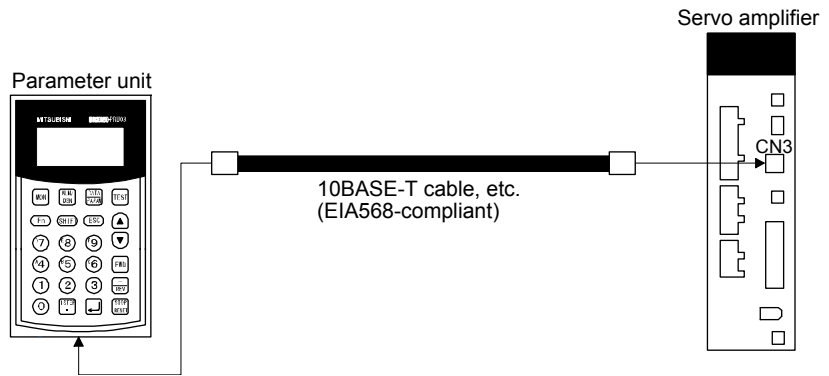
5. CONNECTION WITH SERVO AMPLIFIER

5. CONNECTION WITH SERVO AMPLIFIER

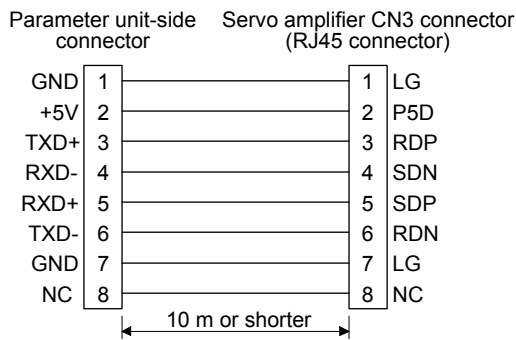
5.1 Single axis

(1) Configuration diagram

This is for operation of the single-axis servo amplifier. It is recommended to use the following cable.



(2) Internal wiring diagram

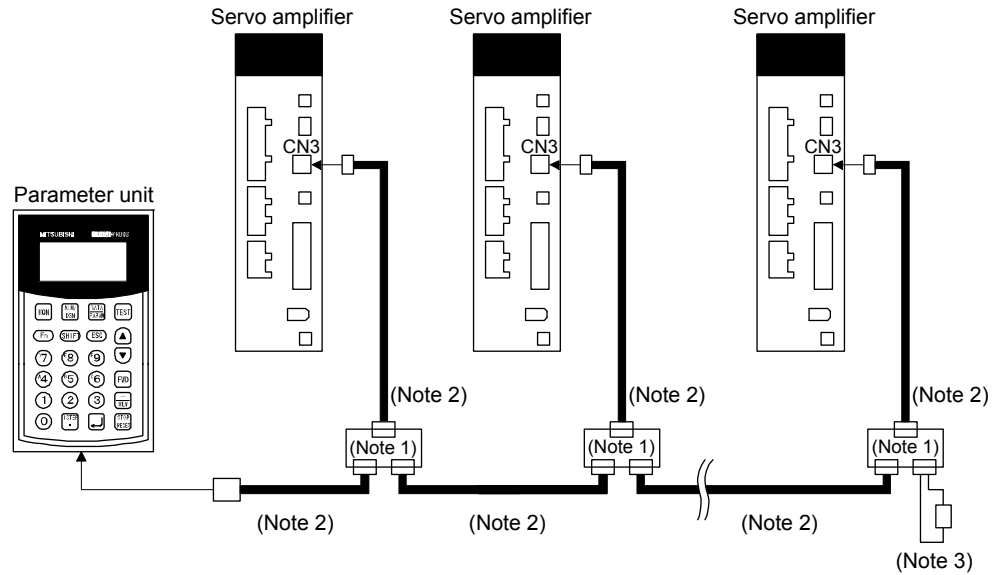


5. CONNECTION WITH SERVO AMPLIFIER

5.2 Multi-drop connection

(1) Configuration diagram

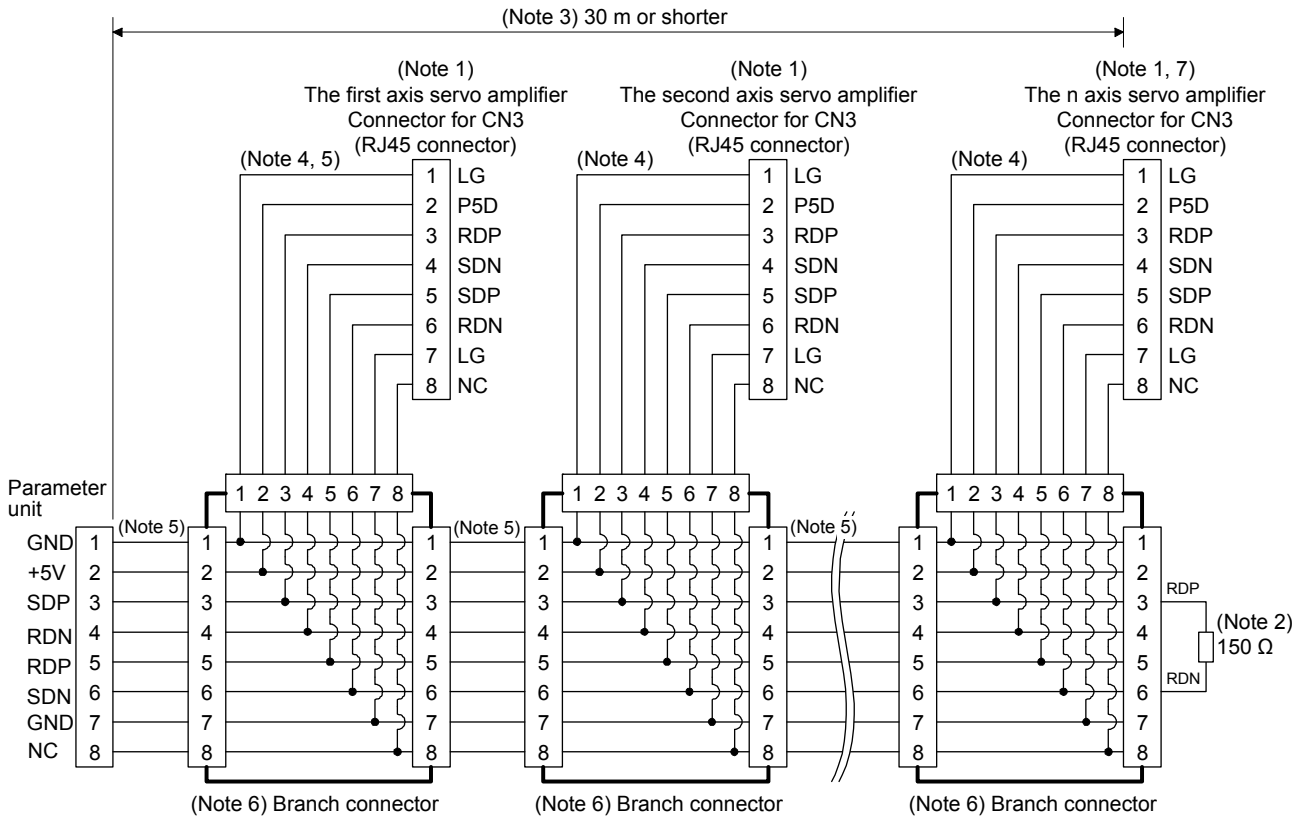
Up to 32 axes of servo amplifiers from stations 0 to 31 can be operated on the same bus.



- Note 1. The BMJ-8 (Hachiko Electric) is recommended as the branch connector.
- Note 2. Use one such as 10BASE-T cable (EIA568-compliant).
- Note 3. The final axis must be terminated between RDP (pin No.3) and RDN (pin No.6) on the receiving side (servo amplifier) with a 150 Ω resistor.

5. CONNECTION WITH SERVO AMPLIFIER

- (2) Internal wiring diagram
Wire the cables as follows.



Note 1. Recommended connector (Hirose Electric)

Plug: TM10P-88P

Connection tool: CL250-0228-1

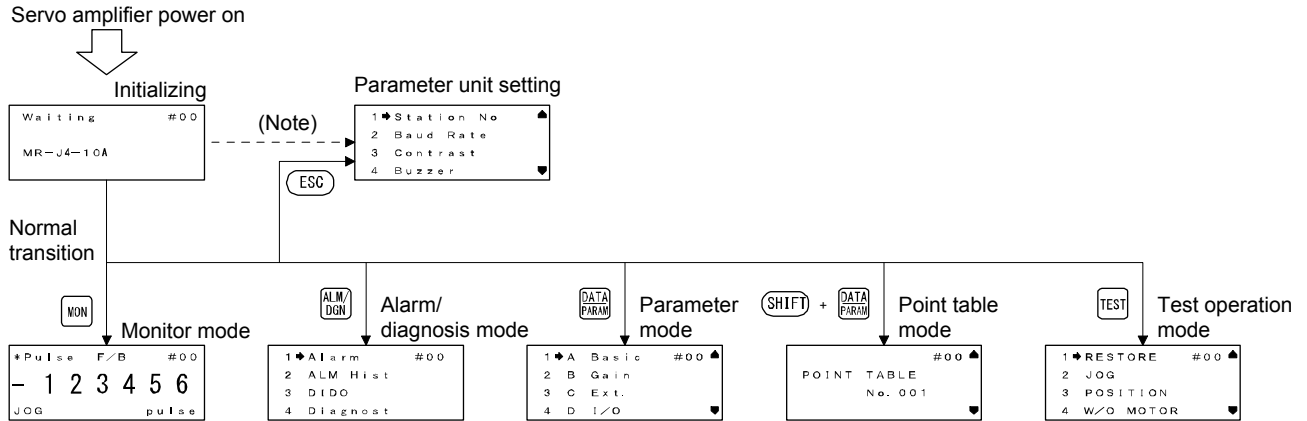
2. The final axis must be terminated between RDP (pin No.3) and RDN (pin No.6) on the receiving side (servo amplifier) with a 150 Ω resistor.
3. The overall length is 30 m or less in low-noise environment.
4. The wiring between the branch connector and servo amplifier should be as short as possible.
5. Use the EIA568-compliant cable (10BASE-T cable, etc.).
6. Recommended branch connector: BMJ-8 (Hachiko Electric)
7. $n \leq 32$ (Up to 32 axes can be connected.)

6. DISPLAY

6. DISPLAY

Connect the parameter unit to the servo amplifier and turn on the power of servo amplifier. The following shows the screen transition of the parameter unit and operation procedures of each mode.

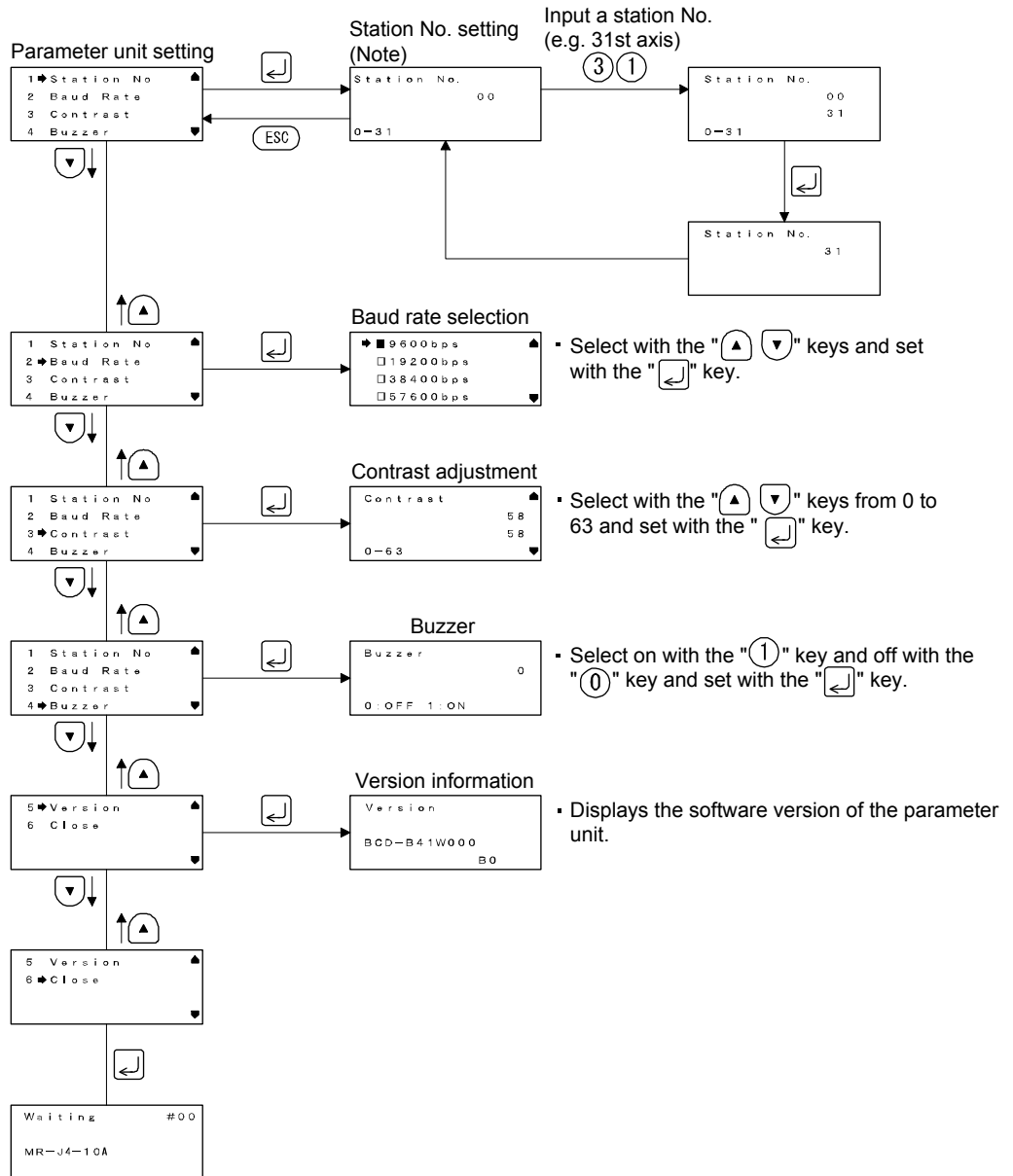
6.1 Outline of screen transition



Note. If communication does not complete during initialization, a communication error is displayed. Press the "ESC" key to return to the parameter unit setting screen.

6. DISPLAY

6.2 Parameter unit setting



Note. Press the "SHIFT" + "ESC" keys to return to the station No. setting screen from any screen.

6. DISPLAY

6.3 Monitor mode (status display)

The servo status during operation is shown on the parameter unit display. Press the "MON" key and select any content with the "▼" or "▲" key.

(1) Combinations of the control mode and operation mode

Status display items that can be checked vary depending on combinations of the control mode and operation mode. In cases where there are "○" both in the control mode and operation mode of the following table, the status display can be checked. In cases where there is a diagonal line in either mode, the status cannot be checked.

Display order	Name	Display name	Control mode (Note 1)						Operation mode (Note 2)				
			P	S	T	CP	CL	PS	Standard	Full.	Lin.	D	
1	Cumulative feedback pulses	Pulse F/B	○	○	○	○	○	○	○	○	○	○	○
2	Servo motor speed/linear servo motor speed	Speed F/B	○	○	○	○	○	○	○	○	○	○	○
3	Droop pulses	Droop Pls	○	△	△	○	○	○	○	○	○	○	○
4	Cumulative command pulses	Pulse Cmd	○	△	△	△	△	△	○	○	○	○	○
5	Command pulse frequency	Pulse Frq	○	△	△	△	△	△	○	○	○	○	○
6	Analog speed command voltage	Speed Cmd	△	○	△	△	△	△	○	○	○	○	○
	Analog speed limit voltage		△	△	○	△	△	△	○	○	○	○	○
7	Analog torque command voltage	Trq Limit	△	△	○	△	△	△	○	○	○	○	○
	Analog torque limit voltage		○	○	△	○	○	○	○	○	○	○	○
8	Regenerative load ratio	Regn Load	○	○	○	○	○	○	○	○	○	○	○
9	Effective load ratio	Effc Load	○	○	○	○	○	○	○	○	○	○	○
10	Peak load ratio	Peak Load	○	○	○	○	○	○	○	○	○	○	○
11	Instantaneous torque	Instn Trq	○	○	○	○	○	○	○	○	○	○	○
12	Position within one-revolution	Cyc posit	○	○	○	○	○	○	○	○	○	○	○
13	ABS counter	Abs count	○	○	○	○	○	○	○	○	○	○	○
14	Load to motor inertia ratio	Moment Rt	○	○	○	○	○	○	○	○	○	○	○
15	Bus voltage	P-N Volt	○	○	○	○	○	○	○	○	○	○	○
16	Load-side encoder cumulative feedback pulses	Opt plsFB	○	△	△	○	○	△	△	△	△	△	△
17	Load-side encoder droop pulses	Opt Droop	○	△	△	○	○	△	△	△	△	△	△
18	Load-side encoder information 1	Opt Cycpo	○	○	○	○	○	△	△	△	△	△	△
19	Load-side encoder information 2	Opt Abscn	○	○	○	○	○	△	△	△	△	△	△
20	For manufacturer setting	Moni Out1	△	△	△	△	△	△	△	△	△	△	△
21		Moni Out2	△	△	△	△	△	△	△	△	△	△	△
22		Abpls F/B	△	△	△	△	△	△	△	△	△	△	△
23	Temperature of motor thermistor	Motor Thm	(Note 3)										
24	Cumulative feedback pulses (motor-side unit)	Pls F/B M	○	○	○	○	○	○	△	△	△	△	△
25	Electrical angle	Ele Cycpo	○	○	○	○	○	○	△	△	△	△	△
26	For manufacturer setting	Reserved	△	△	△	△	△	△	△	△	△	△	△
27		Reserved	△	△	△	△	△	△	△	△	△	△	△
28		Reserved	△	△	△	△	△	△	△	△	△	△	△
29		Reserved	△	△	△	△	△	△	△	△	△	△	△
30		Reserved	△	△	△	△	△	△	△	△	△	△	△
31	Motor-side/load-side position deviation	Posit Dev	○	△	△	○	○	△	△	△	△	△	△
32	Motor-side/load-side speed deviation	Speed Dev	○	△	△	○	○	△	△	△	△	△	△
33	Encoder inside temperature	In Enc Thm	○	○	○	○	○	○	○	○	○	○	○
34	Settling time	Set Time	○	△	△	○	○	○	○	○	○	○	○
35	Oscillation detection frequency	Oscil Frq	○	○	○	○	○	○	○	○	○	○	○
36	Number of tough drive operations	Tough Drv	○	○	○	○	○	○	○	○	○	○	○

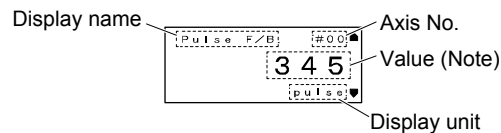
6. DISPLAY

Display order	Name	Display name	Control mode (Note 1)						Operation mode (Note 2)				
			P	S	T	CP	CL	PS	Standard	Full.	Lin.	DD	
37	For manufacturer setting	Drive Rec											
38		In Amp Thm											
39		Am Amp Thm											
40		Fan Speed											
41	Unit power consumption	Power1	○	○	○	○	○	○	○	○	○	○	○
42	Unit total power consumption	Total Pc1	○	○	○	○	○	○	○	○	○	○	○
43	Current position	Cur Posit				○	○		○	○	○	○	○
44	Command position	Cmd Posit				○	○		○	○	○	○	○
45	Command remaining distance	Cmdremin				○	○	○	○	○	○	○	○
46	Point table No./Program No./Station position No.	PntPrgNo				○	○	○	○	○	○	○	○
47	Step No.	PrgStpNo				○			○	○	○	○	○
48	Analog override voltage	Ord volt				○	○		○	○	○	○	○
49	Override level	Ord level				○	○	○	○	○	○	○	○
50	For manufacturer setting	DmoniOut1											
51		DmoniOut2											

- Note 1. P: Position control mode
 S: Speed control mode
 T: Torque control mode
 CP: Positioning mode (point table method)
 CL: Positioning mode (program method)
 PS: Positioning mode (indexer method)
2. Standard: Standard (semi closed loop system) use of the rotary servo motor
 Full.: Fully closed loop system use of the rotary servo motor
 Lin.: Linear servo motor use
 DD: Direct drive (DD) motor use
3. It is displayed when a servo motor with thermistor is used.
 The display shows "9999" when a servo motor without thermistor is used.

(2) Status display

The display of the parameter unit switches screen depending on the status selected. The following example shows the cumulative feedback pulses is selected. For other status displays, refer to table 6.1.



Note. The numbers will be smaller when exceeding ±999999.

6. DISPLAY

Table 6.1 Monitor mode list

Display order	Name	Display name	Display unit	Description
1	Cumulative feedback pulses	Pulse F/B	pulse	Feedback pulses from the servo motor encoder are counted and displayed. Pressing the "RESET" key of the parameter unit will be "0".
2	Servo motor speed/ Linear servo motor speed	Speed F/B	r/min	The servo motor speed or linear servo motor speed is displayed. "-" is shown for reverse rotation. It is displayed rounding off 0.1 r/min (0.1 mm/s) unit.
3	Droop pulses	Droop Pls	pulse	Droop pulses of the deviation counter between a command and servo motor encoder are displayed. "-" is shown for reverse rotation pulses. The number of pulses displayed is in the encoder pulse unit.
4	Cumulative command pulses	Pulse Cmd	pulse	Position command input pulses are counted and displayed. As the value displayed is not yet multiplied by the electronic gear (CMX/CDV), it may not match the indication of the cumulative feedback pulses. Pressing the "RESET" key of the parameter unit will be "0".
5	Command pulse frequency	Pulse Frq	kpps	The frequency of position command input pulses is counted and displayed. The value displayed is not multiplied by the electronic gear (CMX/CDV).
6	Analog speed command voltage	Speed Cmd	volt	Input voltage of VC (Analog speed command) voltage is displayed
	Analog speed limit voltage			Input voltage of VLA (Analog speed limit) voltage is displayed.
7	Analog torque command voltage	Trq Limit	volt	Voltage of TC (Analog torque command) voltage is displayed.
	Analog torque limit voltage			Voltage of TLA (Analog torque limit) voltage is displayed.
8	Regenerative load ratio	Regn Load	%	The ratio of regenerative power to permissible regenerative power is displayed in %.
9	Effective load ratio	Effc Load	%	The continuous effective load current is displayed. The effective value in the past 15 s is displayed relative to the rated current of 100%.
10	Peak load ratio	Peak Load	%	The maximum occurrence torque is displayed. The highest value in the past 15 s is displayed relative to the rated torque of 100%.
11	Instantaneous torque	Instn Trq	%	The instantaneous torque is displayed. The value of torque being occurred is displayed in real time considering a rated torque as 100%.
12	Position within one-revolution	Cyc posit	pulse	The position within one revolution of the servo motor is displayed by pulses. When the value exceeds the maximum number of pulses, it resets to 0. When the servo motor rotates in the CCW direction, the value is added.
13	ABS counter	Abs count	rev	The travel distance from the home position is displayed as multi-revolution counter value of the absolute position encoder in the absolute position detection system.
14	Load to motor inertia ratio	Moment Rt		The estimated ratio of the load inertia moment to the servo motor shaft inertia moment is displayed.
15	Bus voltage	P-N Volt	volt	The voltage of main circuit converter (between P+ and N-) is displayed.
16	Load-side encoder cumulative feedback pulses	Opt plsFB	pulse	Feedback pulses from the load-side encoder are counted and displayed.
17	Load-side encoder droop pulses	Opt Droop	pulse	Droop pulses of the deviation counter between a load-side encoder and a command are displayed.
18	Load-side encoder information 1	Opt Cycpo	pulse	When an incremental encoder is used for the load-side encoder, the Z-phase counter of the load-side encoder is displayed by encoder pulses. When an absolute position linear encoder is used for the load-side encoder, the encoder absolute position is displayed.

6. DISPLAY

Display order	Name	Display name	Display unit	Description
19	Load-side encoder information 2	Opt Abscn	rev	When an incremental encoder is used for the load-side encoder, the display shows 0. When an absolute position linear encoder is used for the load-side encoder, the display shows 0. When a rotary encoder is used for the load-side encoder, the display shows the multi-revolution counter value of the encoder.
20	For manufacturer setting	Moni Out1	volt	
21		Moni Out2	volt	
22		Abpls F/B	pulse	
23	Temperature of motor thermistor	Motor Thm	deg	Displays the temperature of motor thermistor.
24	Cumulative feedback pulses (motor-side unit)	Pls F/B M	pulse	Feedback pulses from the servo motor encoder are counted and displayed for the fully closed loop control.
25	Electrical angle	Ele Cycpo	pulse	The servo motor electrical angle is displayed.
26	For manufacturer setting	Reserved		
27		Reserved		
28		Reserved		
29		Reserved		
30		Reserved		
31	Motor-side/load-side position deviation	Posit Dev	pulse	Displays a position deviation between motor-side encoder and load-side encoder during fully closed loop control.
32	Motor-side/load-side speed deviation	Speed Dev	r/min	Displays a speed deviation between motor side and load side during fully closed loop control.
33	Encoder inside temperature	In Enc Thm	deg	Inside temperature of encoder detected by the encoder is displayed.
34	Settling time	Set Time	msec	Displays the settling time in the position control mode.
35	Oscillation detection frequency	Oscil Frq	Hz	Displays vibration frequency at the time of oscillation detection.
36	Number of tough drive operations	Tough Drv		The number of tough drive functions activated is displayed.
37	For manufacturer setting	Drive Rec		
38		In Amp Thm	deg	
39		Am Amp Thm	deg	
40		Fan Speed		
41	Unit power consumption	Power1	W	Unit power consumption is displayed by increment of 1 W. Positive value indicate power running, and negative value indicate regeneration.
42	Unit total power consumption	Total Pc1	Wh	Unit total power consumption is displayed by increment of 1 kWh. Positive value indicate power running, and negative value indicate regeneration.
43	Current position	Cur Posit	mm	When " __ 0 _ " (positioning display) is set in [Pr. PT26], the actual current position is displayed as machine home position is 0. When " __ 1 _ " (roll feed display) is set in [Pr. PT26], the actual current position is displayed as start position is 0.
44	Command position	Cmd Posit	mm	When " __ 0 _ " (positioning display) is set in [Pr. PT26], the command current position is displayed as machine home position is 0. When " __ 1 _ " (roll feed display) is set in [Pr. PT26], turning on the start signal starts counting from 0 and a command current position to the target position is displayed in the automatic mode. The command positions of the selected point table are displayed at a stop. In the manual mode, the command positions of the selected point table are displayed.
45	Command remaining distance	Cmdremin	mm	Displays the remaining distance to the command position of the currently selected point table.
46	Point table No./Program No./Station position No.	PntPrgNo		Displays the point table No./program No./station position No. currently executed.

6. DISPLAY

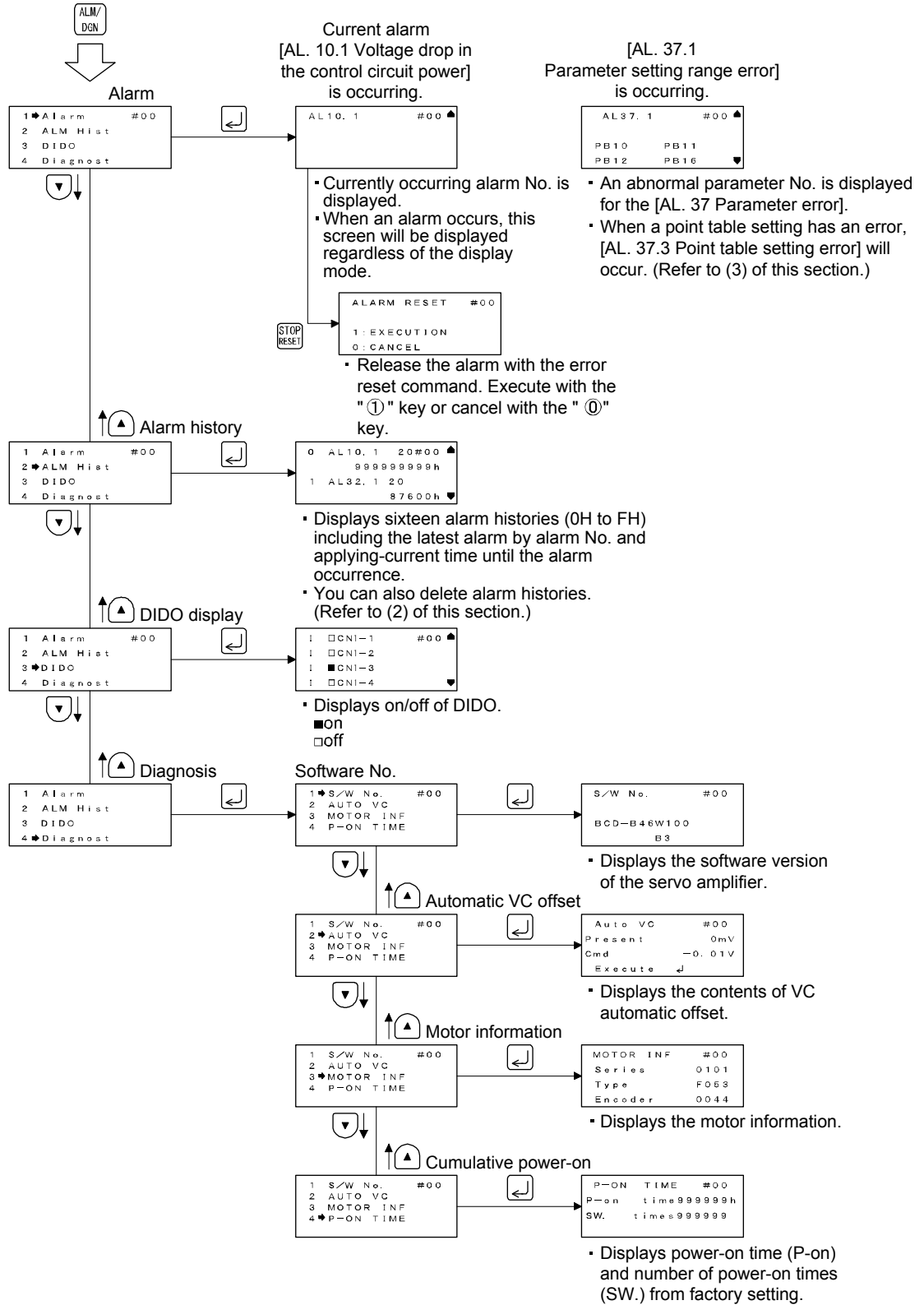
Display order	Name	Display name	Display unit	Description
47	Step No.	PrgStpNo		The step No. of the program currently being executed is displayed.
48	Analog override voltage	Ord volt	volt	The analog override voltage is displayed.
49	Override level	Ord level	%	The setting value of the override is displayed. When the override is disabled, 100% is displayed. The override function has two types. One is analog override by using analog voltage input and another is digital override by using parameter settings.
50	For manufacturer setting	DmoniOut1	Volt	
51		DmoniOut2	Volt	

6. DISPLAY

6.4 Alarm/diagnosis mode

(1) Alarm display

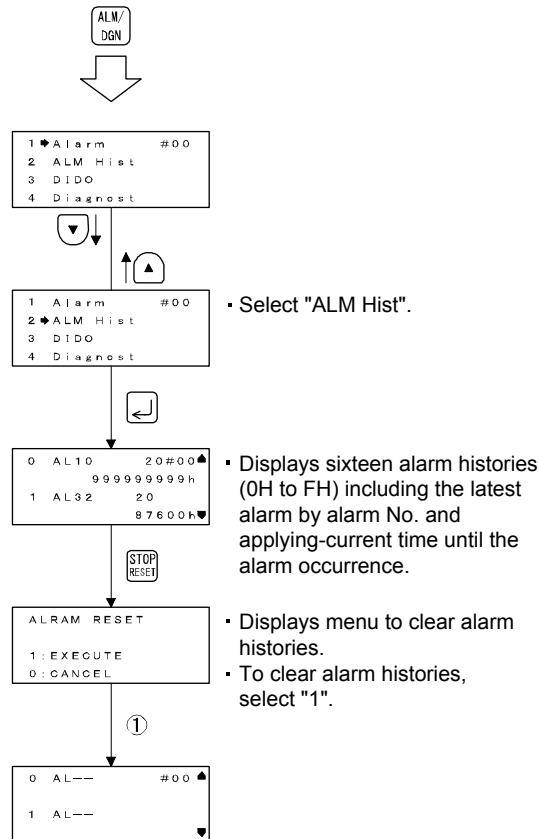
The following shows setting procedures of alarm, alarm history, external I/O signal (DIDO) display, and diagnosis.



6. DISPLAY

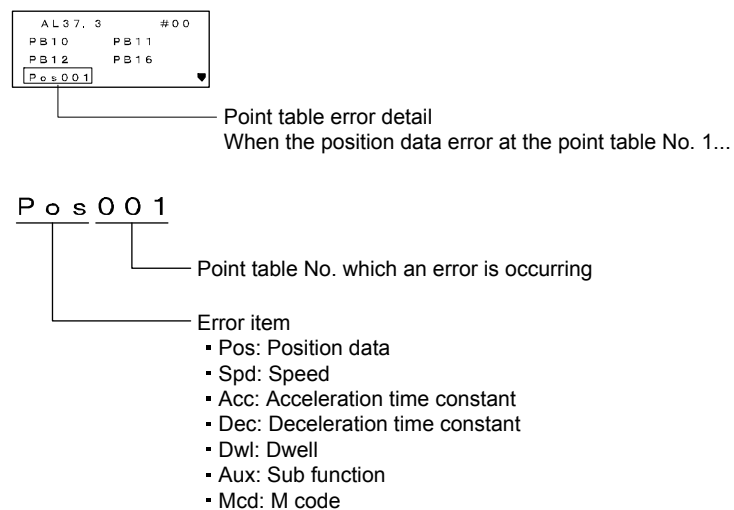
(2) Alarm history clear

The servo amplifier stores last sixteen alarms from when its power is switched on at first. To control the alarms that will occur for regular operation, clear the alarm history before starting regular operation.



(3) Point table error

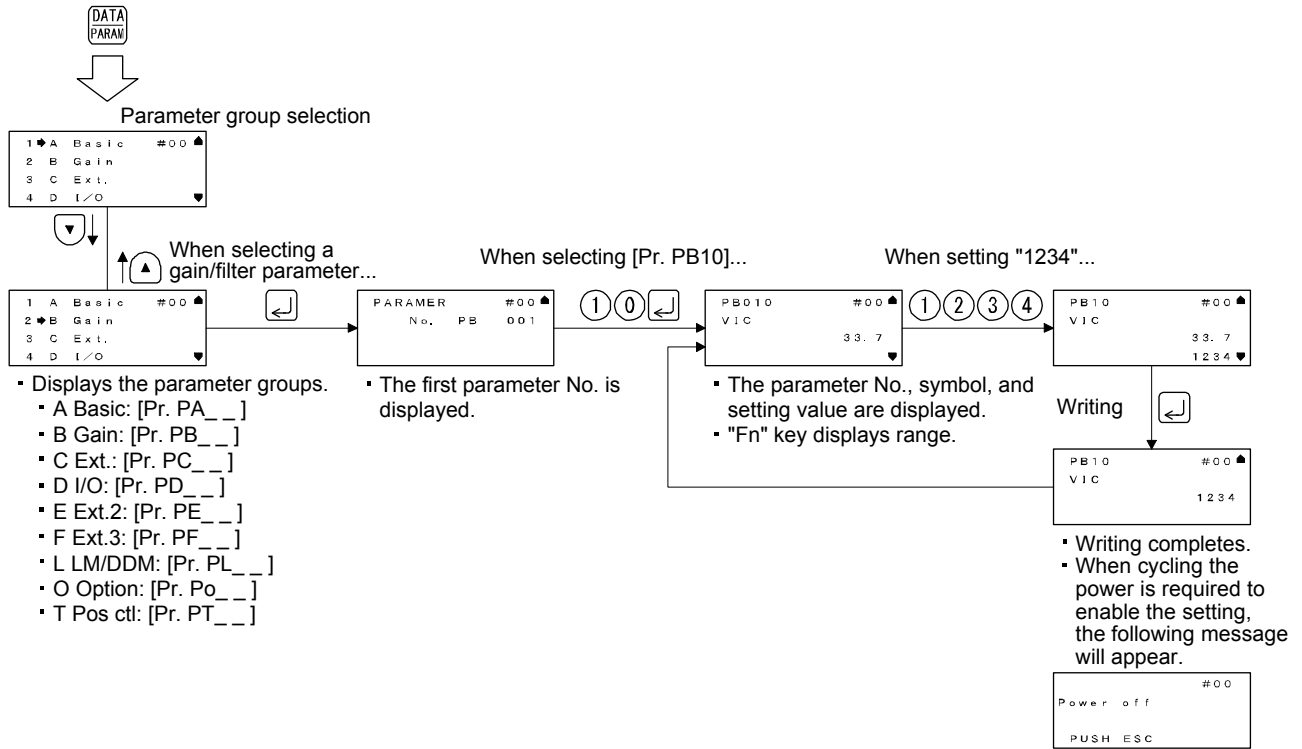
When a point table setting has an error, [AL. 37.3 Point table setting error] will occur. After [AL. 37.3], the content of the point table error will be displayed.



6. DISPLAY

6.5 Parameter mode

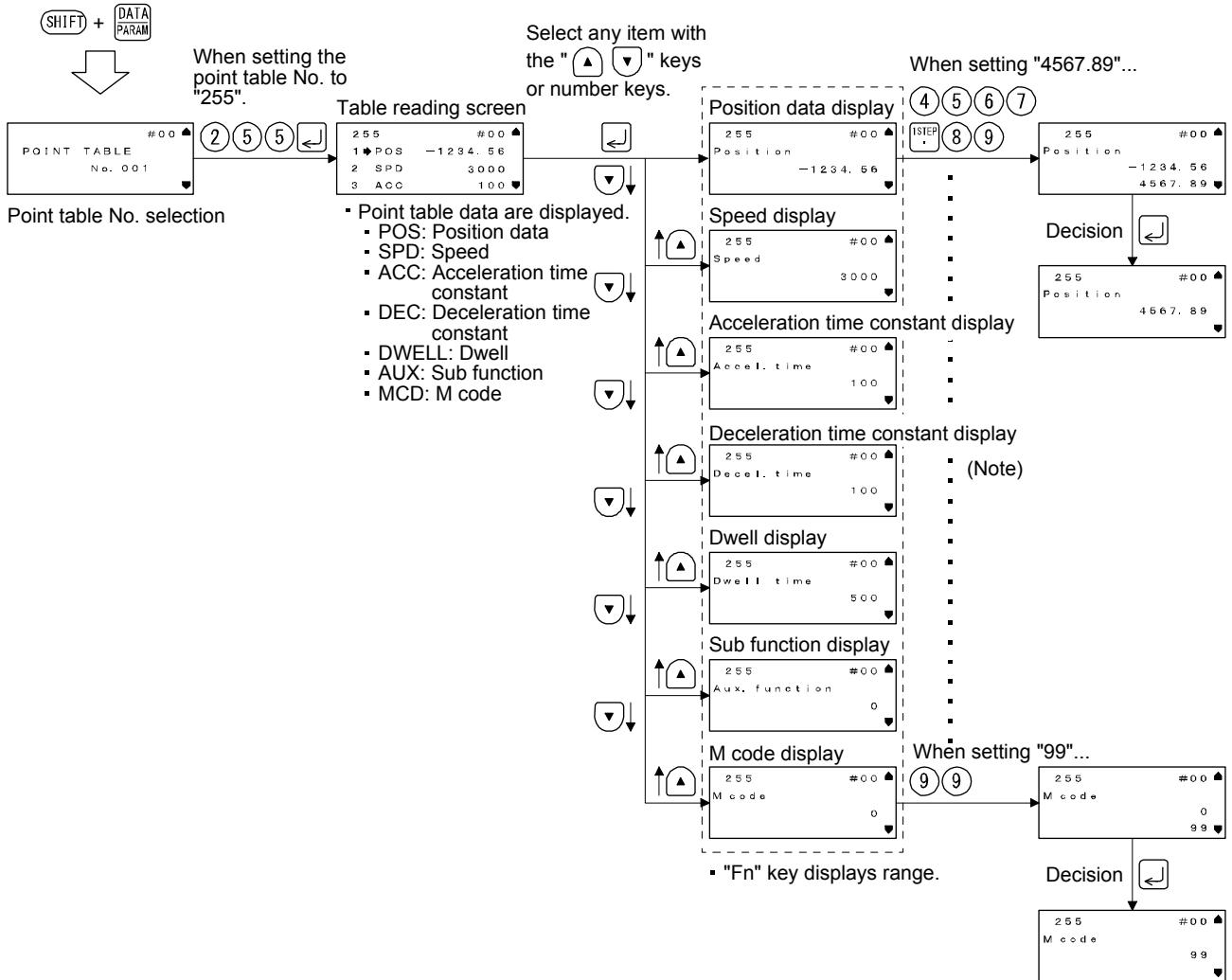
Displays setting procedures of parameters.



6. DISPLAY

6.6 Point table mode

Displays setting procedures of point table data.



Note. The setting procedures for each data are all the same.

6. DISPLAY

6.7 Test operation mode



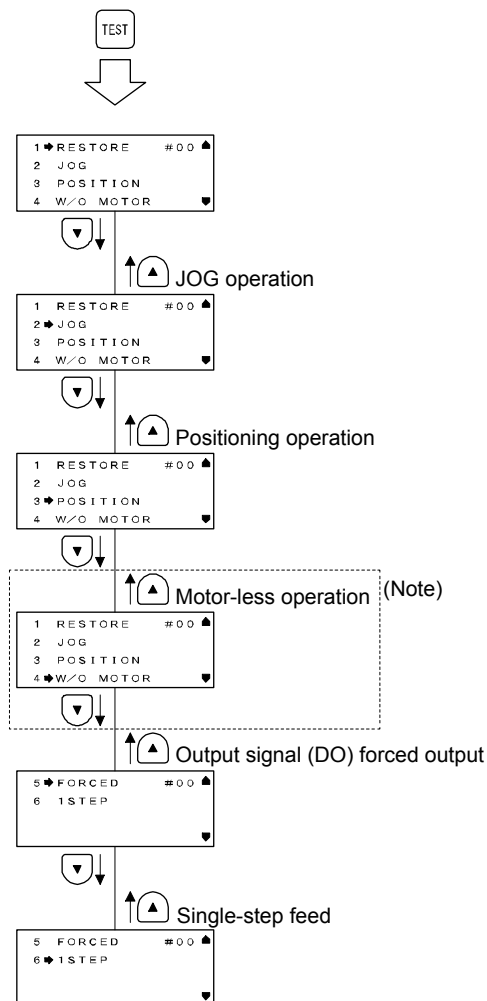
CAUTION

- The test operation mode is designed for checking servo operation. Do not use it for actual operation.
- Before using the test operation mode for operation checks of the machine, check safety devices such as EM2 (Forced stop 2) operate properly.
- If the servo motor operates unexpectedly, use EM2 (Forced stop 2) to stop it.

POINT

- Test operation cannot be performed if SON (Servo-on) is not turned off.
- The single-step feed operation is only for the point table operation.
- The motor-less operation cannot be used with the parameter unit although it is displayed when the test operation mode is selected.

In this mode, you can execute the test cancel, JOG operation, positioning operation, output signal (DO) forced output, and single-step feed. The following shows setting procedures of each operation. When using a servo motor with an electromagnetic brake, be sure to configure the sequence so that the electromagnetic brake operates by the MBR (Electromagnetic brake interlock) of the servo amplifier.



Note. The motor-less operation cannot be used with the parameter unit although it is displayed when the test operation mode is selected.

6. DISPLAY

(1) JOG operation

POINT
<ul style="list-style-type: none"> When performing JOG operation, turn on EM2, LSP and LSN. LSP and LSN can be set to automatic on by setting [Pr. PD01] to "_ C _ _".

JOG operation can be performed when there is no command from the controller.

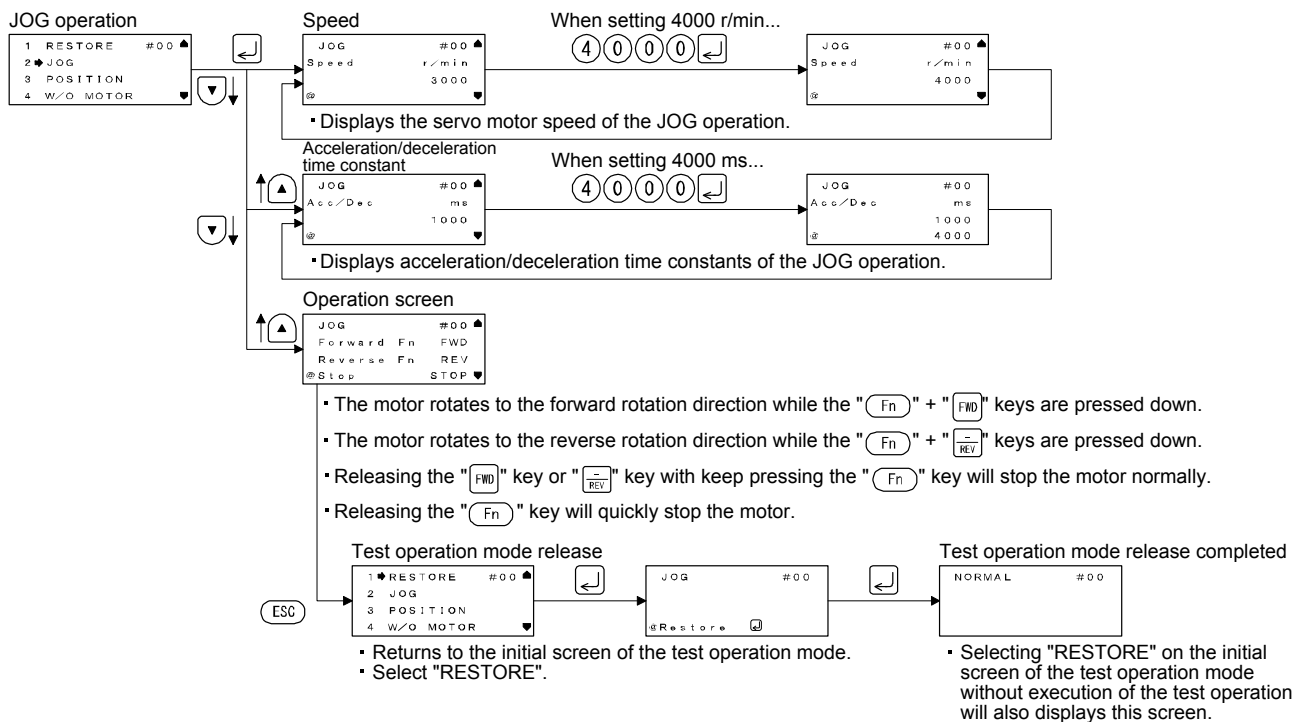
(a) Operation/drive/release

You can change the operation conditions with the parameter unit. The initial operation condition and setting range for operation are listed below.

Item	Initial setting	Setting range
Speed [r/min]	200	0 to permissible instantaneous speed
(Note) Acceleration/deceleration time constant [ms]	1000	0 to 20000

Note. Acceleration time constant is time from stop status (0 r/min) to reach the rated speed, and deceleration time constant is time from the rated speed to reach the stop status.

The following shows the operation condition settings and the operation methods.



If a parameter unit cable is disconnected during JOG operation, the servo motor will decelerate to a stop.

(b) Status display

The status display can be monitored during JOG operation. At this time, the "FWD", "REV", and "STOP" keys are available.

6. DISPLAY

(2) Positioning operation

POINT
● Turn on EM2 (forced stop 2) when performing positioning operation.

One positioning operation can be performed when there is no command from the controller.

(a) Operation/drive/release

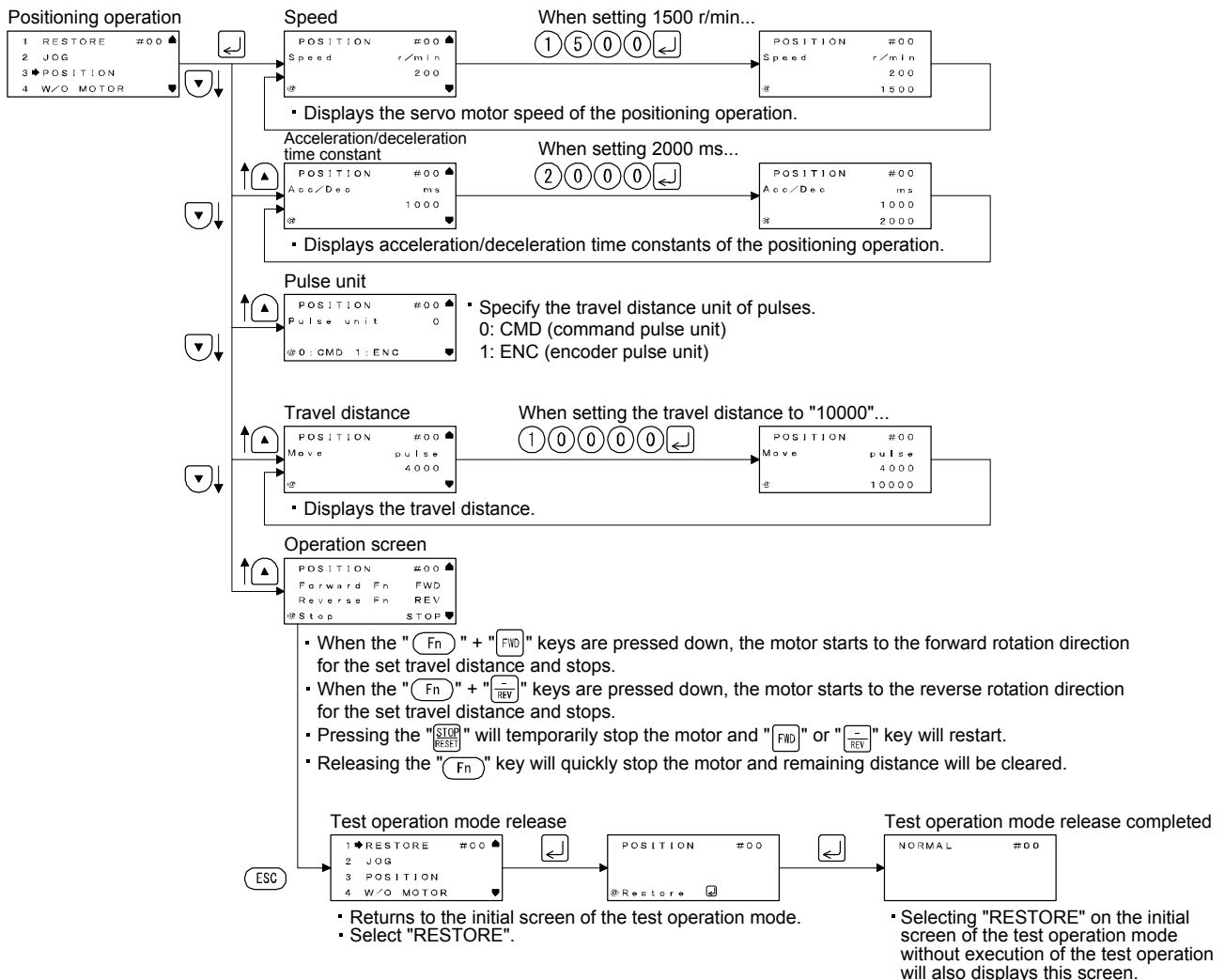
You can change the operation conditions with the parameter unit. The initial operation condition and setting range for operation are listed below.

Item	Initial setting	Setting range
Speed [r/min]	200	0 to permissible instantaneous speed
(Note 2) Acceleration/deceleration time constant [ms]	1000	0 to 20000
(Note 1) Travel distance [pulse]	4000	0 to 99999999

- Note
1. The number of command input pulses per revolution of the servo motor can be changed with [Pr. PA05].
 2. Acceleration time constant is time from stop status (0 r/min) to reach the rated speed, and deceleration time constant is time from the rated speed to reach the stop status.

6. DISPLAY

The following shows the operation condition settings and the operation methods.



If a parameter unit cable is disconnected during positioning operation, the servo motor will stop quickly.

(b) Status display

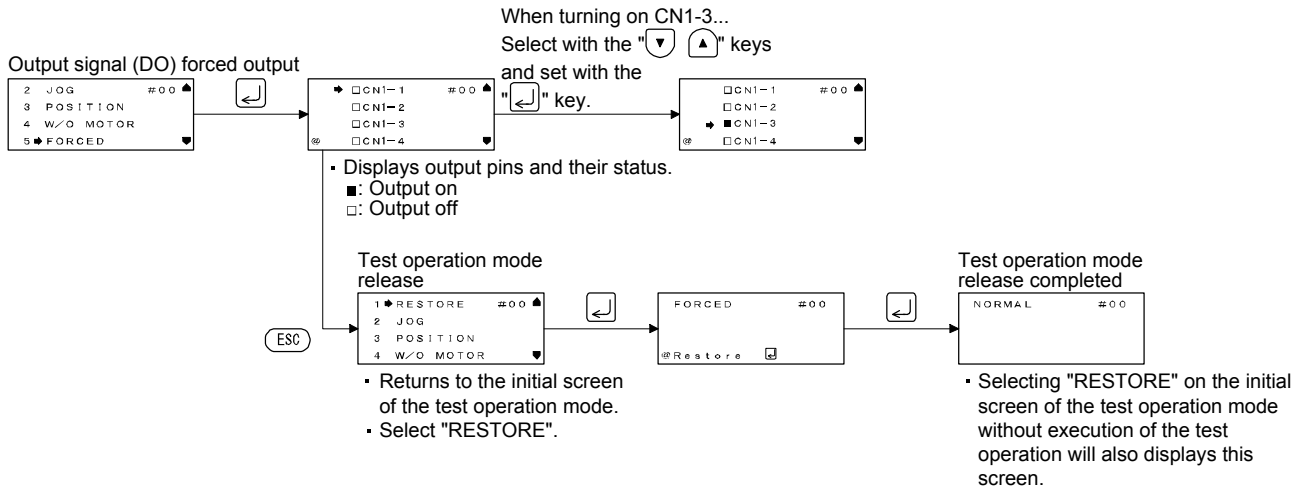
The status display can be monitored during positioning operation. At this time, the "FWD", "REV", and "STOP" keys are available.

6. DISPLAY

(3) Output signal (DO) forced output

Output signals can be switched on/off forcibly independently of the servo status. This function is used for output signal wiring check, etc. This operation must be performed in the servo off state by turning off SON (Servo-on).

The following shows operation methods.

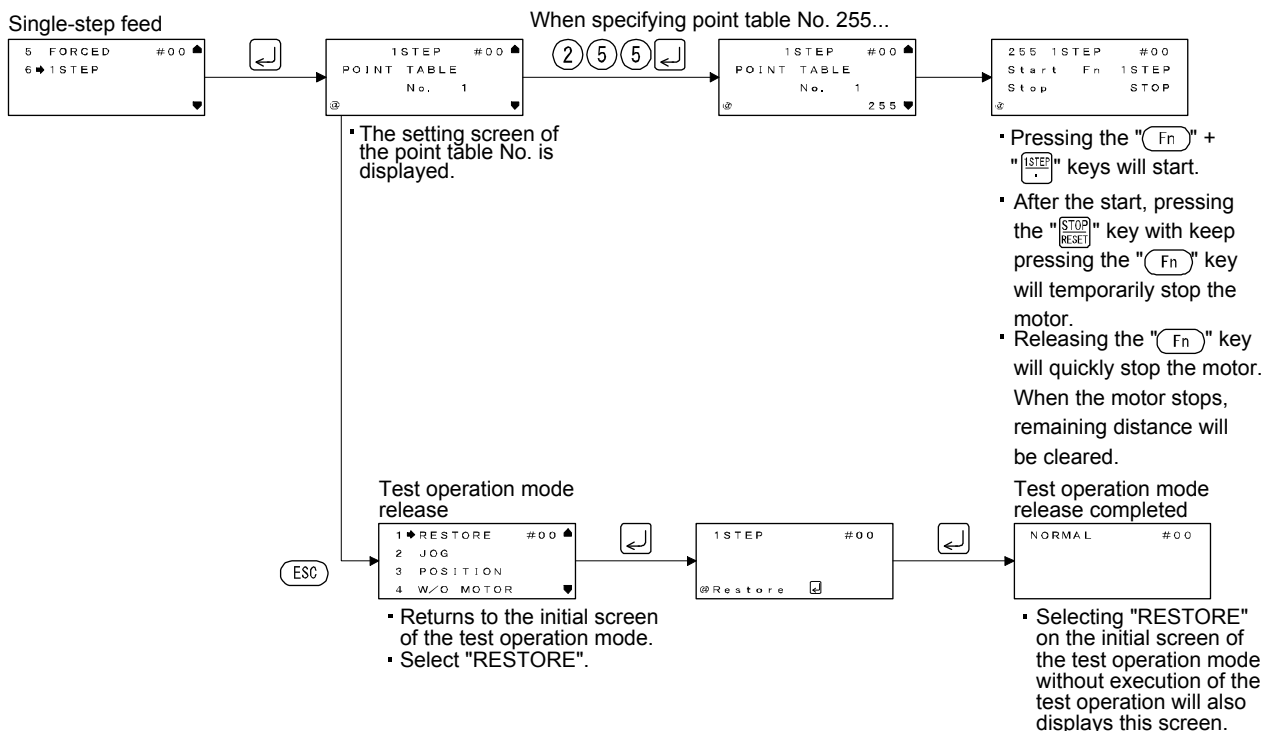


(4) Single-step feed

POINT
● Turn on EM2 (forced stop 2) when performing single-step feed.

The operation is performed based on set point table No.

The following shows the operation condition settings and the operation methods.



7. ERROR/MESSAGE LIST

7. ERROR/MESSAGE LIST

The following errors and messages may be displayed when you use the parameter unit. If an error/message has been displayed, refer to this chapter and remove its cause.

(1) Error

Item	Display	Cause
Communication error	<pre> COMMUNICATION #00 ERROR PUSH ESC </pre>	<ol style="list-style-type: none"> 1. Hardware malfunction 2. Mismatch in station No. 3. Mismatch in baud rate
Setting error	<pre> PB10 #00 VIC INPUT ERR. 1234 </pre>	Incorrect input, etc.
Writing error	<pre> PB10 #00 VIC WRITE ERR. 1234 </pre>	A value was written while writing was disabled.
EEP-ROM writing error	<pre> EEPROM ERR. #00 PUSH ESC </pre>	<ol style="list-style-type: none"> 1. A part in the parameter unit is failure. 2. The number of writing times to EEPROM exceeded 100,000 times in the parameter unit.

7. ERROR/MESSAGE LIST

(2) Message

Display	Description
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> #00 Power off PUSH ESC </div>	A parameter which was enabled at power-off was written.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> #00 DO NOT CHANGE STATION NO PUSH ESC </div>	A station No. was set to transit using the parameter unit during the test operation mode.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> #00 SET TEST DRIVE DIFFER PUSH ESC </div>	The test operation has not been released.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> #00 TEST MODE CHANGED PUSH ESC </div>	The test mode was changed due to external factor.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> #00 DO NOT READ PARAMETER PUSH ESC </div>	An invalid parameter to read in [Pr. PA19 Parameter writing inhibit] was attempted to read.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> TEST DRIVE ON PUSH ESC </div>	In the test operation, the "ESC" key was pressed while the "Fn" key was pressed down to switch the screen to the parameter unit setting screen.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> SERVO NOT READY PUSH ESC </div>	RD (Ready) cannot be turned on due to alarm, etc.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> #00 SON ON PUSH ESC </div>	The mode was attempted to be the test operation mode at servo-on.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> #00 DO NOT CHANGE STATION NO PUSH ESC </div>	A station No. was attempted to change during the test operation.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> #00 DO NOT WRITE BLOCK NUMBER PUSH ESC </div>	A point table No. was attempted to change during the single-step feed operation.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> #00 SET DRIVE MODE DIFFER PUSH ESC </div>	A point table No. was attempted to set to the servo amplifier other than point table method was selected.

REVISION

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USA	MITSUBISHI ELECTRIC AUTOMATION, INC. 500 Corporate Woods Parkway, Vernon Hills, IL 60061, U.S.A.	Tel : +1-847-478-2100 Fax : +1-847-478-2253
Mexico	MITSUBISHI ELECTRIC AUTOMATION, INC. Mexico Branch Mariano Escobedo #69, Col.Zona Industrial, Tlalnepantla Edo, C.P.54030, México	Tel : +52-55-9171-7600 Fax : +52-55-9171-7649
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Germany	MITSUBISHI ELECTRIC EUROPE B.V. German Branch Gothaer Strasse 8, D-40880 Ratingen, Germany	Tel : +49-2102-486-0 Fax : +49-2102-486-1120
UK	MITSUBISHI ELECTRIC EUROPE B.V. UK Branch Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, U.K.	Tel : +44-1707-28-8780 Fax : +44-1707-27-8695
Italy	MITSUBISHI ELECTRIC EUROPE B.V. Italian Branch Centro Direzionale Colleoni - Palazzo Sirio Viale Colleoni 7, 20864 Agrate Brianza(Milano) Italy	Tel : +39-039-60531 Fax : +39-039-6053-312
Spain	MITSUBISHI ELECTRIC EUROPE, B.V. Spanish Branch Carretera de Rubí, 76-80-Apdo. 420, 08173 Sant Cugat del Vallés (Barcelona), Spain	Tel : +34-935-65-3131 Fax : +34-935-89-1579
France	MITSUBISHI ELECTRIC EUROPE B.V. French Branch 25, Boulevard des Bouvets, F-92741 Nanterre Cedex, France	Tel : +33-1-55-68-55-68 Fax : +33-1-55-68-57-57
Czech Republic	MITSUBISHI ELECTRIC EUROPE B.V. Czech Branch Avenir Business Park, Radlicka 751/113e, 158 00 Praha5, Czech Republic	Tel : +420-251-551-470 Fax : +420-251-551-471
Poland	MITSUBISHI ELECTRIC EUROPE B.V. Polish Branch ul. Krakowska 50, 32-083 Balice, Poland	Tel : +48-12-630-47-00 Fax : +48-12-630-47-01
Russia	MITSUBISHI ELECTRIC EUROPE B.V. Russian Branch St. Petersburg office Piskarevsky pr. 2, bld 2, lit "Sch", BC "Benua", office 720; RU-195027 St. Petersburg, Russia	Tel : +7-812-633-3497 Fax : +7-812-633-3499
Turkey	MITSUBISHI ELECTRIC TURKEY A.S Ümraniye Branch Şerifali Mahallesi Nutuk Sokak No:5 TR-34775 Ümraniye, İstanbul, Turkey	Tel : +90-216-526-3990 Fax : +90-216-526-3995
South Africa	ADROIT TECHNOLOGIES 20 Waterford Office Park, 189 Witkoppen Road, ZA-Fourways, South Africa	Tel : +27-11-658-8100 Fax : +27-11-658-8101
China	MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. No.1386 Hongqiao Road, Mitsubishi Electric Automation Center, Changning District, Shanghai, China	Tel : +86-21-2322-3030 Fax : +86-21-2322-3000
Taiwan	SETSUYO ENTERPRISE CO., LTD. 6F, No.105, Wugong 3rd Road, Wugu District, New Taipei City 24889, Taiwan, R.O.C.	Tel : +886-2-2299-2499 Fax : +886-2-2299-2509
Korea	MITSUBISHI ELECTRIC AUTOMATION KOREA CO., LTD. 1480-6, Gayang-Dong, Gangseo-Gu, Seoul, 157-200, Korea	Tel : +82-2-3660-9510 Fax : +82-2-3664-8372/8335
Singapore	MITSUBISHI ELECTRIC ASIA PTE. LTD. 307, Alexandra Road, Mitsubishi Electric Building, Singapore 159943	Tel : +65-6473-2308 Fax : +65-6476-7439
Thailand	MITSUBISHI ELECTRIC FACTORY AUTOMATION (THAILAND) CO., LTD. 12th Floor, SV.City Building, Office Tower 1, No. 896/19 and 20 Rama 3 Road, Kwaeng Bangpompang, Khet Yannawa, Bangkok 10120,Thailand	Tel : +66-2682-6522 to 6531 Fax : +66-2682-6020
Indonesia	PT. MITSUBISHI ELECTRIC INDONESIA Gedung Jaya 11th Floor, JL. MH. Thamrin No.12, Jakarta Pusat 10340, Indonesia	Tel : +62-21-3192-6461 Fax : +62-21-3192-3942
Vietnam	MITSUBISHI ELECTRIC VIETNAM COMPANY LIMITED Unit 01 - 04, 10th Floor, Vincom Center, 72 Le Thanh Ton Street, District 1, Ho Chi Minh City, Vietnam	Tel : +84-8-3910-5945 Fax : +84-8-3910-5947
India	MITSUBISHI ELECTRIC INDIA PVT. LTD. Pune Branch Emerald House, EL-3, J Block, M.I.D.C., Bhosari, Pune, 411026, Maharashtra State, India	Tel : +91-20-2710-2000 Fax : +91-20-2710-2100
Australia	MITSUBISHI ELECTRIC AUSTRALIA PTY. LTD. 348 Victoria Road, P.O. Box 11, Rydalmere, N.S.W 2116, Australia	Tel : +61-2-9684-7777 Fax : +61-2-9684-7245

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Warranty

1. Warranty period and coverage

We will repair any failure or defect hereinafter referred to as "failure" in our FA equipment hereinafter referred to as the "Product" arisen during warranty period at no charge due to causes for which we are responsible through the distributor from which you purchased the Product or our service provider. However, we will charge the actual cost of dispatching our engineer for an on-site repair work on request by customer in Japan or overseas countries. We are not responsible for any on-site readjustment and/or trial run that may be required after a defective unit are repaired or replaced.

[Term]

The term of warranty for Product is twelve (12) months after your purchase or delivery of the Product to a place designated by you or eighteen (18) months from the date of manufacture whichever comes first ("Warranty Period"). Warranty period for repaired Product cannot exceed beyond the original warranty period before any repair work.

[Limitations]

- (1) You are requested to conduct an initial failure diagnosis by yourself, as a general rule.
It can also be carried out by us or our service company upon your request and the actual cost will be charged. However, it will not be charged if we are responsible for the cause of the failure.
- (2) This limited warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and instructions that are set forth in the instruction manual and user manual for the Product and the caution label affixed to the Product.
- (3) Even during the term of warranty, the repair cost will be charged on you in the following cases;
 - (i) a failure caused by your improper storing or handling, carelessness or negligence, etc., and a failure caused by your hardware or software problem
 - (ii) a failure caused by any alteration, etc. to the Product made on your side without our approval
 - (iii) a failure which may be regarded as avoidable, if your equipment in which the Product is incorporated is equipped with a safety device required by applicable laws and has any function or structure considered to be indispensable according to a common sense in the industry
 - (iv) a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced
 - (v) any replacement of consumable parts (battery, fan, smoothing capacitor, etc.)
 - (vi) a failure caused by external factors such as inevitable accidents, including without limitation fire and abnormal fluctuation of voltage, and acts of God, including without limitation earthquake, lightning and natural disasters
 - (vii) a failure generated by an unforeseeable cause with a scientific technology that was not available at the time of the shipment of the Product from our company
 - (viii) any other failures which we are not responsible for or which you acknowledge we are not responsible for

2. Term of warranty after the stop of production

- (1) We may accept the repair at charge for another seven (7) years after the production of the product is discontinued. The announcement of the stop of production for each model can be seen in our Sales and Service, etc.
- (2) Please note that the Product (including its spare parts) cannot be ordered after its stop of production.

3. Service in overseas countries

Our regional FA Center in overseas countries will accept the repair work of the Product. However, the terms and conditions of the repair work may differ depending on each FA Center. Please ask your local FA center for details.

4. Exclusion of responsibility for compensation against loss of opportunity, secondary loss, etc.

Whether under or after the term of warranty, we assume no responsibility for any damages arisen from causes for which we are not responsible, any losses of opportunity and/or profit incurred by you due to a failure of the Product, any damages, secondary damages or compensation for accidents arisen under a specific circumstance that are foreseen or unforeseen by our company, any damages to products other than the Product, and also compensation for any replacement work, readjustment, start-up test run of local machines and the Product and any other operations conducted by you.

5. Change of Product specifications

Specifications listed in our catalogs, manuals or technical documents may be changed without notice.

6. Application and use of the Product

- (1) For the use of our General-Purpose AC Servo, its applications should be those that may not result in a serious damage even if any failure or malfunction occurs in General-Purpose AC Servo, and a backup or fail-safe function should operate on an external system to General-Purpose AC Servo when any failure or malfunction occurs.
- (2) Our General-Purpose AC Servo is designed and manufactured as a general purpose product for use at general industries. Therefore, applications substantially influential on the public interest for such as atomic power plants and other power plants of electric power companies, and also which require a special quality assurance system, including applications for railway companies and government or public offices are not recommended, and we assume no responsibility for any failure caused by these applications when used
In addition, applications which may be substantially influential to human lives or properties for such as airlines, medical treatments, railway service, incineration and fuel systems, man-operated material handling equipment, entertainment machines, safety machines, etc. are not recommended, and we assume no responsibility for any failure caused by these applications when used. We will review the acceptability of the abovementioned applications, if you agree not to require a specific quality for a specific application. Please contact us for consultation.

MODEL	
MODEL CODE	

MITSUBISHI ELECTRIC CORPORATION

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