5.3 Program Operation

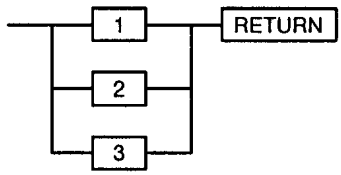
Mode	Test mode	Function	Program operation	Drawing No. 5-34

Program Operation Item Selection Screen

Message

```
T PROGRAM OPE.
 1SINGLE
 2CONTINUOUS
 3RANDOM
```

Key Operation



Operation Procedure & Explanations	Precautions/Remarks

The program operation type is selected at this screen.
The available types are as follows: independent, continuous, and random.

Selecting "single operation":

[1] [RETURN] - - - ► Go to 5-35

Selecting "continuous operation":

[2] [RETURN] - - - ► Go to 5-37

Selecting "random operation":

[3] [RETURN] - - - ► Go to 5-39

Notes

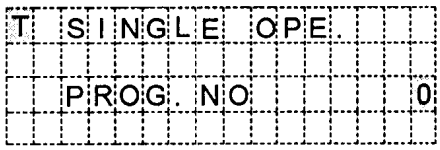
When the No. of an item is keyed in, that item No. will be highlighted.

Drawing No.

Mode	Test mode	Function	Program operation (single operation)	5-35

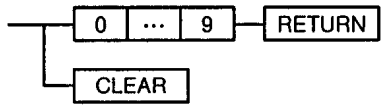
Calling the Designated Program

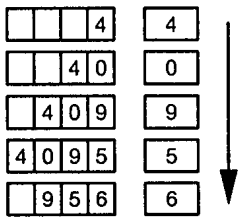
Message



Cursor position

Key Operation



Operation Procedure & Explanations	Precautions/Remarks
Use keys 0 to 9 to designate the number of the program to be read out. The program number range is 0 to 4095. Only the 4 most recent digits entered will be valid. All other digits will be ignored.	In order to execute program operation, a program must first be created in the program mode.
 Each time an input occurs, the displayed digits will move 1 space to the left.	When this program call screen is displayed, the call program No. registered at that time will be displayed as the default.
To make an input correction, press the CLEAR key to delete the input field.	
When a program has been successfully read out (by pressing RETURN key), the execution START screen for that program will be displayed. - - - ► Go to 5-36	If no program exists, the error message "!PROG. NOT FOUND" will be displayed.

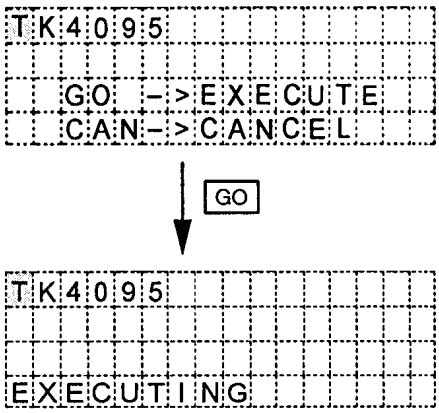
Notes

Drawing No.

Mode	Test mode	Function	Program operation (single operation)	5-36

Program Execution START Screen Operation

Message



Key Operation

Operation Procedure & Explanations	Precautions/Remarks
When the GO key is pressed, "EXECUTING" will be displayed, and execution of the designated program will begin. "COMPLETED" is displayed when program execution is completed, and the system returns to the program operation selection screen (see 5-34).	

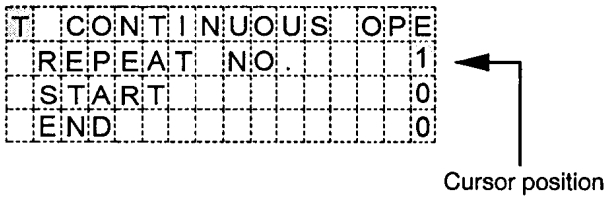
Notes

Drawing No.

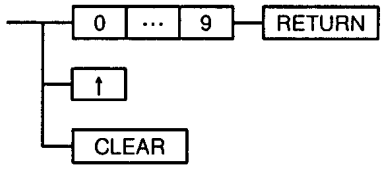
Mode	Test mode	Function	Program operation (continuous operation)	5-37

START/END Program No. Set

Message

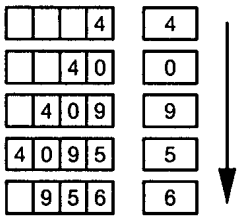


Key Operation



Operation Procedure & Explanations

In order to execute continuous operation, the 0 to 9 keys must be used to designate the operation repeat count, and the START and END program numbers. The repeat count range is 0 to 65535, with endless operation occurring when "0" is designated. The program number range is 0 to 4095.
The 5 most recently input digits are valid for the repeat count entry, and the 4 most recently input digits are valid for the program No. entry. All other digits will be ignored.



Each time an input occurs, the displayed digits will move 1 space to the left.

To make an input correction, press the CLEAR key to delete the input field at the cursor position.
When this screen is first displayed after selecting continuous operation, the repeat count will be displayed as "1", and both the START and END program numbers will be displayed as the minimum numbers possible for continuous operation. The cursor will be positioned at the right-most digit of the repeat count value.
When the RETURN key is pressed, the cursor moves to the lower input field. To re-designate an existing setting, press the ↑ key to move the cursor back to the upper field.
When the RETURN key is pressed at the END No. field, a check will be conducted to verify that the programs designated in the START No. to END No. range exist.
If a missing program No. is found, the error message "! PROG. NOT FOUND" will be displayed together with the missing program number.
If all programs are ready, the continuous operation execute START screen (5-38) will be displayed.

Precautions/Remarks

To execute continuous operation, the programs must first be created in the program mode. The START program No. and END program No. relationship must be as follows:
[START No.] <= [END No.]

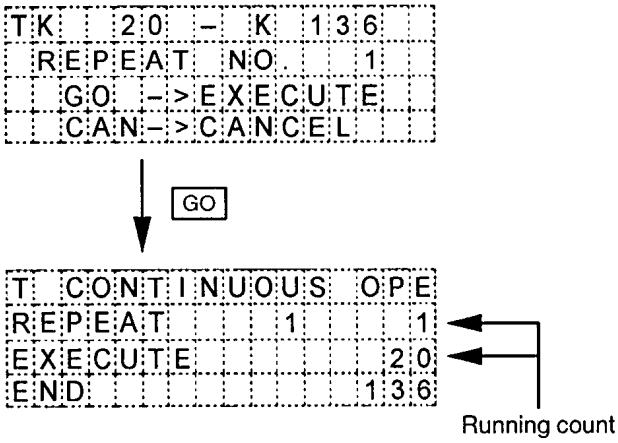
Notes

Drawing No.

Mode	Test mode	Function	Program operation (continuous operation)	5-38

Executing Continuous Operation

Message



Key Operation

Operation Procedure & Explanations	Precautions/Remarks
When the GO key is pressed, the "executing continuous operation" screen is displayed, and the designated program range will be repeated until the designated count is reached. The program number being executed will be indicated at the "EXECUTE" display line. A running count occurs at this line until the END number is reached. When the designated count is reached and continuous operation is completed, the message "COMPLETED" will be displayed. When this occurs, press the CAN key to change to the "START/END Program No. Set" screen (5-37). To end a continuous program operation while it is in progress, press the STOP key.	Continuous operation will continue without end if the repeat count is designated as "0". In this case, the STOP key must be pressed to end the operation.

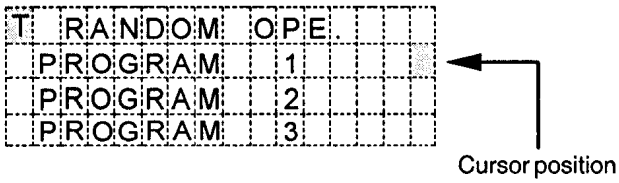
Notes

Drawing No.

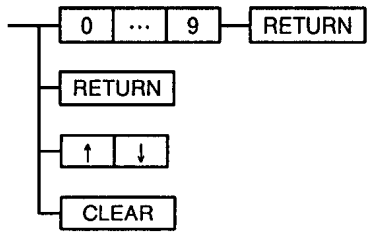
Mode	Test mode	Function	Program operation (random operation)	5-39

Random Operation Program No. Designation

Message

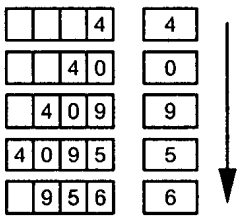


Key Operation



Operation Procedure & Explanations

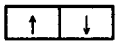
Random operation can be executed for up to 30 programs.
When the "random operation program No. designation" screen is first displayed, the input area for program No.1 to program No.3 will be shown, and the cursor will be positioned at the program No.1 input field.
The input area is scrolled upward when the RETURN key is pressed at the bottom line program No. input field. Scrolling is also possible using the ↑, ↓ keys. Scrolling is possible within the program No. range 1 to 30.
Enter the program Nos. in their order of execution, and press the RETURN key to register each No. Each time the RETURN key is pressed, a check is conducted to determine if that program exists, and if it can be executed.
The range for program numbers is 0 to 4095 and program numbers are input using keys 0 to 9. Only the 4 most recent digits entered will be valid. All other digits will be ignored.



Each time an input occurs, the displayed digits will move 1 space to the left.

To make an input correction, press the CLEAR key to delete the input field at the cursor position.
Program registration for the random operation is ended when the maximum of 30 program Nos. are registered, or when the CLEAR key is pressed at an input field, creating a space. The "repeat count input" screen (5-40) is then displayed.

Movement between input fields:



Use the ↑, ↓ keys for movement within the program 1 to 30 range. The display will scroll accordingly. If the ↑ is pressed at the program 1 position, the cursor will move to program 30. If the ↓ key is pressed at program 30, the cursor will move to program 1.

Precautions/Remarks

In order to execute program operation, the programs must first be created in the program mode.

Random operation is possible for up to 30 programs. Be sure to register the programs in an unbroken series, beginning from program 1. If a CLEAR (space) status exists at some point in the program Nos., the subsequent program Nos. will not be executed.

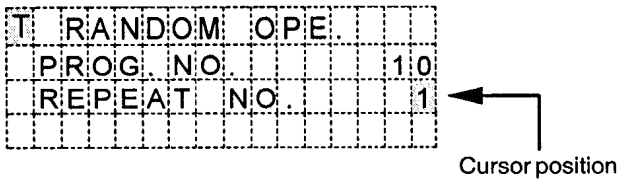
Notes

Drawing No.

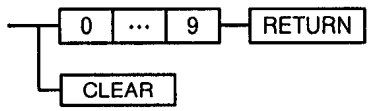
Mode	Test mode	Function	Program operation (random operation)	5-40

Random Operation Repeat Count Designation

Message



Key Operation



Operation Procedure & Explanations	Precautions/Remarks
The number of repeat operations for the registered programs (30 or less) is designated at the above screen. The repeat count range is 0 to 65535. If "0" is designated, operation will be repeated without end. When the repeat count input is completed, the random operation START screen (5-41) is displayed.	

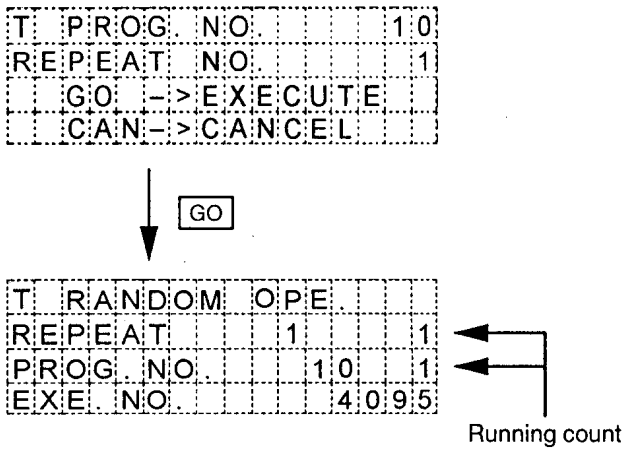
Notes

Drawing No.

Mode	Test mode	Function	Program operation (random operation)	5-41

Random Operation Execute

Message



Key Operation

Operation Procedure & Explanations	Precautions/Remarks
When the GO key is pressed, the "executing random operation" screen is displayed, and the designated program range will be repeated until the designated count is reached. The program number being executed will be indicated at the "EXECUTE NO." display line. When the designated count is reached, "COMPLETED" will be displayed. When this occurs, press the CAN key to change to the "random operation program No. set screen" (5-39). To end a random program operation while in progress, press the STOP key. Program Nos. designated for the random program operation must be registered at the "program No. registration" screen (5-24). However, the random operation will only be executed through a consecutive program No. range which begins with program 1 and is uninterrupted. In other words, operation will be executed up to the first CLEAR (space) status.	If a repeat count of "0" is designated, operation will be repeated without end. In this case, the STOP key must be pressed to stop the operation. When the program Nos. are designated as shown below, the random operation will be executed from program 1 to program 2. Program 1 10 Program 2 20 Program 3 CLEAR Program 4 40 Program 5 45 ⋮

Notes

5.4 Settings Present Values

Drawing No.

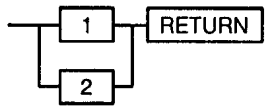
Mode	Test mode	Function	Present value set	5-42

Item Selection Screen Operation for Present Value Set

Message

```
T  P. VAL  SETTING
  1 ZERO  RETURN
  2 P. VAL  CHANGE
```

Key Operation



Operation Procedure & Explanations	Precautions/Remarks
The present value setting type ("zero return" or "present value change") is selected at this screen. Selecting "zero return": [1] [RETURN] - - - ► Go to 5-43 Selecting "present value change": [2] [RETURN] - - - ► Go to 5-44	

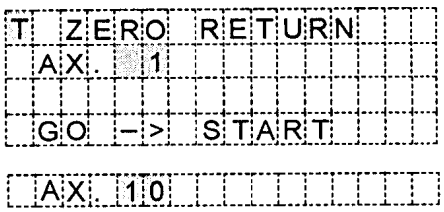
Notes	
	When the number of an item is keyed in, that item No. will be highlighted.

Drawing No.

Mode	Test mode	Function	Present value set (zero return)	5-43

Home Position Return Screen

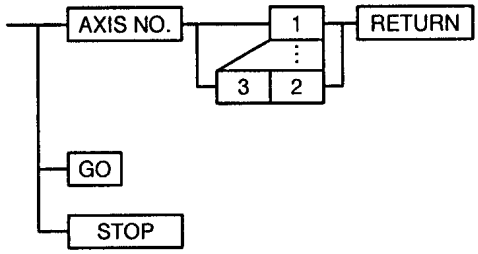
Message



The axis No. is highlighted when the servo ON status is established.

When axis No. is a 2-digit value

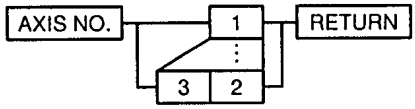
Key Operation



Operation Procedure & Explanations

The axis where a home position return is to occur is designated at this screen.
Return operation instructions are also displayed here.
When "zero return" is designated at the "item selection for present value set" screen, the axis number displayed here will be "1".

Changing the axis:



After pressing the AXIS NO. key, designate the axis No. where a home position return is desired, then press the RETURN key.
The range of axis Nos. which can be designated varies according to the CPU type being used.

For A273UHCPU (8-axis specs.)	1 to 8 axes
For A273UHCPU (32-axis specs.)	1 to 32 axes
For A171SCPU	1 to 4 axes

START:

GO — Press the GO key to execute a home position return for the displayed axis No. "EXECUTING" is displayed during the home position return operation, and "COMPLETED" is displayed when the operation is completed.

STOP:

STOP — Press the STOP key to stop a home position return operation which is in progress.

Precautions/Remarks

If an axis No. outside the ranges shown at left is designated (by RETURN key), the error message "! MIS OPERATION" will be displayed at the bottom of the screen, and the axis No. will not be changed.

Notes

Drawing No.

Mode	Test mode	Function	Present value set (present value change)	5-44

Present Value Change Screen

Message

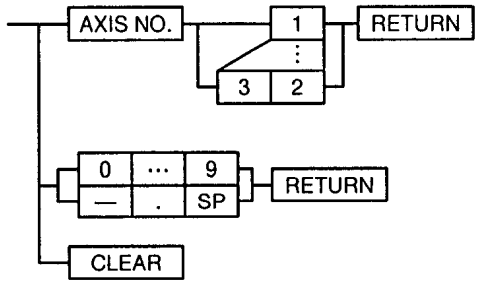
```
T P VAL CHANGE
AX  1
   -2147483648. u
              u
```

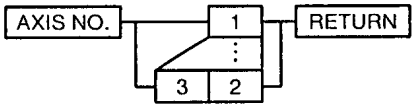
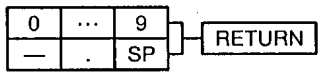
The axis No. is highlighted when the servo ON status is established.

```
AX 10
```

When axis No. is a 2-digit value

Key Operation



Operation Procedure & Explanations	Precautions/Remarks
The present value which is to be changed is designated at this screen. When "present value change" is designated at the "item selection for present value set" screen, axis 1 data will be displayed here. The present value for the displayed axis No. is indicated, and the cursor is positioned beneath this value where the new value is to be entered. Changing the axis:  After pressing the AXIS NO. key, designate the axis No. where a present value change is desired, then press the RETURN key. The range of axis Nos. which can be designated varies according to the CPU type being used. For A273UCPU (8-axis specs.) 1 to 8 axes For A273UCPU (32-axis specs.) 1 to 32 axes For A171SCPU 1 to 4 axes Entering the new (change) value:  Enter the new value, then press the RETURN key. The present value will then be changed accordingly. To correct an entered value, press the CLEAR key to clear the input field, then enter the desired value. Only the 12 most recent digits entered as the new (change) value will be valid. All other digits will be ignored.	If an axis No. outside the ranges shown at left is designated (by RETURN key), the error message "! MIS OPERATION" will be displayed at the bottom of the screen, and the axis No. will not be changed.

Notes

5.5 PC Test

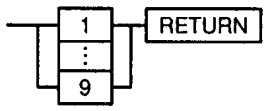
Mode	Test mode	Function	PC test	Drawing No. 5-45

Operation at Device Selection Screen for PC Test

Message

```
T  PC  TEST
1  X   4  B   7  W
2  Y   5  F   8  T
3  M   6  D   9  C
```

Key Operation



Operation Procedure & Explanations

Select the device type as shown below.

Bit data

X	1	RETURN
Y	2	RETURN
M	3	RETURN
B	4	RETURN
F	5	RETURN

Word data

D	6	RETURN
W	7	RETURN
T	8	RETURN
C	9	RETURN

Precautions/Remarks

The device No. setting range varies according to the CPU type being used. If a device No. outside the applicable range is designated, the error message "! SETTING ERROR." will be displayed at the bottom of the screen, and the device No. will not be accepted.

Notes

Drawing No.

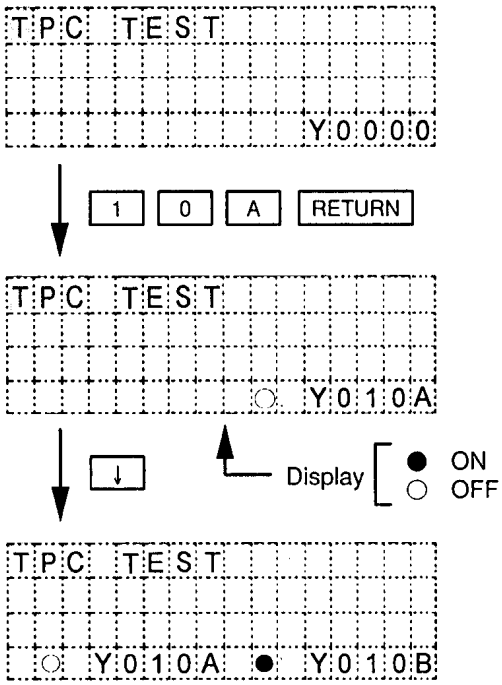
Mode	Test mode	Function	PC test	5-46

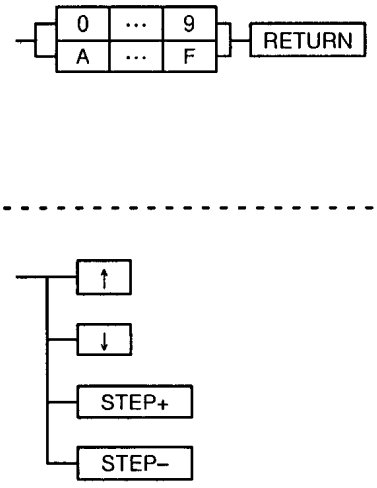
X, Y, M, B, F Device Data Set

Message

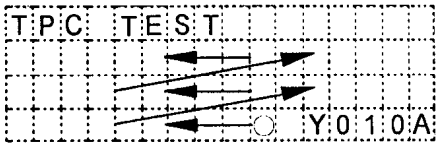
Key Operation

Example when "Y" device is selected





When the ↑, ↓ keys are used to change the address, previous addresses (address history) will be displayed on the other available lines. The progression of previous address displays on the screen is as shown below.

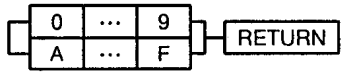


Notes

Drawing No.

Mode	Test mode	Function	PC test	5-46.1

X, Y, M, B, F Device Data Set

Operation Procedure & Explanations	Precautions/Remarks
After selecting an X, Y, M, B, F device and entering its address, the displayed address can be switched ON and OFF. Entering the device address:  A hexadecimal address is entered for X, Y, B devices, and a decimaladdress is entered for M, F devices. Displaying the previous device address: [↑] Press the ↑ to display the previous device address. If positioned at the first address, the last address will be displayed. Displaying the next device address: [↓] Press the ↓ to display the next device address. If positioned at the last device address, the first device address will be displayed. Switching the device ON: [STEP+] ● will be displayed. Switching the device OFF: [STEP–] ○ will be displayed.	

Notes

Drawing No.

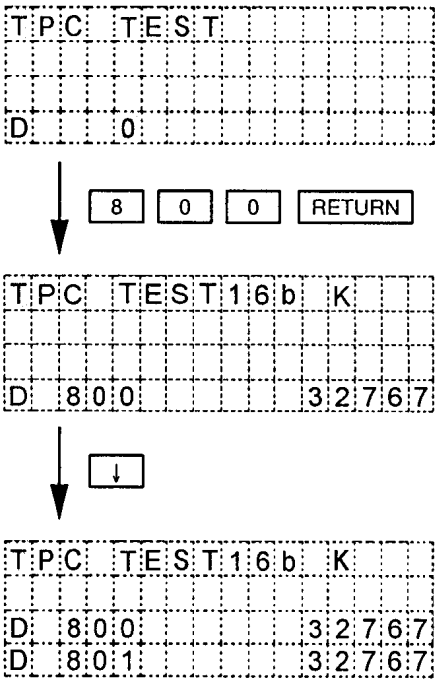
Mode	Test mode	Function	PC test	5-47

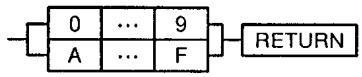
D, W, T, C Device Data Set

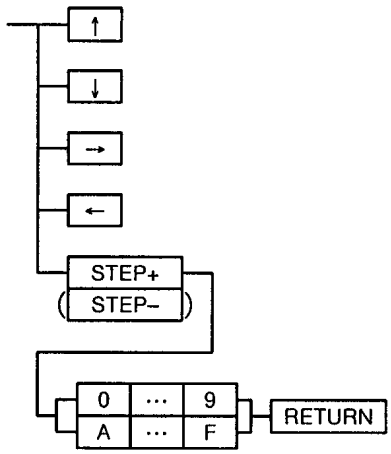
Message

Key Operation

Example when "D" device is selected







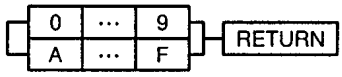
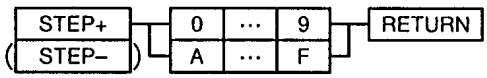
When the ↑, ↓ keys are used to change the address, the previous addresses (address history) will be displayed (3 lines).

Notes

The PC test function cannot be executed at field registers (R) or extension file registers.

Mode	Test mode	Function	PC test	5-47.1

D, W, T, C Device Data Set

Operation Procedure & Explanations	Precautions/Remarks
After selecting a D, W, T, C device and entering its address, a setting value can be designated for the displayed address. Entering the device address:  A hexadecimal address is entered for the W device, and a decimaladdress is entered for D, T, C devices. Displaying the previous device address: [↑] Press the ↑ to display the previous device address. If positioned at the first address, the last address will be displayed. Displaying the next device address: [↓] Press the ↓ to display the next device address. If positioned at the last device address, the first device address will be displayed. 16/32-bit switching: [→] Press the → key to switch between a 16-bit and 32-bit address display format. 16/32-bit switching will occur at the top of the screen. The currently displayed address will also be changed according to the 16/32-bit switching which occurs. Decimal/hexadecimal switching: [←] Press the ← key to switch between a decimal and hexadecimal address display format. When a decimal format is selected, "K" is displayed at the top of the screen. When a hexadecimal format is selected, "H" is displayed. Enter the setting value:  When the STEP+ key is pressed, the cursor will appear at the bottom right of the screen for the setting value input. Enter the desired setting value in accordance with the selected mode (decimal/hexadecimal) and bit length (16/32), the press the RETURN key.	For the T and C devices, the 16-bit, decimal format is fixed. (16/32-bit and decimal/hexadecimal switching is ignored.) Moreover, only decimal inputs (0 to 9) are possible at these devices.

Notes

5.6 Servo ON/OFF

Drawing No.

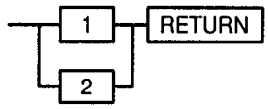
Mode	Test mode	Function	Servo ON	5-48

Servo ON/OFF Function Selection Screen Operation

Message

```
T SERVO ON/OFF
 1ALL AX. ON/OFF
 2EACH AX. ON/OFF
```

Key Operation



Operation Procedure & Explanations	Precautions/Remarks

Select the desired ON/OFF function as follows:

All-axes servo ON/OFF:

[1] [RETURN] - - - ► Go to 5-49

Individual axis servo ON/OFF:

[2] [RETURN] - - - ► Go to 5-50

Notes

Drawing No.

Mode	Test mode	Function	All-axes servo ON	5-49

All-Axes Servo ON/OFF Execute Screen

Message

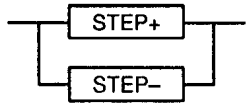
```
T ALL AX. ON/OFF
ALL AX. SERVO ON
   REQUEST ACP.
      (M2009) ○
```

→ For A171SCPU and A273UHCPU (8-axis specs.)

```
      (M2049) ○
```

→ For A273UHCPU (32-axis specs.)

Key Operation



Operation Procedure & Explanations	Precautions/Remarks
All-axes servo ON: STEP+ ● is displayed at servo ON. All-axes servo OFF: STEP– ○ is displayed at servo OFF.	The device No. display varies according to the CPU type being used.

Notes

Drawing No.

Mode	Test mode	Function	Individual servo ON	5-50

Individual Servo ON/OFF Execute Screen

Message

A171S

```
T EACH AX. ON/OFF
  1AX.  (M1615)  ○
# 2AX.  (M1635)  ○
  3AX.  (M1655)  ○
  4AX.  (M1675)  ○
```

↑ ↓ Scrolling

For A273UHCPU (8-axis specs.)

```
T EACH AX. NO/OFF
# 1AX.  (X000F)  ○
  2AX.  (X001F)  ○
  3AX.  (X002F)  ○
  4AX.  (X003F)  ○
  5AX.  (X004F)  ○
  6AX.  (X005F)  ○
  7AX.  (X006F)  ○
  8AX.  (X007F)  ○
```

↑ ↓ Scrolling

For A273UHCPU (32-axis specs.)

```
T EACH AX. NO/OFF
# 1AX.  (M2415)  ○
  2AX.  (M2435)  ○
  3AX.  (M2455)  ○
  4AX.  (M2475)  ○
   ⋮      ⋮
29AX.  (M2975)  ○
30AX.  (M2995)  ○
31AX.  (M3015)  ○
32AX.  (M3035)  ○
```

↑ ↓ Scrolling

Key Operation

↑ ↓ STEP+ STEP−

Operation Procedure & Explanations	Precautions/Remarks
Moving the "#" mark (changing the servo ON axis): ↓ Press the ↓ key to move the "#" mark downward. ↑ Press the ↑ key to move the "#" mark upward. Switching the servo ON at a given axis: STEP+ Move the "#" mark to the axis where the servo is to be switched ON, then press the STEP+ key. "●" will be displayed. Switching the servo OFF at a given axis: STEP− Move the "#" mark to the axis where the servo is to be switched OFF, then press the STEP− key. "○" will be displayed.	The device No. display varies according to the CPU type being used.

Notes

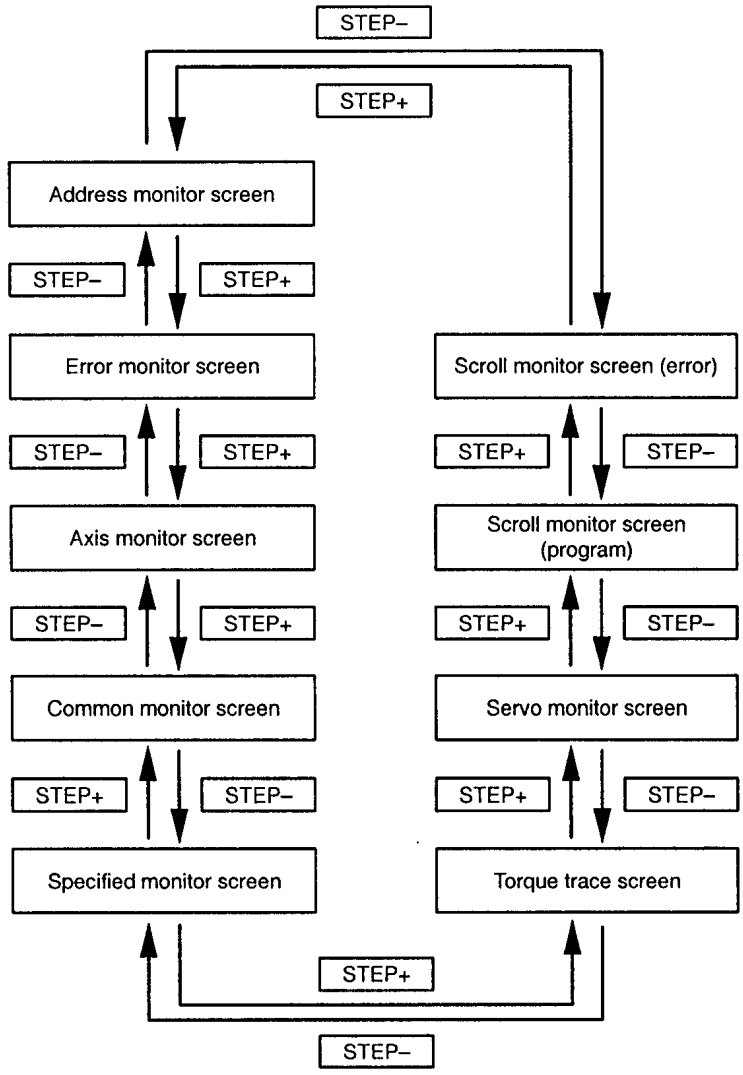
6. MONITOR MODE

Drawing No.

Mode	Monitor mode	Function	Monitor item selection	6-1

Monitor Item Screen Switching

Operation Procedure & Explanations	Precautions/Remarks
The type of monitoring can be selected at the monitor item selection screen. Moreover, the STEP+ and STEP– keys can be used to switch from one monitor item screen to another. The screen switching progression in response to STEP+ and STEP– key operation is shown below.	The address monitor screen is the first screen to be displayed when the monitor mode is accessed.



Notes

6

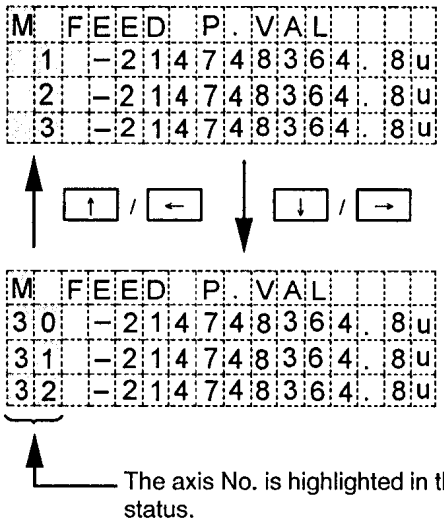
6.1 Address Monitor

Drawing No.

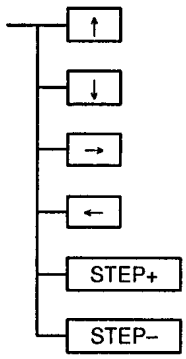
Mode	Monitor mode	Function	Address (feed present value) monitor	6-2

Address (Feed Present Value) Monitor Screen Operation

Message



Key Operation



Operation Procedure & Explanations	Precautions/Remarks
The number of axes where feed present value monitoring occurs varies according to the CPU being used: For A171SCPU 4 axes For A273UHCPU (8-axis specs.) 8 axes For A273UHCPU (32-axis specs.) 32 axes The screen can be scrolled 1 axis at a time by using the ↓, ↑ keys, or 3 axes at a time by using the ←, → keys. Switching the monitor item screen: STEP+ Switches to the error monitor screen. - - - ► Go to 6-3 STEP– Switches to the scroll monitor (error) screen. - - - ► Go to 6-14	Scroll through the axis No. range by pressing the ←, →, ↑, ↓ keys. If the ↓ key is pressed when axes 30, 31, 32 are displayed, the display content will change to axes 31, 32, 1. If the ↑ key is pressed when axes 1, 2, 3 are displayed, the display content will change to axes 32, 1, 2.

Notes

6

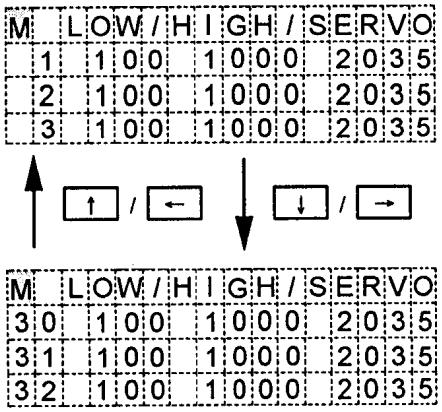
6.2 Error Monitor

Drawing No.

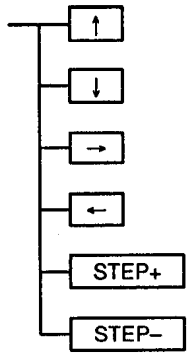
Mode	Monitor mode	Function	Error monitor	6-3

Error Monitor Screen Operation

Message



Key Operation



Operation Procedure & Explanations	Precautions/Remarks
The number of axes where error monitoring occurs varies according to the CPU being used: For A171SCPU 4 axes For A273UHCPU (8-axis specs.) 8 axes For A273UHCPU (32-axis specs.) 32 axes The most recent minor, major, or servo error is displayed. The screen can be scrolled 1 axis at a time by using the ↓, ↑ keys, or 3 axes at a time by using the ←, → keys. Switching the monitor item screen: [STEP+] Switches to the axis monitor screen. - - - ► Go to 6-4 [STEP–] Switches to the address monitor screen. - - - ► Go to 6-2	Scroll through the axis No. range by pressing the ←, →, ↓, ↑ keys. If the ↓ key is pressed when axes 30, 31, 32 are displayed, the display content will change to axes 31, 32, 1. If the ↑ key is pressed when axes 1, 2, 3 are displayed, the display content will change to axes 32, 1, 2.

Notes

⚠ CAUTION

⚠ If an error occurs, check the error contents and remedy the error as described in this manual. Some errors can result in unpredicted machine movements.

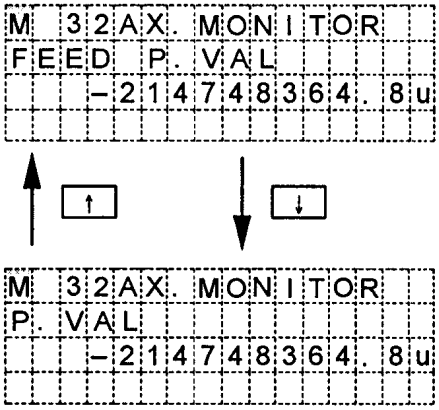
6.3 Axis Monitor

Drawing No.

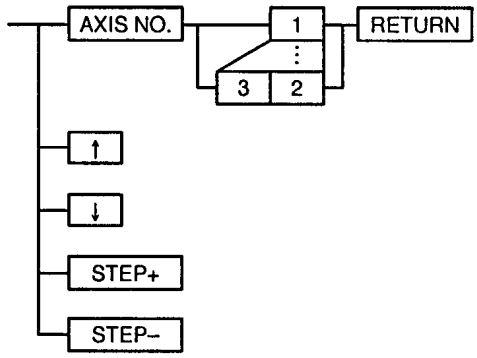
Mode	Monitor mode	Function	Axis monitor	6-4

Axis Monitor Screen Operation

Message



Key Operation



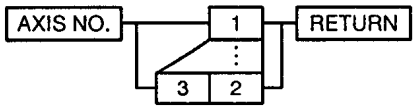
Operation Procedure & Explanations	Precautions/Remarks
The number of axes monitored varies according to the CPU being used: For A171SCPU 4 axes For A273UHCPU (8-axis specs.) 8 axes For A273UHCPU (32-axis specs.) 32 axes 15 positioning related data items are monitored for each of the axes. Use the ↓, ↑ keys to scroll from item to item.	The scrolling sequence for monitor items is shown below. Press the ↓ key to scroll downward, and the ↑ key to scroll upward. Feed present value Present value Droop pulse value Low, high, servo error Movement value after dog ON Zero return removement value Execution program No. M-code & torque restriction value Movement value change Present value at STOP input Change value of present value Speed change value JOG speed setting value Input status Output status External signal CHANGE during torque limit control

Notes

Drawing No.

Mode	Monitor mode	Function	Axis monitor	6-4.1

Axis Monitor Screen Operation

Operation Procedure & Explanations	Precautions/Remarks
Changing the monitored axis:  Press the AXIS NO. key, enter the axis No. where monitoring is desired, then press the RETURN key. The monitor item will remain the same, but the monitored axis will be changed. Changing the monitor item: STEP+ Press the STEP+ key to switch to the common monitor screen. - - - ► Go to 6-6 STEP– Press the STEP– key to switch to the error monitor screen. - - - ► Go to 6-3	If an axis No. outside the applicable range (monitoring impossible) is designated by a RETURN key input, the error message "! MIS OPERATION" will be displayed at the bottom of the screen, and the displayed axis No. will not be changed.

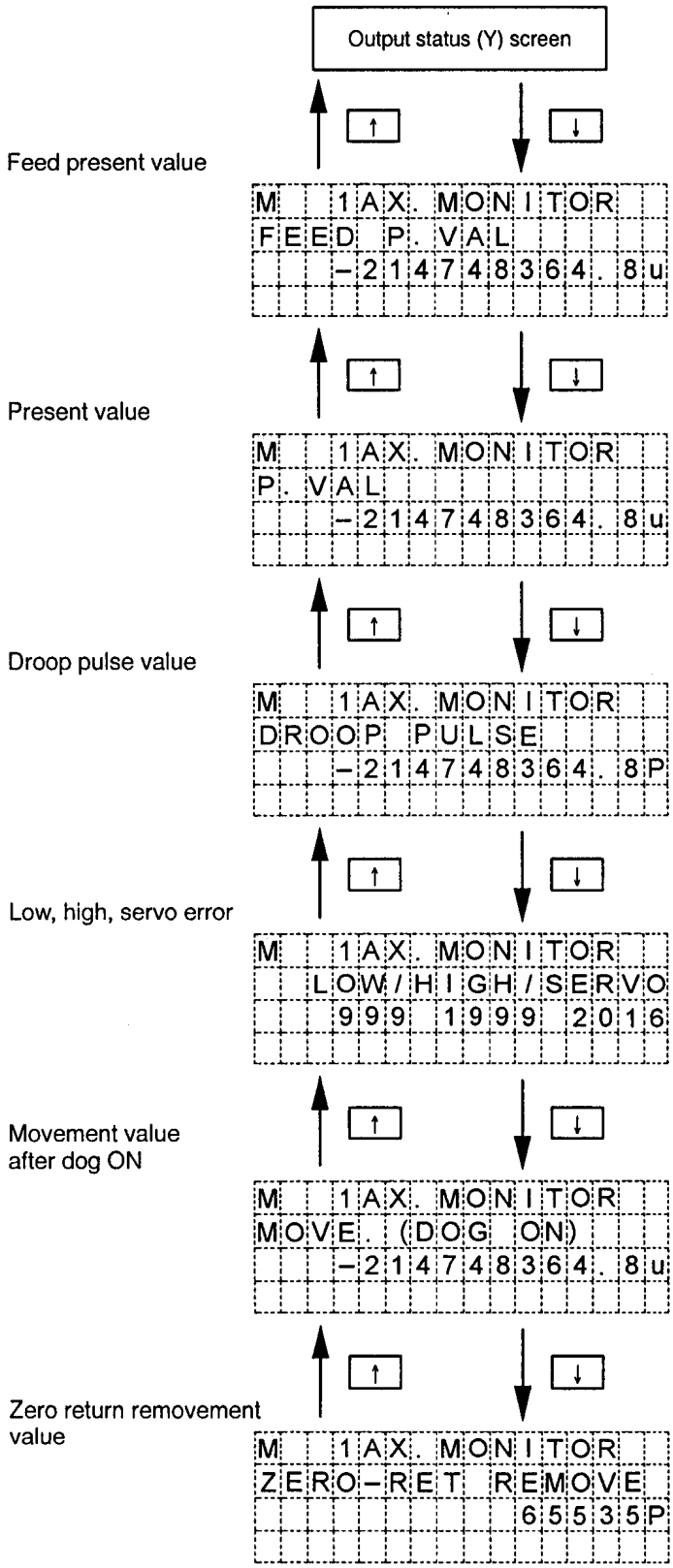
Notes

Drawing No.

Mode	Monitor mode	Function	Axis monitor	6-4.2

Axis Monitor Screen Scrolling

Operation Procedure & Explanations

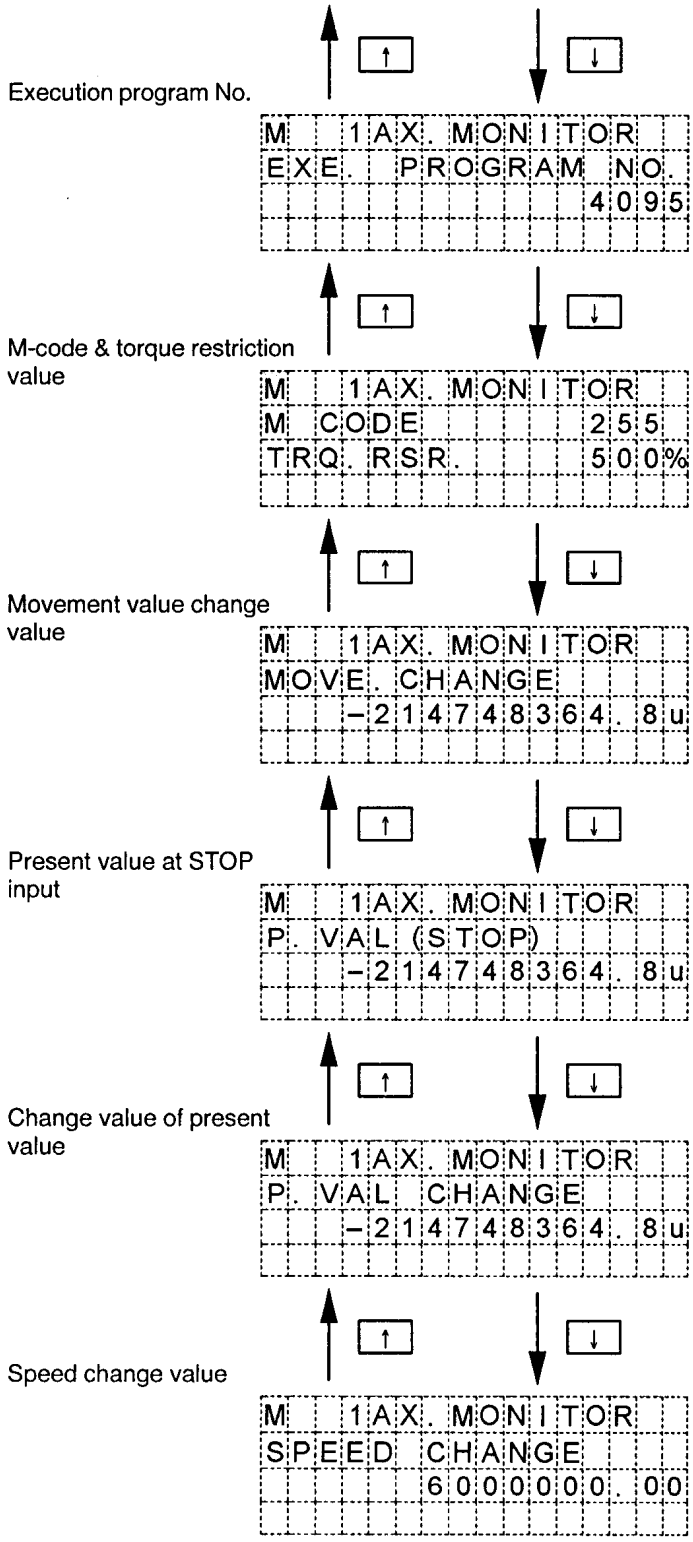


Drawing No.

Mode	Monitor mode	Function	Axis monitor	6-4.3

Axis Monitor Screen Scrolling

Operation Procedure & Explanations



There is no such display when using the A273UHCPU (32-axis specs.).

There is no such display when using the A273UHCPU (32-axis specs.).

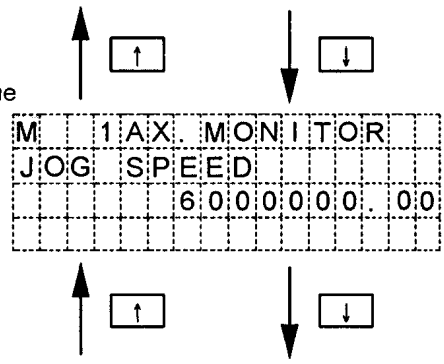
Drawing No.

Mode	Monitor mode	Function	Axis monitor	6-4.4

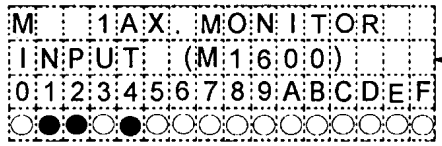
Axis Monitor Screen Scrolling

Operation Procedure & Explanations

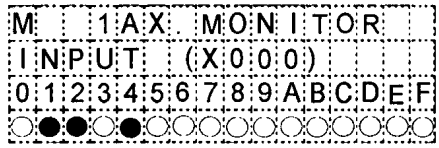
JOG speed setting value



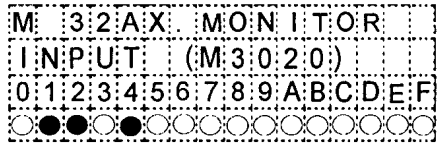
Input status



First device No. of axis in question
A171SCPU



A273UHCPU (8-axis specs.)



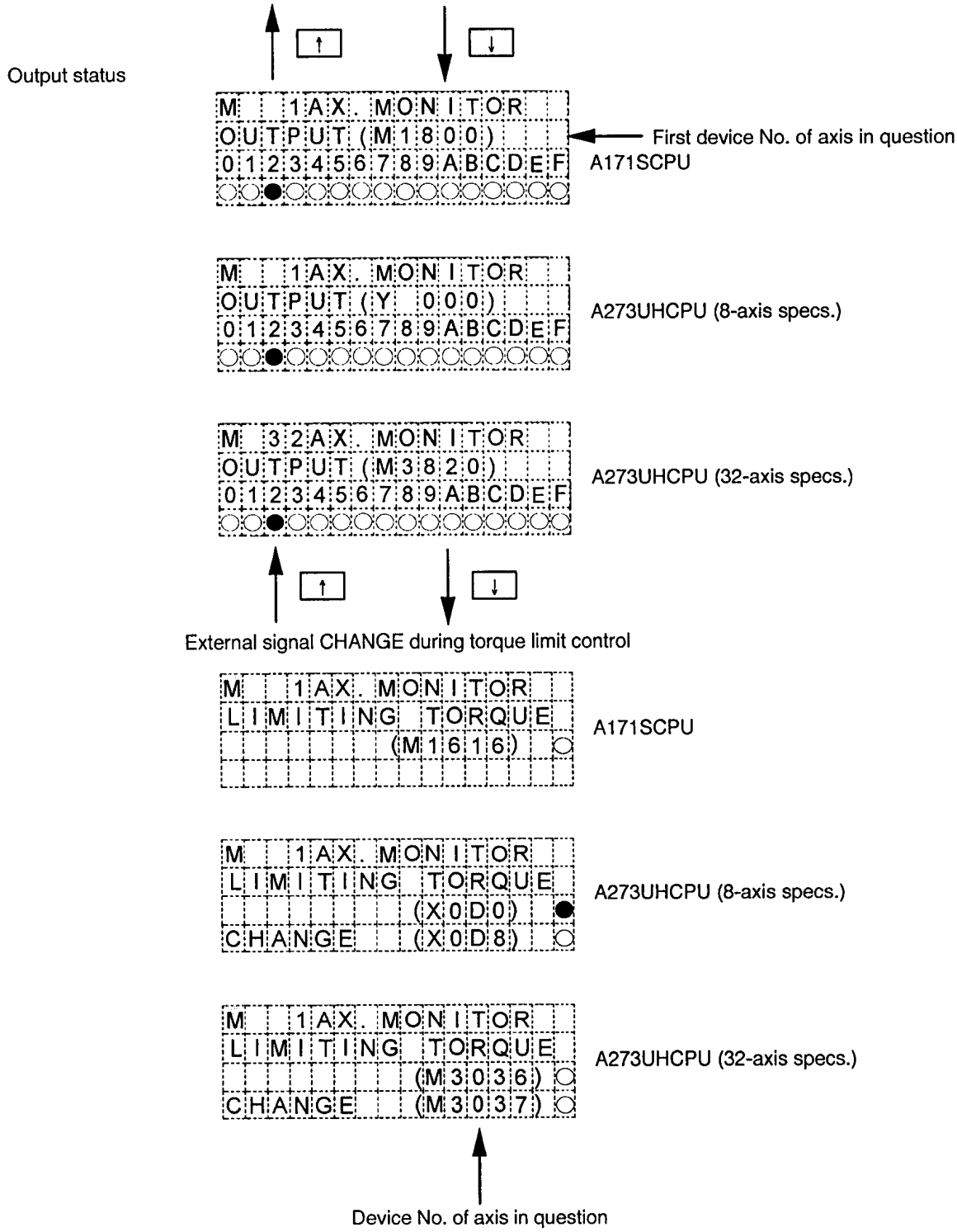
A273UHCPU (32-axis specs.)

Drawing No.

Mode	Monitor mode	Function	Axis monitor	6-4.5

Axis Monitor Screen Scrolling

Operation Procedure & Explanations

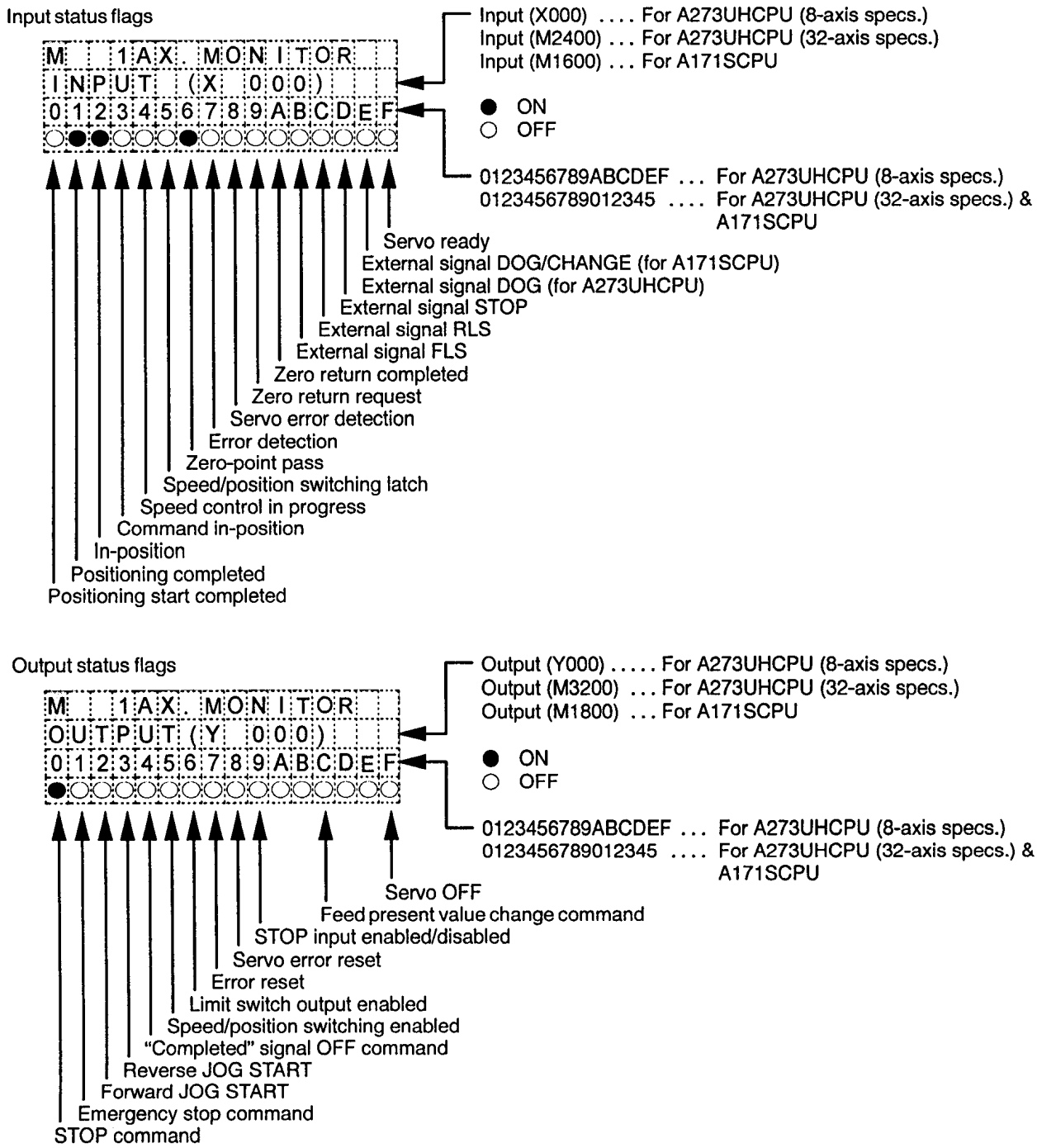


Drawing No.

Mode	Monitor mode	Function	Axis monitor	6-5

Input Status & Output Status Flags

Operation Procedure & Explanations



6.4 Common Monitor

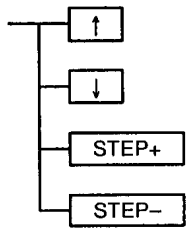
Drawing No.

Mode	Monitor mode	Function	Common monitor	6-6

Common Monitor Screen Operation

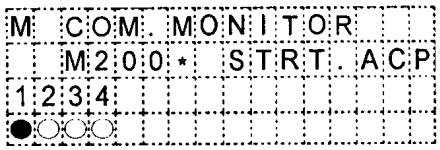
Message

Key Operation



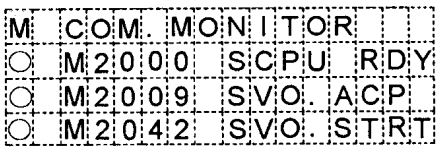
For A171SCPU & A273UHCPU (8-axis specs.)

A171S

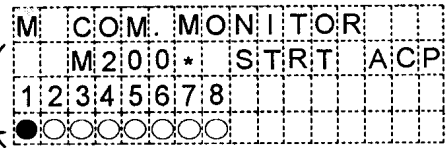


Applies to axes 1 to 4

↓ or ↑



A273UHCPU (8-axis specs.)

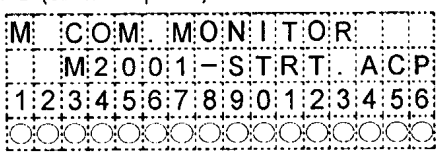


Applies to axes 1 to 8

↓ or ↑

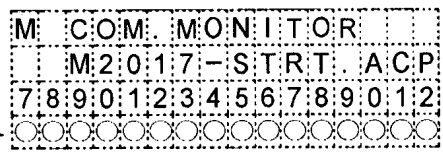
● ON
○ OFF

A273UHCPU (32-axis specs.)



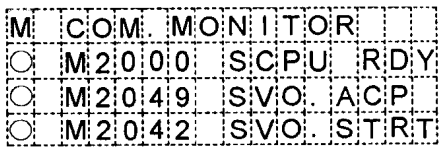
Applies to axes 1 to 16

↓ or ↑



Applies to axes 17 to 32

↓ or ↑



↓ or ↑

● ON
○ OFF

Notes

Drawing No.

Mode	Monitor mode	Function	Common monitor	6-6.1

Common Monitor Screen Operation

Operation Procedure & Explanations	Precautions/Remarks
For A171SCPU & A273UHCPU (8-axis specs.) Use the ↓, ↑ keys to switch between the 2 common monitor screens. START flag ON/OFF monitoring occurs at screen 1, and PC READY, all-axes servo ON accept flag, and all-axes servo ON request ON/OFF monitoring occurs at screen 2. For A273UHCPU (32-axis specs.) Use the ↓, ↑ keys to switch between the 3 common monitor screens. The START accept flag ON/OFF statuses for axes 1 to 16 are monitored at screen 1, and the START accept flag ON/OFF statuses for axes 17 to 32 are monitored at screen 2. The PC READY, all-axes servo ON accept flag, and all-axes servo ON request ON/OFF statuses are monitored at screen 3. Changing the monitor item: STEP+ Press the STEP+ key to switch to the specified monitor screen. - - - ► Go to 6-7 STEP− Press the STEP− key to switch to the axis monitor screen. - - - ► Go to 6-4	The device No. display varies according to the CPU type being used.

Notes

6.5 Designated Monitor

Drawing No.

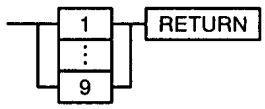
Mode	Monitor mode	Function	Specified monitor	6-7

Operation at Specified Monitor Device Selection Screen

Message

```
MSPC. MONITOR
1  X    4  B    7  W
2  Y    5  F    8  T
3  M    6  D    9  C
```

Key Operation



Operation Procedure & Explanations

Select the device type as shown below.

Bit data

X	1	RETURN
Y	2	RETURN
M	3	RETURN
B	4	RETURN
F	5	RETURN

Word data

D	6	RETURN
W	7	RETURN
T	8	RETURN
C	9	RETURN

Precautions/Remarks

The device No. setting range varies according to the CPU type being used. If a device No. outside the applicable range is designated, the error message "! SETTING ERROR " will be displayed at the bottom of the screen, and the device No. will not be accepted.

Notes

Drawing No.

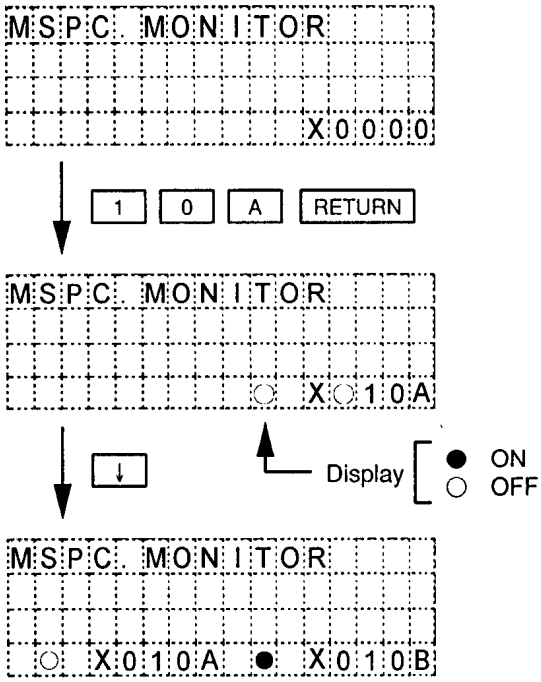
Mode	Monitor mode	Function	Specified monitor	6-8

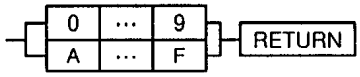
X, Y, M, B, F Device Monitoring

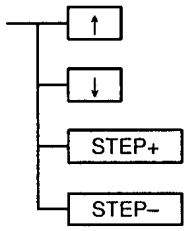
Message

Key Operation

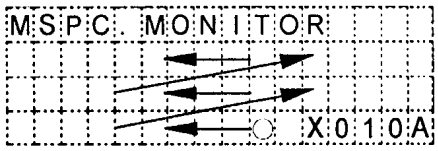
Example when "X" device is selected







When the ↑, ↓ keys are used to change the address, previous addresses (address history) will be displayed on the other available lines. The progression of previous address displays on the screen is as shown below.



Notes

Drawing No.

Mode	Monitor mode	Function	Specified monitor	6-8.1

X, Y, M, B, F Device Monitoring

Operation Procedure & Explanations	Precautions/Remarks
After selecting an X, Y, M, B, F device and entering its address, the ON/OFF status of the address can be monitored. Entering the device address: [0 ··· 9 / A ··· F] [RETURN] A hexadecimal address is entered for X, Y, B devices, and a decimaladdress is entered for M, F devices. Monitoring the previous device address: [↑] Press the ↑ to monitor the previous device address. If positioned at the first address, the last address (address of highest device No.) will be monitored. Monitoring the next device address: [↓] Press the ↓ to monitor the next device address. If positioned at the last device address (address of highest device No.), the first device address will be monitored. Changing the monitor item: [STEP+] Press the STEP+ key to switch to the torque trace screen. - - - ► Go to 6-10 [STEP–] Press the STEP– key to switch to the common monitor screen. - - - ► Go to 6-6	

Notes

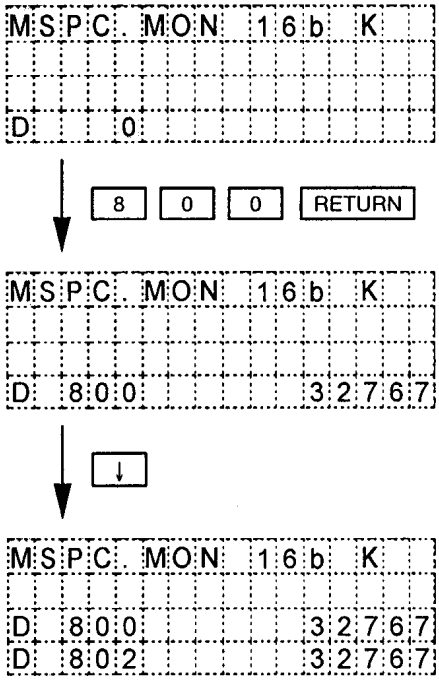
Drawing No.

Mode	Monitor mode	Function	Specified monitor	6-9

D, W, T, C Device Monitoring

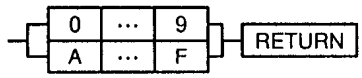
Message

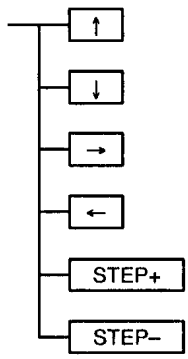
Example when "D" device is selected



When the ↑, ↓ keys are used to change the address, the previous addresses (address history) will be displayed (3 lines).

Key Operation



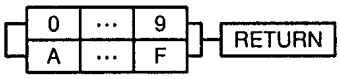


Notes

File registers (R) and extension file registers cannot be monitored.

Mode	Monitor mode	Function	Specified monitor	6-9.1

D, W, T, C Device Monitoring

Operation Procedure & Explanations	Precautions/Remarks
After selecting the device type (D, W, T, C) and entering the device address, the device data will be monitored. Entering the device address:  A hexadecimal address is entered for W devices, and a decimal address is entered for D, T, C devices. Monitoring the previous device address: [↑] Press the ↑ to monitor the previous device address. If positioned at the first address, the last address will be monitored. Monitoring the next device address: [↓] Press the ↓ to monitor the next device address. If positioned at the last device address, the first device address will be monitored. 16/32-bit switching: [→] Press the → key to switch between a 16-bit and 32-bit address display format. 16/32-bit switching will occur at the top of the screen. The currently displayed address will also be changed according to the 16/32-bit switching which occurs. Decimal/hexadecimal switching: [←] Press the ← key to switch between a decimal and hexadecimal address display format. When a decimal format is selected, "K" is displayed at the top of the screen. When a hexadecimal format is selected, "H" is displayed. Also used to switch between decimal and hexadecimal input for address content set values. Changing the monitor item: [STEP+] Press the STEP+ key to switch to the torque trace screen. - - - ► Go to 6-10 [STEP–] Press the STEP– key to switch to the common monitor screen. - - - ► Go to 6-6	For the T and C devices, the 16-bit, decimal format is fixed. (16/32-bit and decimal/hexadecimal switching is ignored.)

Notes

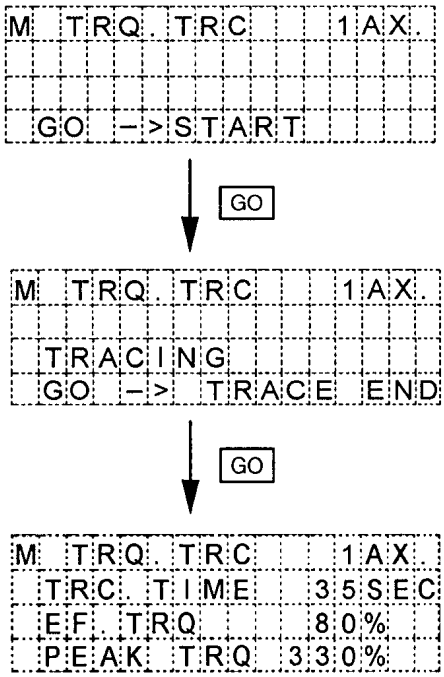
6.6 Torque Trace

Drawing No.

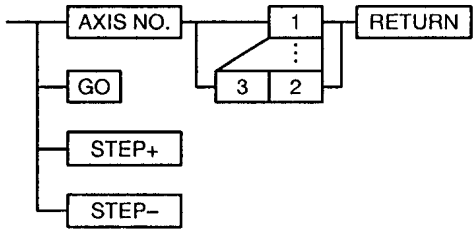
Mode	Monitor mode	Function	Torque trace	6-10

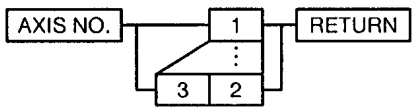
Torque Trace Screen Operation

Message



Key Operation



Operation Procedure & Explanations	Precautions/Remarks
Changing the trace axis:  Press the AXIS NO. key, enter the axis No. where the torque trace function is desired, then press the RETURN key. The number of axes where the torque trace function is possible varies according to the CPU being used: For A171SCPU 4 axes For A273UHCPU (8-axis specs.) 8 axes For A273UHCPU (32-axis specs.) 32 axes	If an axis No. outside the ranges shown at left is designated (by RETURN key), the error message "! SETTING ERROR " will be displayed at the bottom of the screen, and the axis No. will not be changed.

Notes

Drawing No.

Mode	Monitor mode	Function	Torque trace	6-10.1

Torque Trace Screen Operation

Operation Procedure & Explanations	Precautions/Remarks
Trace START & STOP: [GO] Press the GO key to start the trace function. "TRACING" will be displayed. Press the GO key again to stop the trace function. The trace results will then be displayed. Changing the monitor item: [STEP+] Press the STEP+ key to switch to the servo monitor screen. - - - ► Go to 6-11 [STEP–] Press the STEP– key to switch to the specified monitor screen. - - - ► Go to 6-7	

Notes	

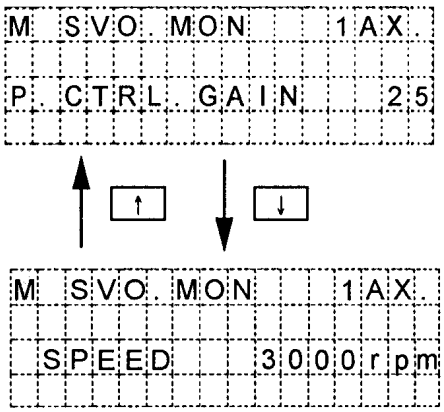
6.7 Servo Monitor

Drawing No.

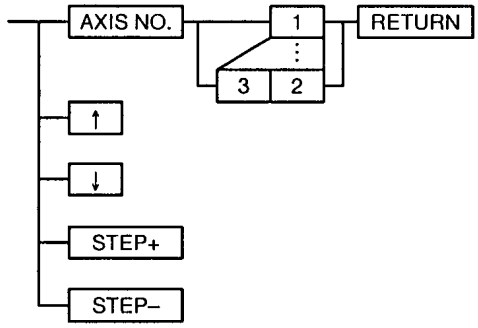
Mode	Monitor mode	Function	Servo monitor	6-11

Servo Monitor Screen Operation

Message



Key Operation

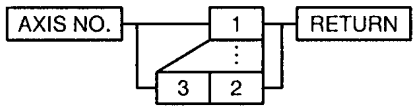


Operation Procedure & Explanations

Servo monitoring is possible for up to 32 axes, with 3 screens for monitoring servo data, 2-port memory, and address designation. Six types of data can be monitored in servo data monitoring, and the ↓, ↑ keys are used to scroll among them.
The servo data monitor screen is the first screen to be displayed when the servo monitor function is selected.

- - - ► Go to 6-12

Changing the monitored axis:



Press the AXIS NO. key, enter the axis No. where monitoring is desired, then press the RETURN key. The monitor item will remain the same, but the monitored axis will be changed.
The range of axis Nos. which can be designated varies according to the CPU type being used.

For A273UHCPU (8-axis specs.)	1 to 8 axes
For A273UHCPU (32-axis specs.)	1 to 32 axes
For A171SCPU	1 to 4 axes

Precautions/Remarks

The scrolling sequence for servo data monitor items is shown below. Use the ↓ key to scroll downward, and the ↑ key to scroll upward.

Position control gain
Motor speed
Motor current
Regeneration level
Servo alarm
Error parameter No.

The servo data monitoring function takes 5 data readings, with the average value being displayed.

If an axis No. outside the range shown at left is designated (by RETURN key), the error message "! SETTING ERROR " will be displayed at the bottom of the screen, and the axis No. will not be changed.

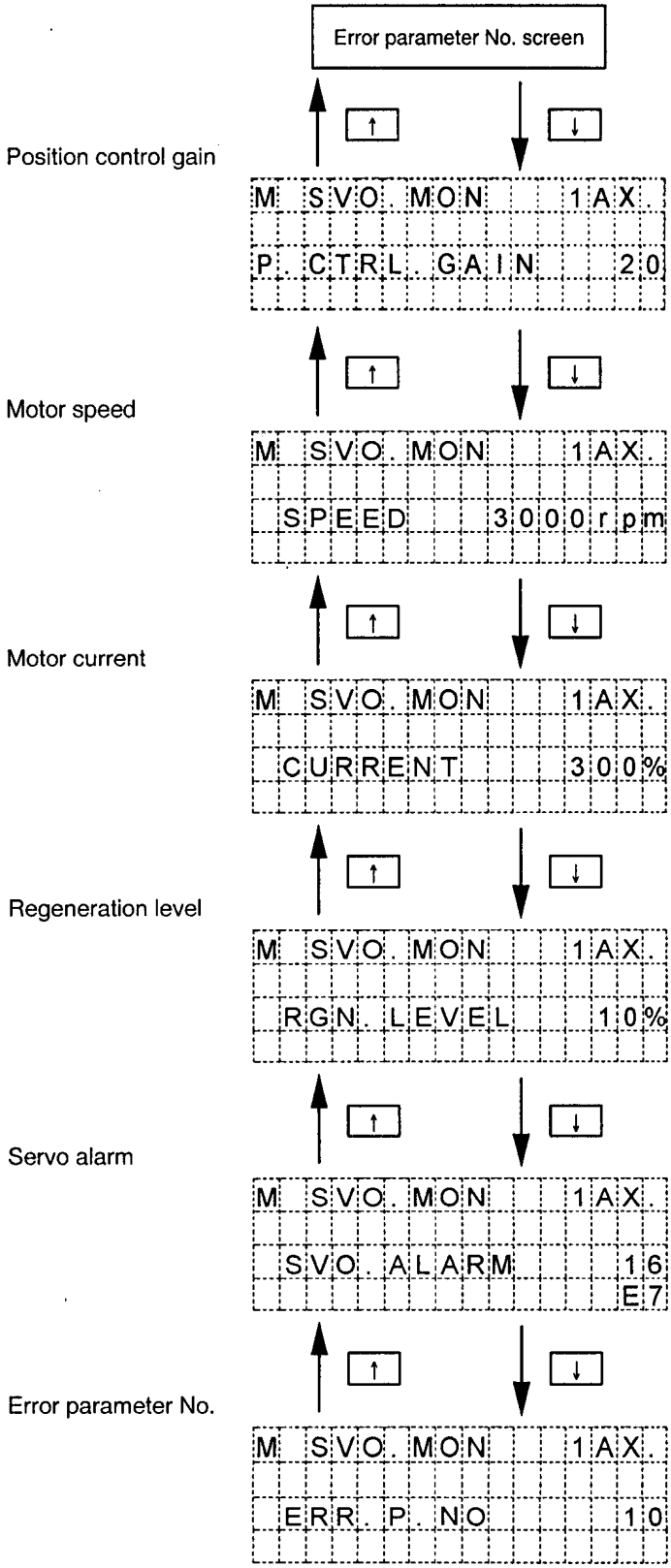
Notes

Drawing No.

Mode	Monitor mode	Function	Servo monitor (servo data monitor)	6-12

Servo Data Monitor Screen Scrolling

Operation Procedure & Explanations



6.8 Scroll Monitor (Program)

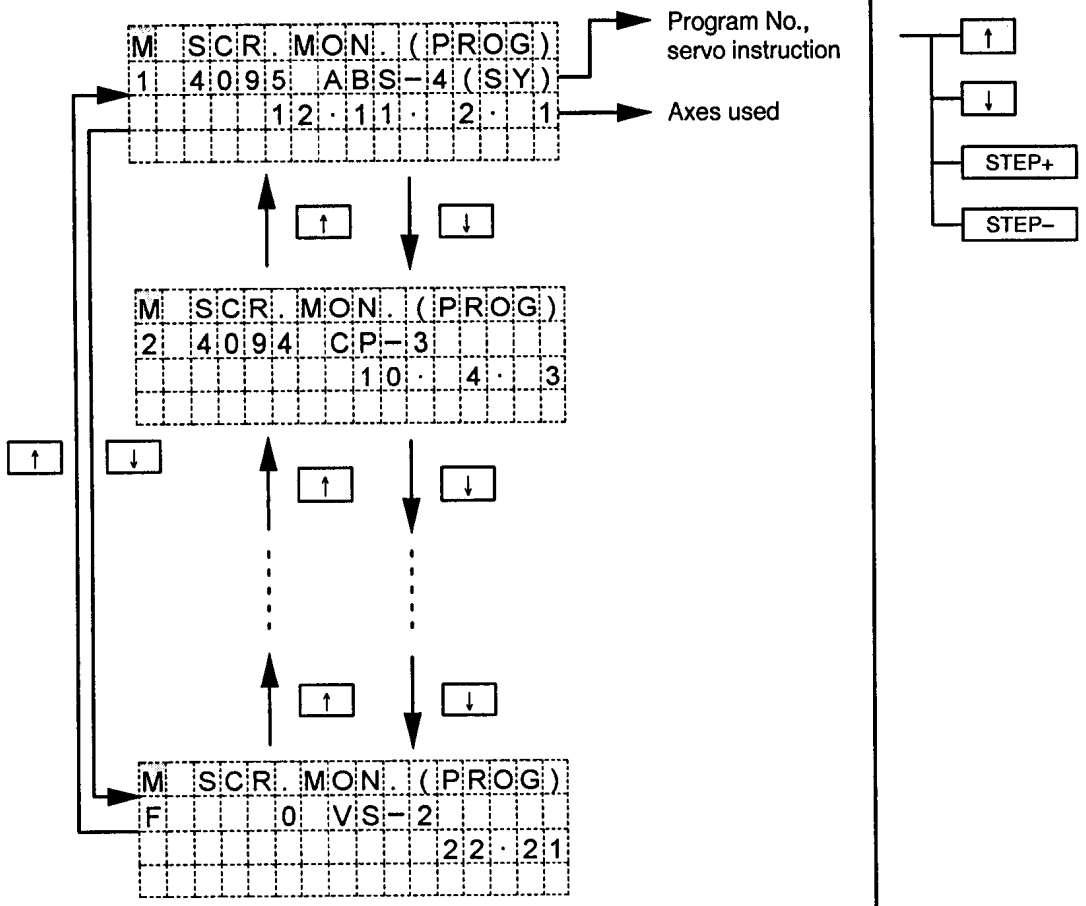
Drawing No.

Mode	Monitor mode	Function	Scroll monitor (program)	6-13

Scroll Monitor (Program) Screen Operation

Message

Key Operation



Operation Procedure & Explanations	Precautions/Remarks
"No.1" is the first screen to be displayed when the scroll monitor function is selected. Use the ↓ key to switch to the next No., and the ↑ key to switch to the previous No. As the execution program display begins from No.1, the execution programs are set from No.1 up when the number of execution programs is fewer than 15.	If the ↓ key is pressed at the No.F display, No.1 will be displayed. If the ↑ key is pressed at the No.1 display, No.F will be displayed. JOG operation is designated at the scroll monitor.

Notes

Drawing No.

Mode	Monitor mode	Function	Scroll monitor (program)	6-13.1

Scroll Monitor (Program) Screen Operation

Operation Procedure & Explanations	Precautions/Remarks
Changing the monitor item: STEP+ Press the STEP+ key to switch to the scroll monitor (error) screen. - - - ► Go to 6-14 STEP– Press the STEP– key to switch to the servo monitor screen. - - - ► Go to 6-11	

Notes

6.9 Scroll Monitor (Error)

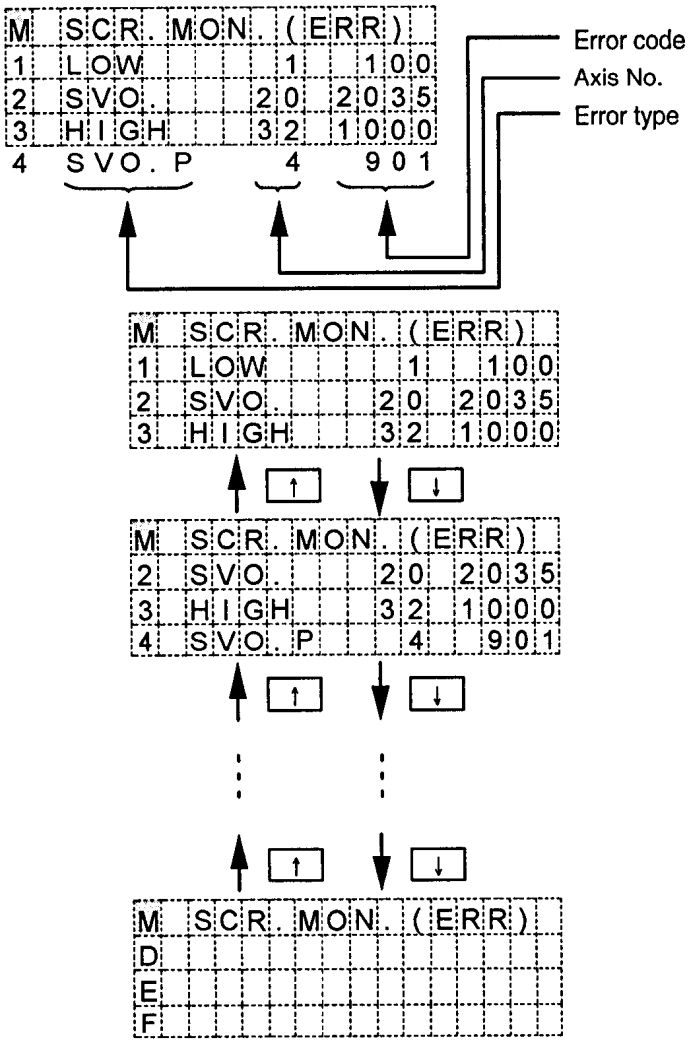
Drawing No.

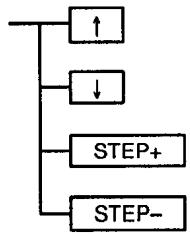
Mode	Monitor mode	Function	Scroll monitor (error)	6-14

Scroll Monitor (Error) Screen Operation

Message

Key Operation





Operation Procedure & Explanations	Precautions/Remarks
The scroll monitor (error) function displays the following error information (for 15 errors) in order, beginning from the oldest error: error type, error axis No., and error code. Information for the oldest error is displayed at No.1, and information for the most recent error is displayed at No.F. Error monitor Nos.1, 2, 3 are the first to be displayed when the scroll monitor function is selected. Use the ↓, ↑ keys to scroll to other Nos. As the execution program display begins from No.1, the execution programs are set from No.1 up when the number of execution programs is fewer than 15.	Error types are abbreviated on-screen as follows: Low level error LOW High level error HIGH Servo error SVO Servo program error SVO.P If the ↓ is pressed at the Nos.1, 2, 3 display, Nos.F, 1, 2 will be displayed. If the ↑ key is pressed at the Nos.D, E, F display, Nos.E, F, 1 will be displayed.

Notes

Drawing No.

Mode	Monitor mode	Function	Scroll monitor (error)	6-14.1

Scroll Monitor (Error) Screen Operation

Operation Procedure & Explanations	Precautions/Remarks
Changing the monitor item: STEP+ Press the STEP+ key to switch to the address monitor screen. - - - ► Go to 6-2 STEP– Press the STEP– key to switch to the scroll monitor (program) screen. - - - ► Go to 6-13	

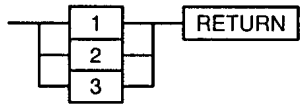
Notes

7. DATA SETTING MODE

Drawing No.

Mode	Data setting mode	Function	Data setting item selection	7-1

Setting Item Selection Screen After Entering Data Setting Mode

Message	Key Operation
D DATA SETTING 1 AX. DATA 2 P. BLOCK 3 SUB. FUNCTION	

Operation Procedure & Explanations	Precautions/Remarks
The data setting item is selected at this screen. Selecting "axis data setting": 1 RETURN - - - ► Go to 7-2 Selecting "parameter block setting": 2 RETURN - - - ► Go to 7-7 Selecting "auxiliary function setting": 3 RETURN - - - ► Go to 7-9	

Notes	When the number of an item is keyed in, that item number will be highlighted.

⚠ CAUTION

⚠ Parameter settings which are appropriate for the system's application should be designated. Incorrect settings could disable the protective function.

7

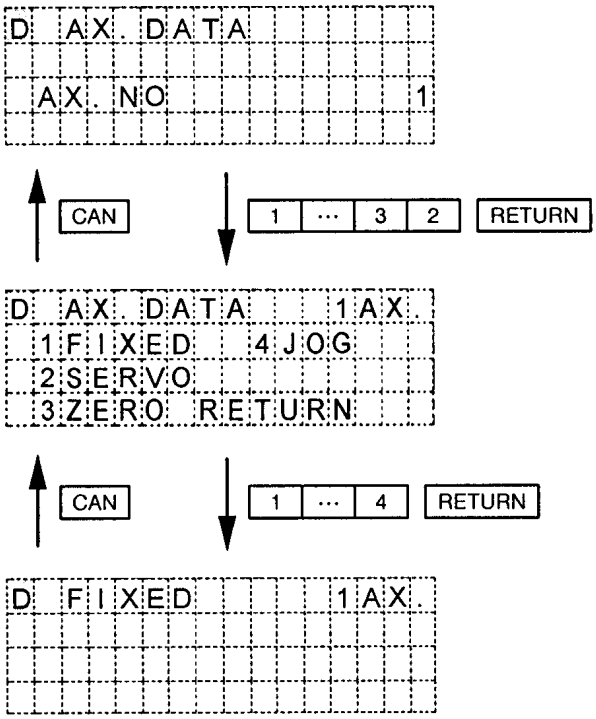
7.1 Setting the Axis Data

Drawing No.

Mode	Data setting mode	Function	Axis data setting	7-2

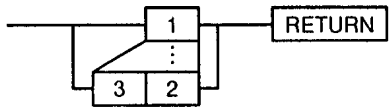
Axis No. & Item Selection Screen Operation (for Axis Data Setting)

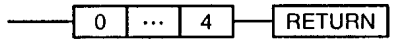
Message

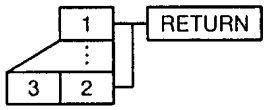


Fixed parameters

Key Operation





Operation Procedure & Explanations	Precautions/Remarks
Designating the axis:  Designate the axis where data setting is to occur, then press the RETURN key. The number of axes for which data setting is possible varies according to the CPU being used: For A171SCPU 4 axes For A273UHCPU (8-axis specs.) 8 axes For A273UHCPU (32-axis specs.) 32 axes After data setting is completed, the data item selection screen for the designated axis is displayed.	If an axis No. outside the ranges shown at left is designated (by RETURN key), the error message "! SETTING ERROR" will be displayed at the bottom of the screen, and the axis No. will not be changed.

Notes

7

7

Drawing No.

Mode	Data setting mode	Function	Axis data setting	7-2.1

Axis No. & Item Selection Screen Operation (for Axis Data Setting)

Operation Procedure & Explanations	Precautions/Remarks
Selecting the axis data item: To select "fixed parameter setting": 1 RETURN - - - ► Go to 7-3 To select "servo parameter setting": 2 RETURN - - - ► For A273UH ADU, see 7-4 - - - ► For A273UH/A171S MR-H-B, see 7-4.3 - - - ► For A273UH/A171S MR-J-B, see 7-4.10 To select "zero return data setting": 3 RETURN - - - ► Go to 7-5 To select "JOG data setting": 4 RETURN - - - ► Go to 7-6	

Notes	

Drawing No.

Mode	Data setting mode	Function	Axis data setting (fixed parameter)	7-3

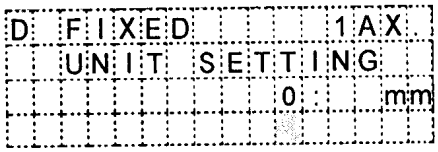
Fixed Parameter Setting Procedure & Screen Switching

Operation Procedure & Explanations

Limit switch output setting screen

↑ ↓ or RETURN

Unit setting

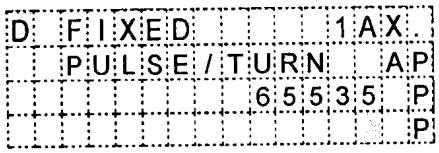


	Display
0: mm	u
1: inch	i
2: deg	°
3: PLS	P

Selected from the above

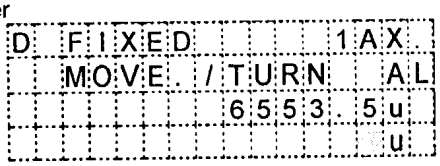
↑ ↓ or RETURN

Number of pulses per revolution (AP)



↑ ↓ or RETURN

Movement value per revolution (AL)



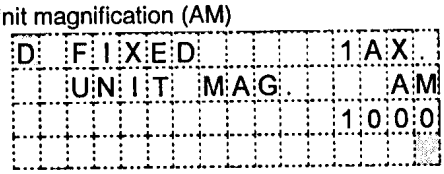
If "PLS (3)" is selected as the system-of-units setting, a "unit magnification" setting is not required.

↑ ↓ or RETURN

When "mm (0)", "inch (1)", or "deg (2)" is selected as the system-of-units setting, a unit magnification setting must be designated as shown below.

↑ ↓ or RETURN

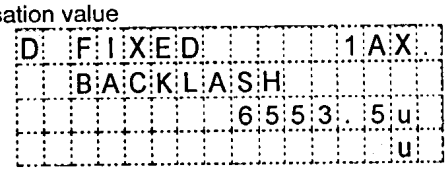
Unit magnification (AM)



Enter one of the following values: 1, 10, 100, or 1000.

↑ ↓ or RETURN

Backlash compensation value

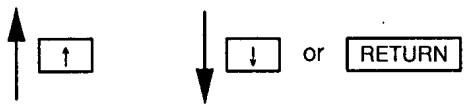


Drawing No.

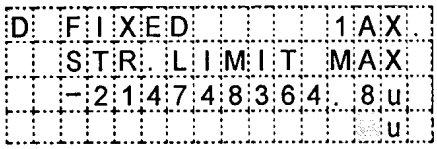
Mode	Data setting mode	Function	Axis data setting (fixed parameter)	7-3.1

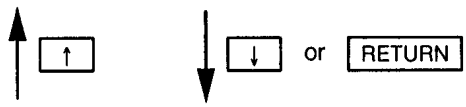
Fixed Parameter Setting Procedure & Screen Switching

Operation Procedure & Explanations

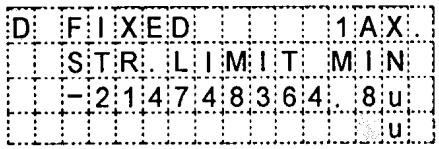


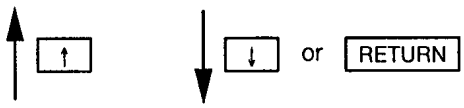
Stroke upper limit



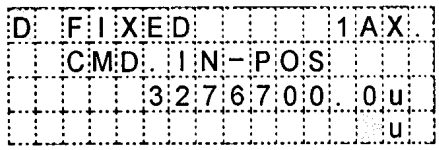


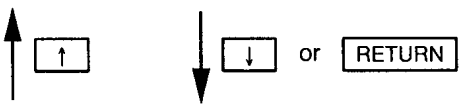
Stroke lower limit



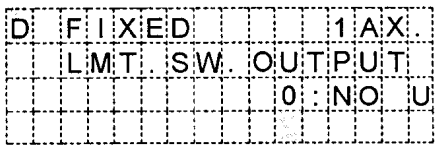


Command in-position range

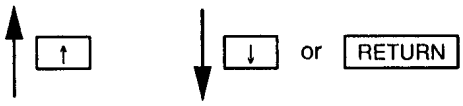




Limit switch output



0: NO U
1: USE
Select one the above.



Unit setting screen

System-of-units	mm	inch	deg	PLS
Number of pulses per revolution (AP)	1 to 65535			
Travel value per revolution (AL)	0.1 to 6553.5	0.00001 to 0.65535	0.00001 to 0.65535	1 to 65535
Unit magnification (AM)	1: x 1 10: x 10 100: x 100 1000: x 1000			
Backlash compensation amount	0.0 to 6553.5	0.00000 to 0.65535	0.00000 to 0.65535	0 to 255
Stroke upper limit	–214748364.8 to 214748364.7	–21474.83648 to 21474.83647	0.00000 to 359.99999	–2147483648 to 2147483647
Stroke lower limit	–214748364.8 to 214748364.7	–21474.83648 to 21474.83647	0.00000 to 359.99999	–2147483648 to 2147483647
Command in-position range	0.1 to 214748364.7	0.00001 to 21474.83647	0.00001 to 359.99999	1 to 2147483647
Limit switch output	0: Unused 1: Used			

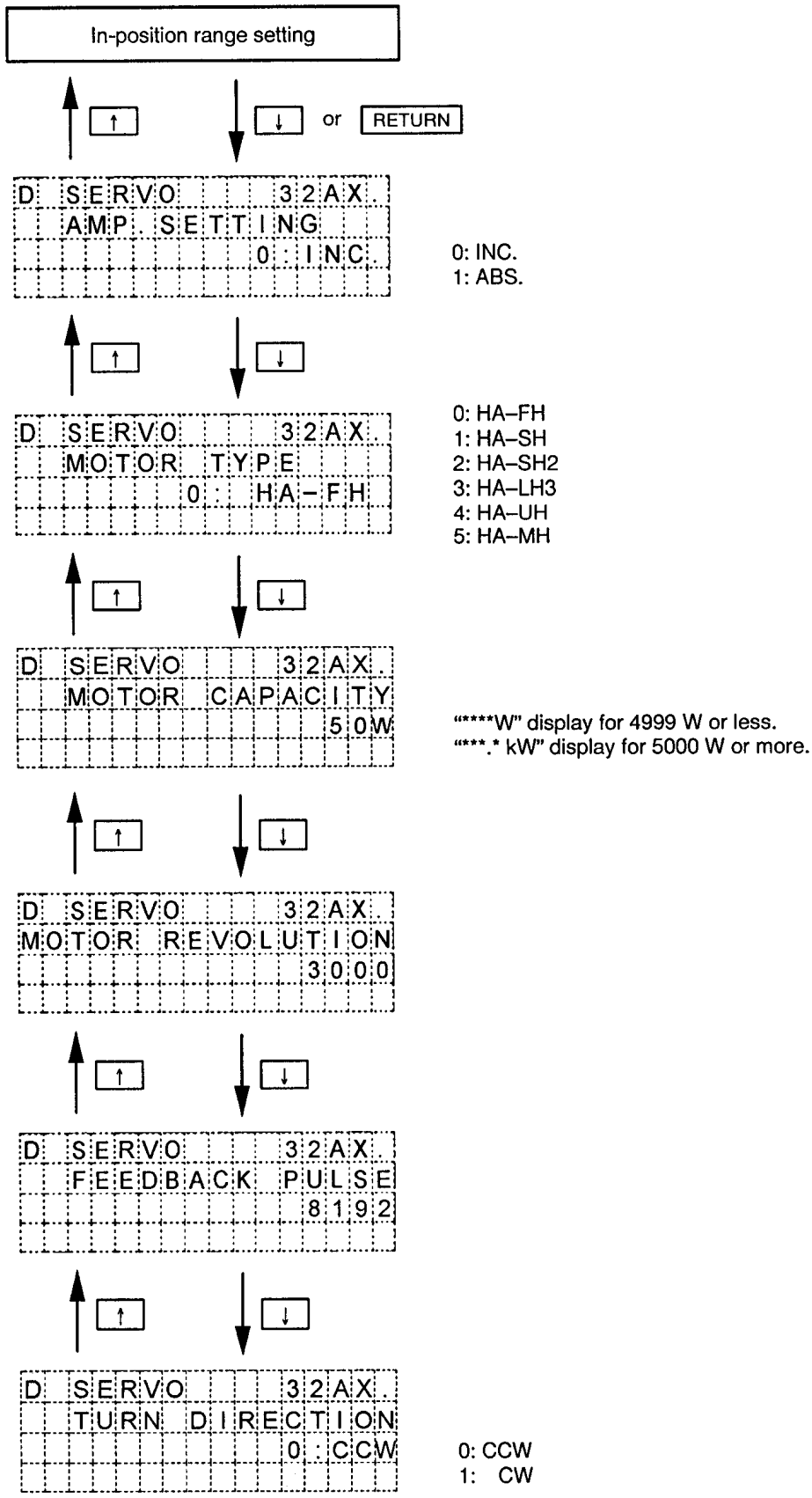
Drawing No.

Mode	Data setting mode	Function	Axis data setting (servo parameters) (for ADU)	7-4

Servo Parameter Setting Procedure & Screen Switching

Operation Procedure & Explanations

For A273UH ADU:

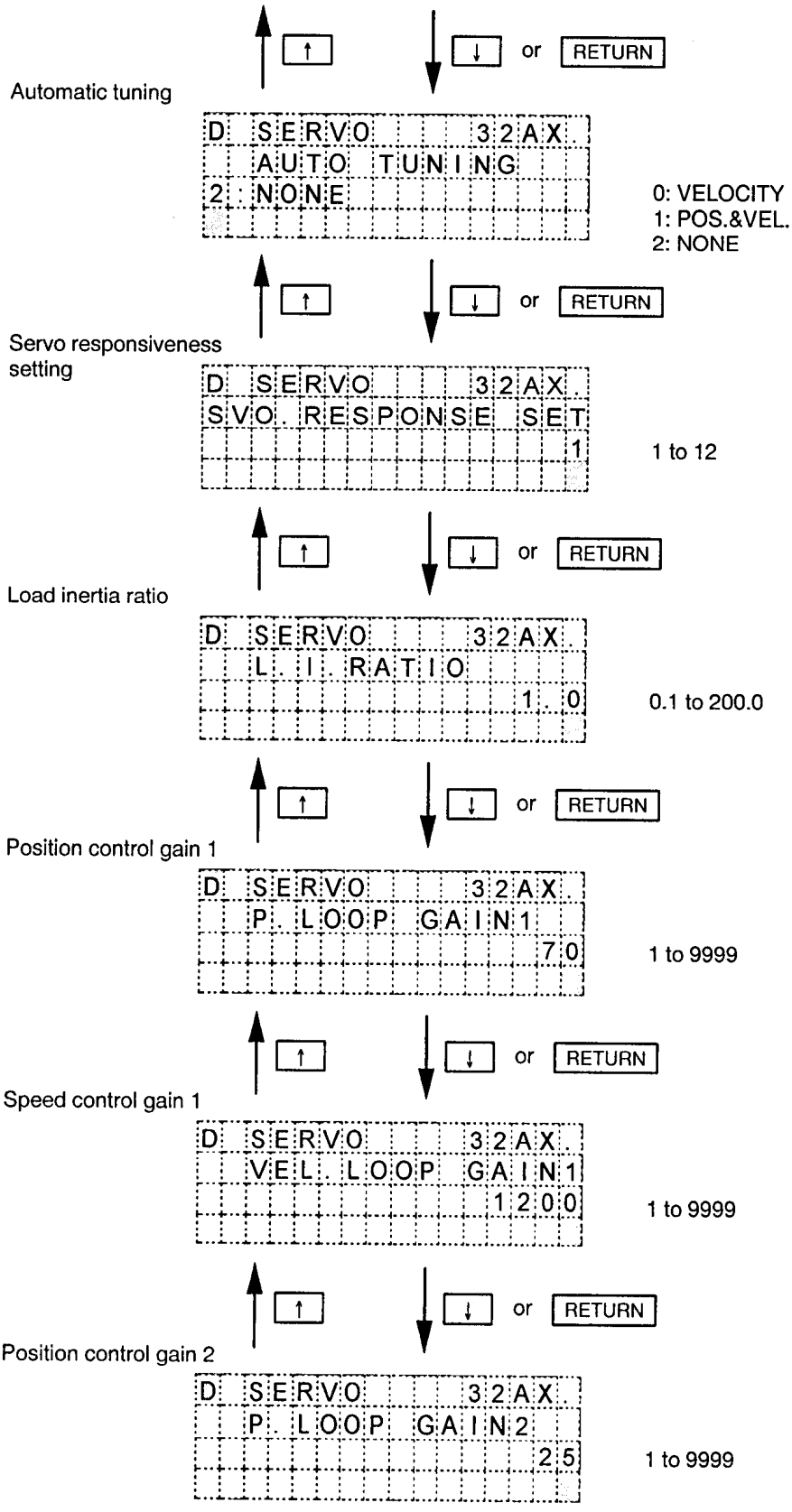


Drawing No.

Mode	Data setting mode	Function	Axis data setting (servo parameters) (for ADU)	7-4.1

Servo Parameter Setting Procedure & Screen Switching

Operation Procedure & Explanations

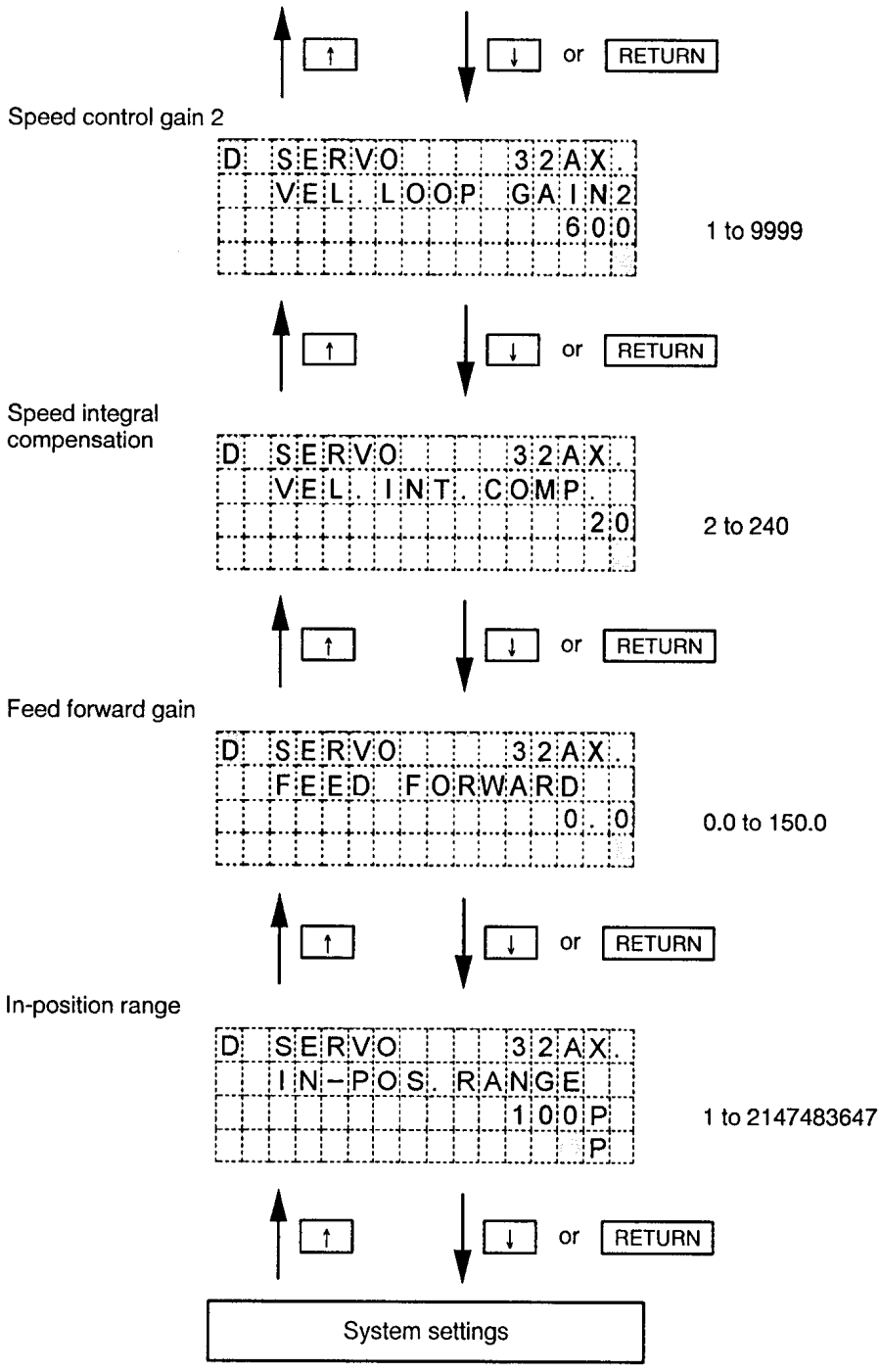


Drawing No.

Mode	Data setting mode	Function	Axis data setting (servo parameters) (for ADU)	7-4.2

Servo Parameter Setting Procedure & Screen Switching

Operation Procedure & Explanations



Drawing No.

Mode	Data setting mode	Function	Axis data setting (servo parameters) (for MR–H)	7-4.3

Servo Parameter Setting Procedure & Screen Switching

Operation Procedure & Explanations

For A273UH/A171S
MR–H–B

Speed differential compensation setting

↑ ↓ or RETURN

System settings (display only)

```
D SERVO    32AX
  AMP. SETTING
    0:MR-H*B INC
```

0: MR–H*B INC
1: MR–H*B ABS

↑ ↓

Regenerative resistance (display only)

```
D SERVO    32AX
  RESISTANCE
    0:STAND.
```

0: STAND.
1: FR–RC/BU
2: MR–RB013
3: MR–RB033
4: MR–RB064*2
5: MR–RB32
6: MR–RB34
7: MR–RB54
8: MR–RB30
9: MR–RB50
A: MR–RB100
B: MR–RB31
C: MR–RB51
D: MR–RB101
E: STAND. + FAN
F: MR–RB064

↑ ↓

External dynamic brake (display only)

```
D SERVO    32AX
  DYNAMIC BRAKE
            0:N
```

0: N
1: Y

↑ ↓

Motor type (display only)

```
D SERVO    32AX.
  MOTOR TYPE
      1:HA-FH
```

0: HA–SH
1: HA–LH
2: HA–UH
3: HA–FH
4: HA–RH
5: HA–MH

↑ ↓

Motor capacity (display only)

```
D SERVO    32AX.
  MOTOR CAPACITY
          50W
```

"****W" display for 4999 W or less.
"****.* kW" display for 5000 W or more.

↑ ↓

Motor speed (display only)

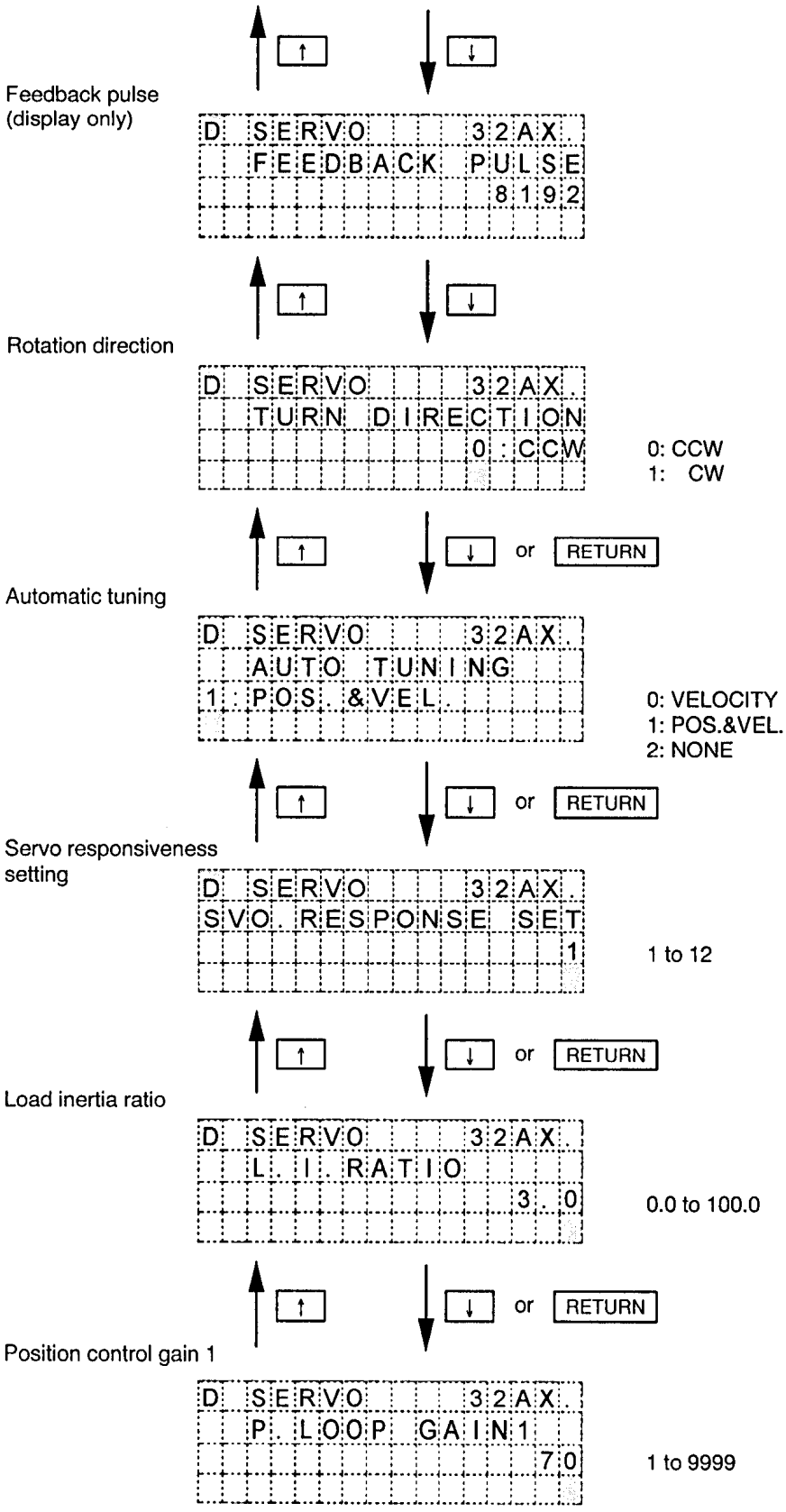
```
D SERVO    32AX.
MOTOR REVOLUTION
          3000
```

Drawing No.

Mode	Data setting mode	Function	Axis data setting (servo parameters) (for MR–H)	7-4.4

Servo Parameter Setting Procedure & Screen Switching

Operation Procedure & Explanations

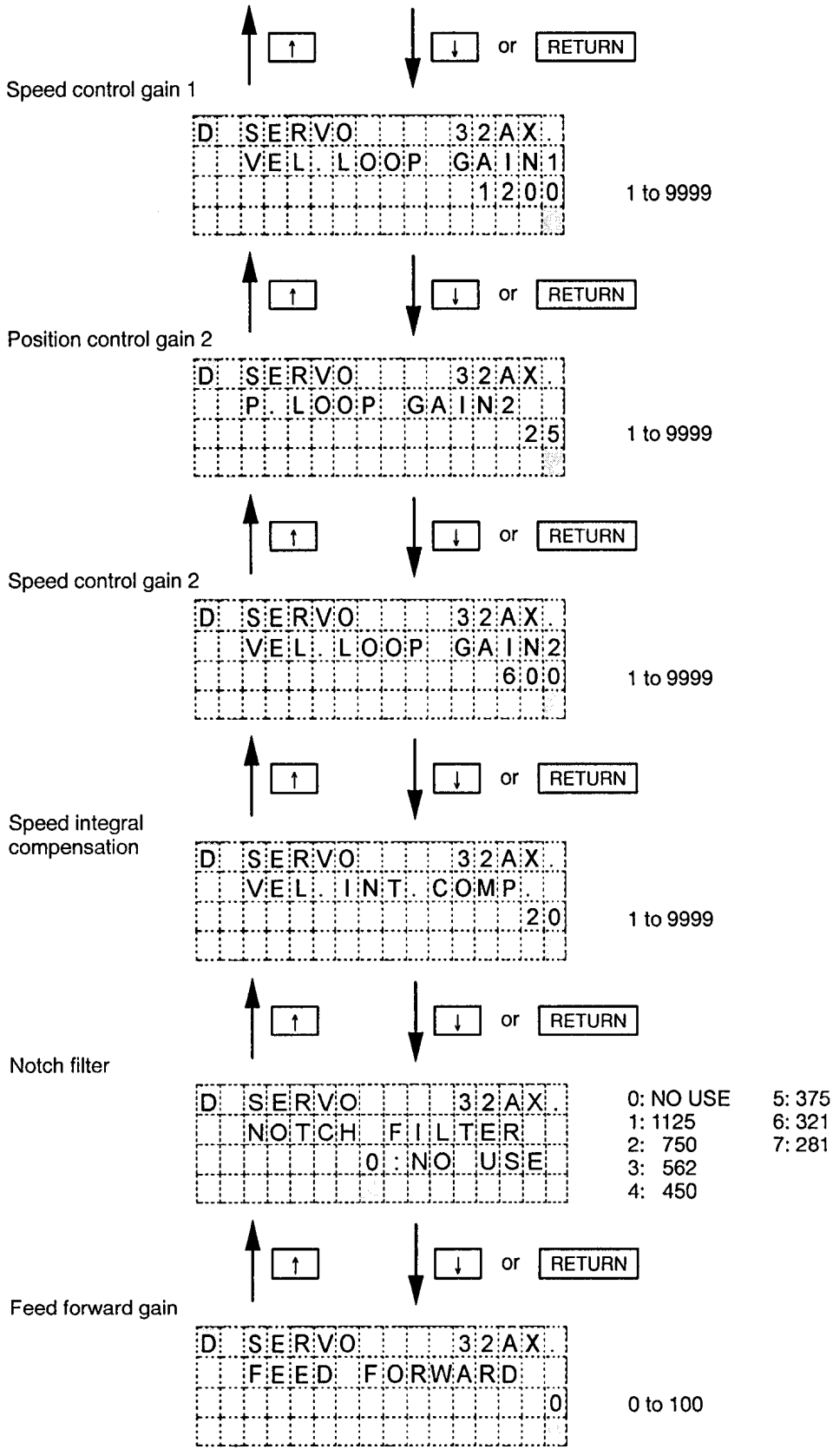


Drawing No.

Mode	Data setting mode	Function	Axis data setting (servo parameters) (for MR–H)	7-4.5

Servo Parameter Setting Procedure & Screen Switching

Operation Procedure & Explanations

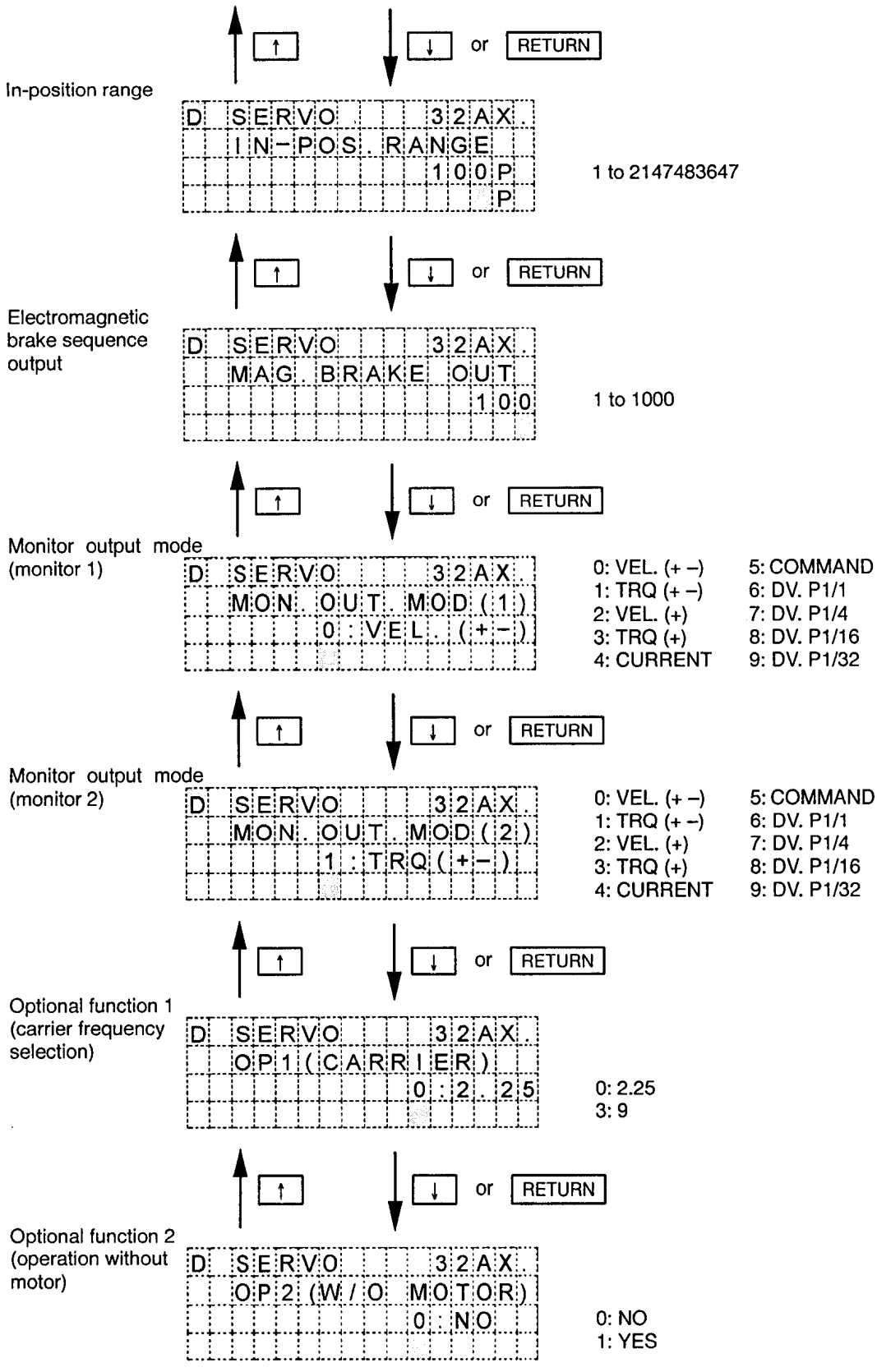


Drawing No.

Mode	Data setting mode	Function	Axis data setting (servo parameters) (for MR–H)	7-4.6

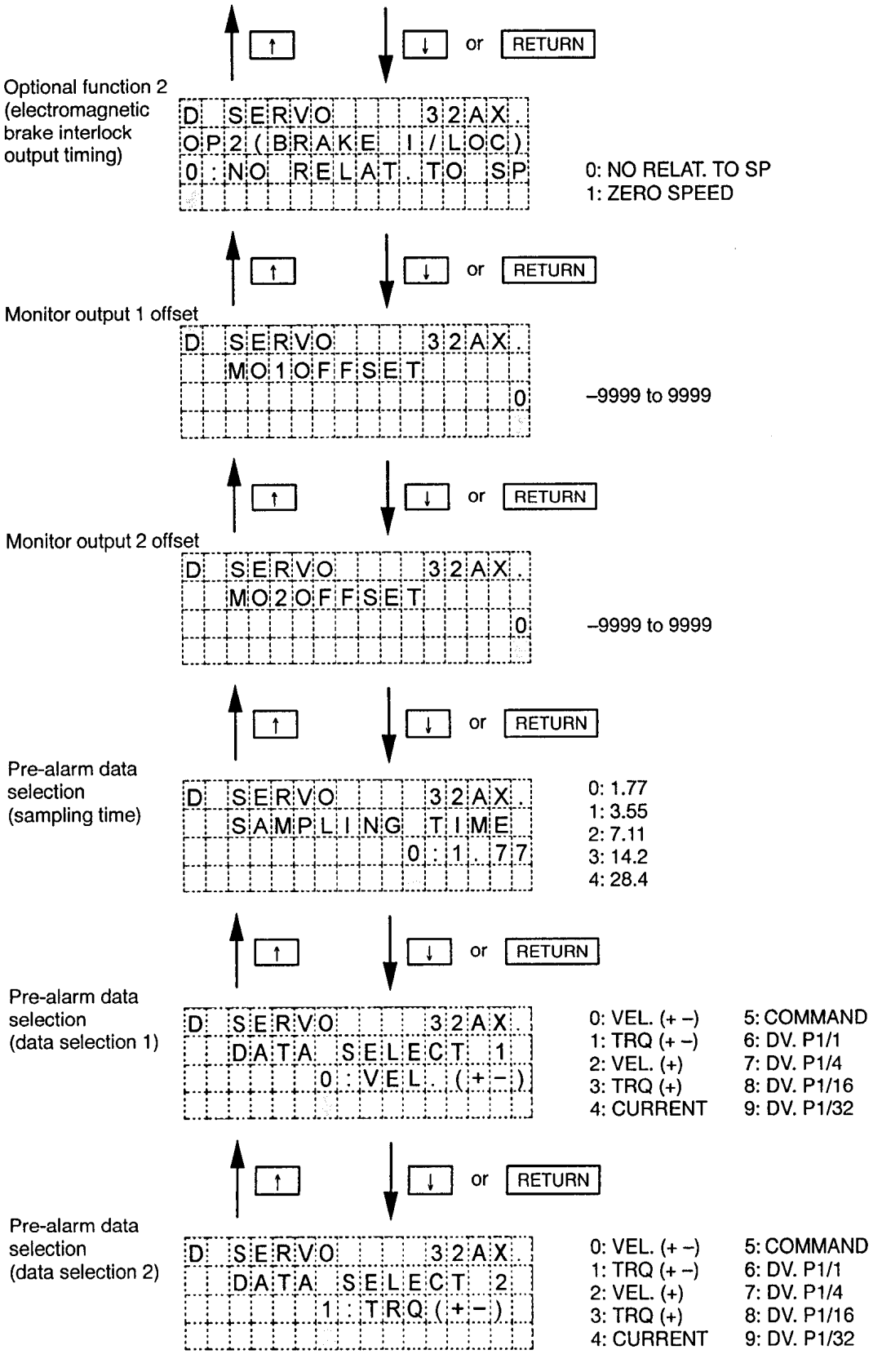
Servo Parameter Setting Procedure & Screen Switching

Operation Procedure & Explanations



Servo Parameter Setting Procedure & Screen Switching

Operation Procedure & Explanations

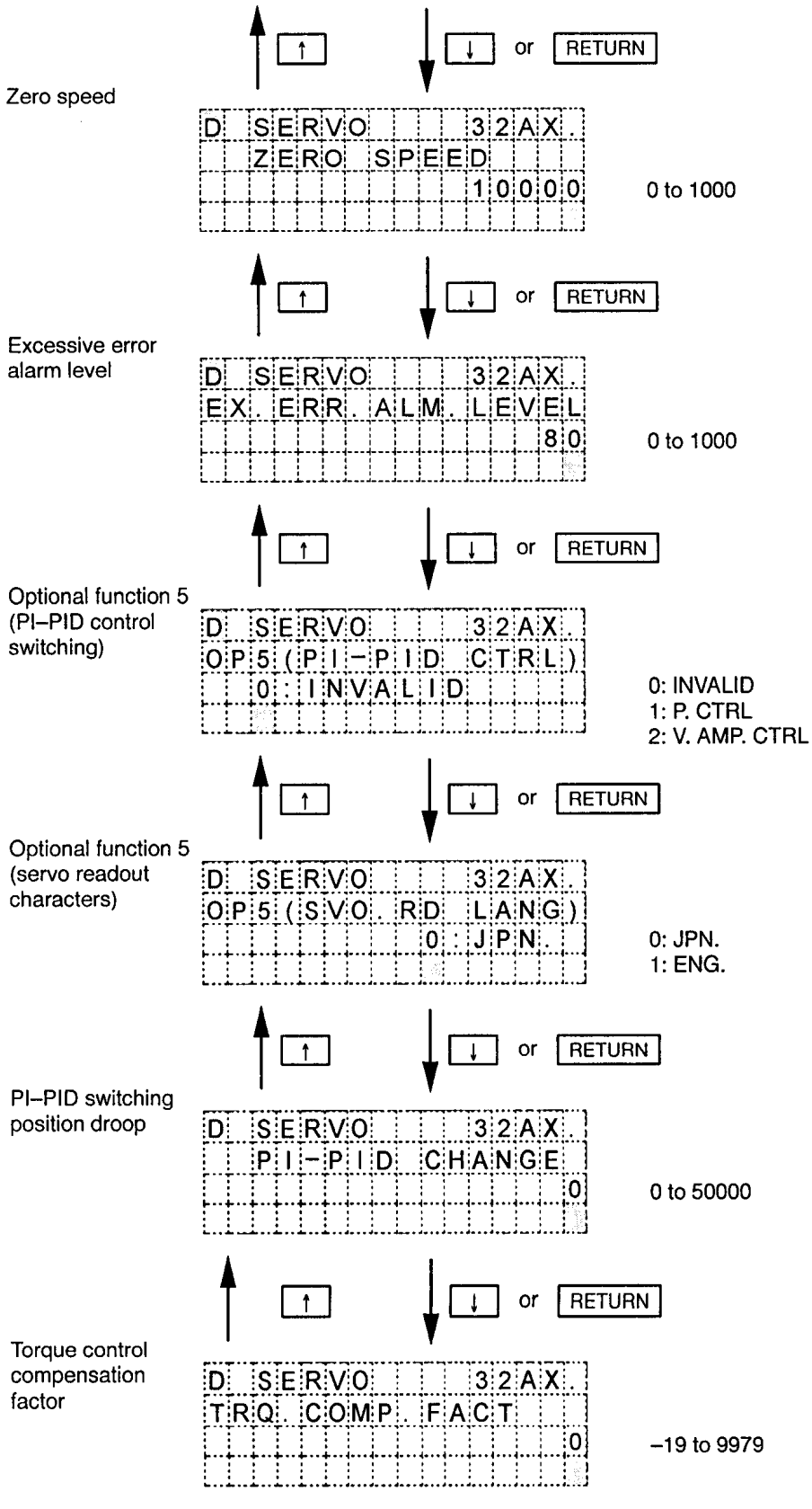


Drawing No.

Mode	Data setting mode	Function	Axis data setting (servo parameters) (for MR–H)	7-4.8

Servo Parameter Setting Procedure & Screen Switching

Operation Procedure & Explanations

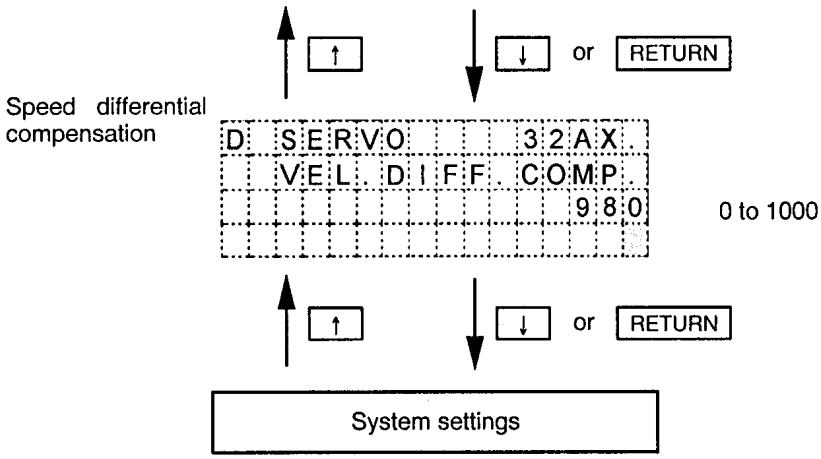


Drawing No.

Mode	Data setting mode	Function	Axis data setting (servo parameters) (for MR–H)	7-4.9

Servo Parameter Setting Procedure & Screen Switching

Operation Procedure & Explanations



Drawing No.

Mode	Data setting mode	Function	Axis data setting (servo parameters) (for MR–J)	7-4.10

Servo Parameter Setting Procedure & Screen Switching

Operation Procedure & Explanations

For A273UH/A171S
MR–J–B

Speed differential compensation setting

↑ ↓ or RETURN

System settings (display only)

```
D SERVO    32AX.
  AMP. SETTING
    0:MR-J*B INC
```

0: MR–J*B INC
1: MR–J*B ABS

↑ ↓

Regenerative resistance (display only)

```
D SERVO    32AX.
  RESISTANCE
    0:NONE
```

0: NONE
1: FR–RC/BU
2: MR–RB013
3: MR–RB033
4: MR–RB064*2
5: MR–RB32
6: MR–RB34
7: MR–RB54
8: MR–RB30
9: MR–RB50
A: MR–RB100
B: MR–RB31
C: MR–RB51
D: MR–RB101
E: STAND. + FAN
F: MR–RB064

↑ ↓

External dynamic brake (display only)

```
D SERVO    32AX.
  DYNAMIC BRAKE
          0:N
```

0: N
1: Y

↑ ↓

Motor type (display only)

```
D SERVO    32AX.
  MOTOR TYPE  E
        3:HA-FH
```

0: HA–SH
1: HA–LH
2: HA–UH
3: HA–FH
4: HA–RH
5: HA–MH

↑ ↓

Motor capacity (display only)

```
D SERVO    32AX.
  MOTOR CAPACITY
          50W
```

"****W" display for 4999 W or less.
"****.* kW" display for 5000 W or more.

↑ ↓

Motor speed (display only)

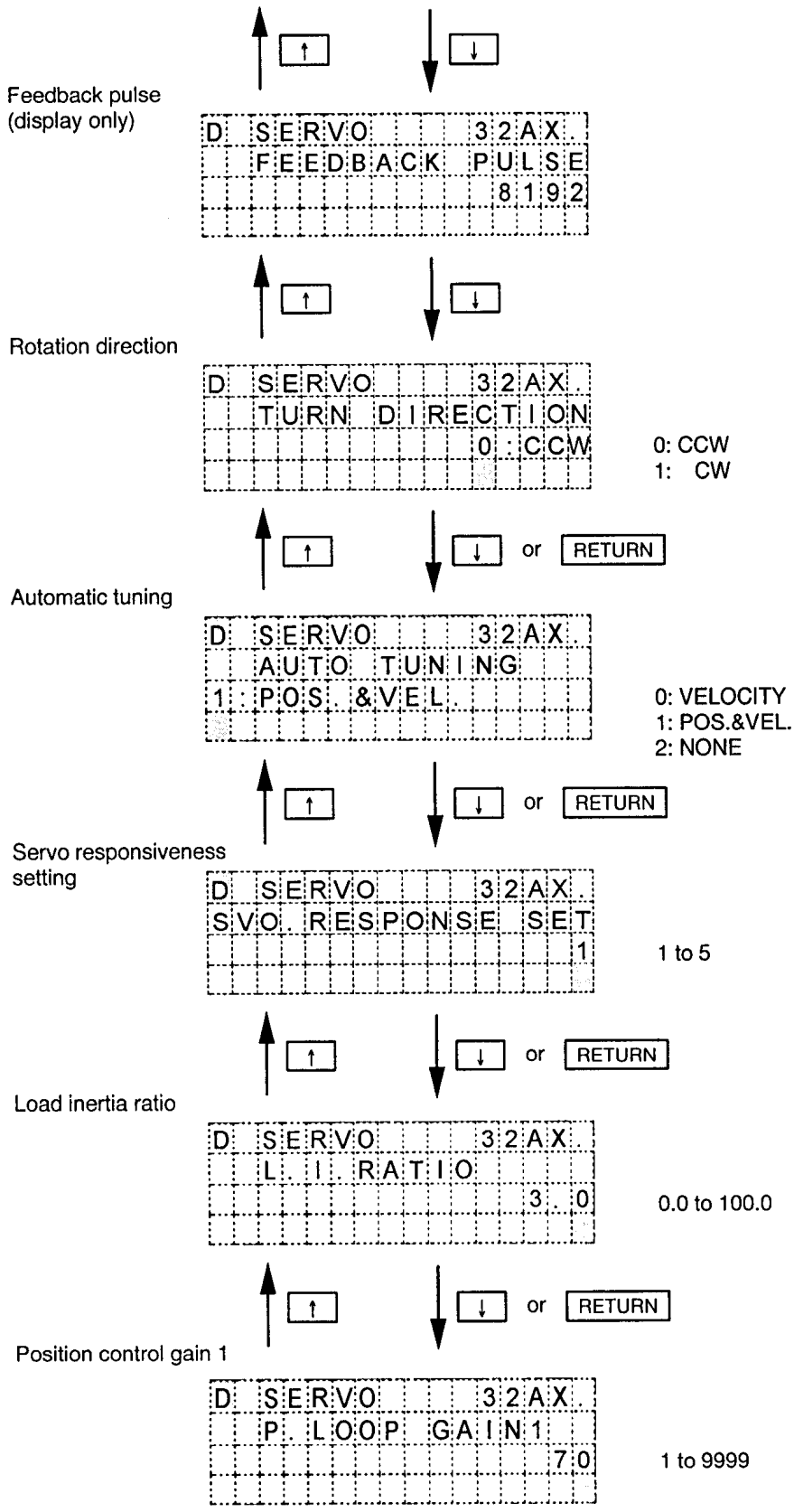
```
D SERVO    32AX.
MOTOR REVOLUTION
          3000
```

Drawing No.

Mode	Data setting mode	Function	Axis data setting (servo parameters) (for MR–J)	7-4.11

Servo Parameter Setting Procedure & Screen Switching

Operation Procedure & Explanations



Drawing No.

Mode	Data setting mode	Function	Axis data setting (servo parameters) (for MR–J)	7-4.12

Servo Parameter Setting Procedure & Screen Switching

Operation Procedure & Explanations

↑ ↓ or RETURN

Speed control gain 1

```
D SERVO    32AX.
  VEL. LOOP GAIN1
          1200
```

1 to 9999

↑ ↓ or RETURN

Position control gain 2

```
D SERVO    32AX.
  P. LOOP GAIN2
            25
```

1 to 9999

↑ ↓ or RETURN

Speed control gain 2

```
D SERVO    32AX.
  VEL. LOOP GAIN2
          600
```

1 to 9999

↑ ↓ or RETURN

Speed integral compensation

```
D SERVO    32AX.
  VEL. INT. COMP.
            20
```

1 to 9999

↑ ↓ or RETURN

Notch filter

```
D SERVO    32AX.
  NOTCH FILTER
      0:NO USE
```

0: NO USE
1: 1125
2: 750
3: 562
4: 450
5: 375
6: 321
7: 281

↑ ↓ or RETURN

Feed forward gain

```
D SERVO    32AX.
  FEED FORWARD
              0
```

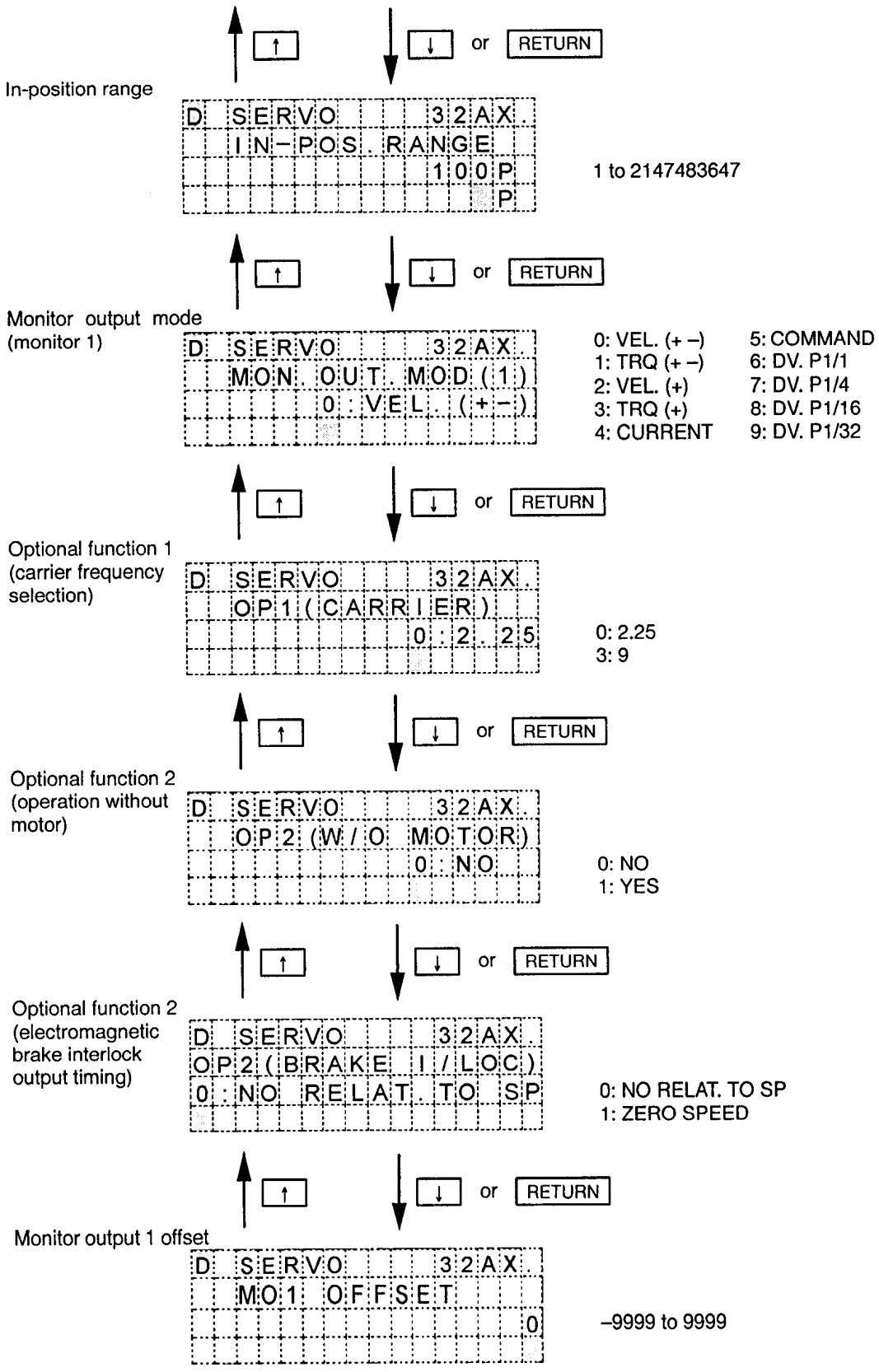
0 to 100

Drawing No.

Mode	Data setting mode	Function	Axis data setting (servo parameters) (for MR–J)	7-4.13

Servo Parameter Setting Procedure & Screen Switching

Operation Procedure & Explanations

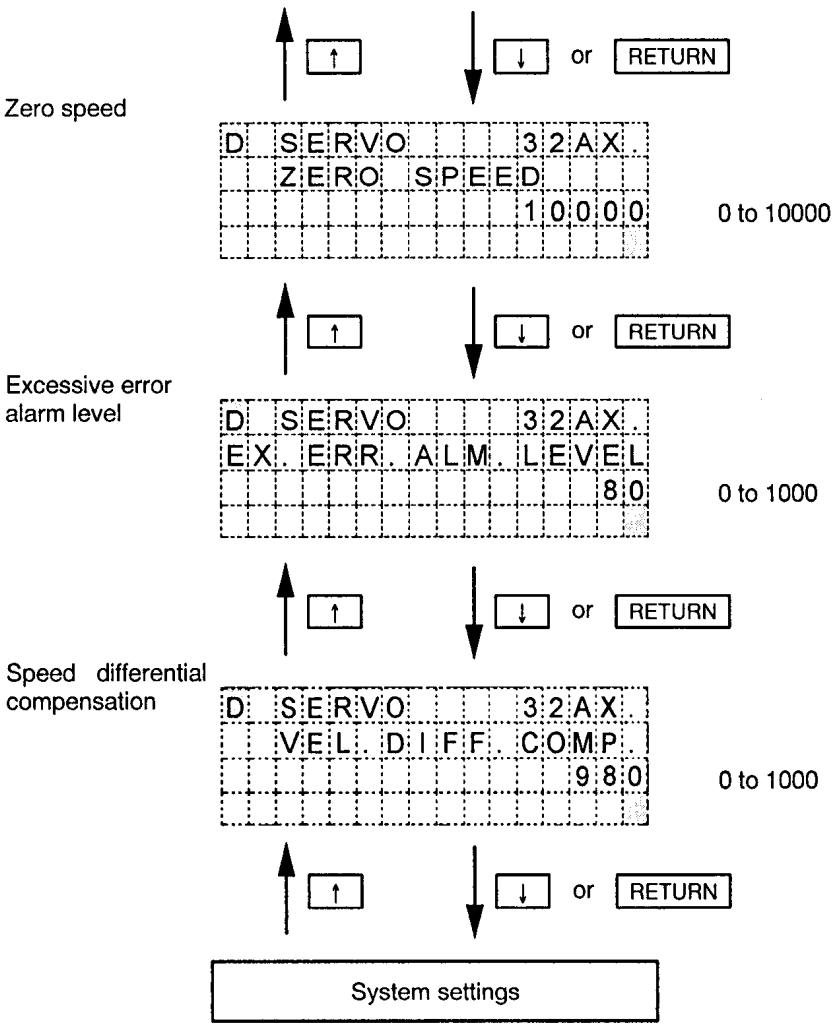


Drawing No.

Mode	Data setting mode	Function	Axis data setting (servo parameters) (for MR–J)	7-4.14

Servo Parameter Setting Procedure & Screen Switching

Operation Procedure & Explanations



Drawing No.

Mode	Data setting mode	Function	Axis data setting (zero return data)	7-5

Zero Return Data Setting Procedure & Screen Switching

Operation Procedure & Explanations

When the "dog (0)" or "count (1)" type zero return method is selected:

Parameter block designation screen

When the "data set (2)" type zero return method is selected:

Zero address setting screen

↑ ↓ or RETURN

Zero return direction

```
D ZERO-RET  1AX.
  DIRECTION
      0:REVERSE
```

0: REVERSE
1: FORWARD
Select one of the above.

↑ ↓ or RETURN

Zero return method

```
D ZERO-RET  1AX.
  METHOD
      0:DOG
```

0: DOG
1: COUNT
2: DATA ST
Select one of the above.

↑ ↓ or RETURN

Zero address

```
D ZERO-RET  1AX.
  ADDRESS
  -2147483648.8u
                u
```

↓ or ↑ RETURN

When the "data set (2)" type zero return method has been selected:

Zero address setting screen

When the "dog (0)" or "count (1)" type zero return method has been selected:

↑ ↓ or RETURN

Zero return speed

```
D ZERO-RET  1AX.
  SPEED
      60000000.00
```

↑ ↓ or RETURN

Creep speed

```
D ZERO-RET  1AX.
  CREEP SPEED
      60000000.00
```

Drawing No.

Mode	Data setting mode	Function	Axis data setting (zero return data)	7-5.1

Zero Return Data Setting Procedure & Screen Switching

Operation Procedure & Explanations

When the "dog" format has been selected as the zero return method, no "movement value after dog" setting is required.

↑ ↓ or RETURN

↑ ↓ or RETURN

Movement value after dog

```
D ZERO-RET  1AX.
  MOVE AFTER DOG
    2147483647.7u
                u
```

↑ ↓ or RETURN

When a "count (1)" or "data set (2)" type zero return method has been selected:

Parameter block designation

```
D ZERO-RET  1AX.
  P.BLOCK NO.
              1
```

When using an A171S/A273UH (8-axis specs.), input a value within the range 1 to 16.
When using an A273UH (32-axis specs.), input a value within the range 1 to 64.

↑ ↓ or RETURN

Zero return direction setting screen

Drawing No.

Mode	Data setting mode	Function	Axis data setting (zero return data)	7-5.2

Zero Return Data Input Ranges

System-of-units	mm	inch	deg	PLS
Zero address	-214748364.8 to 214748364.7	-21474.83648 to 21474.83647	-21474.83648 to 21474.83647	-2147483648 to 2147483647
Zero return speed	0.01 to 6000000.00	0.001 to 600000.000	0.001 to 600000.000	1 to 1000000
Creep speed	0.01 to 6000000.00	0.001 to 600000.000	0.001 to 600000.000	1 to 1000000
Movement value after dog	0.0 to 214748364.7	0.00000 to 21474.83647	0.00000 to 21474.83647	0 to 2147483647
Parameter block designation	1 to 16 (A171S/A273UH 8-axis specs.) 1 to 64 (A273UH 32-axis specs.)			

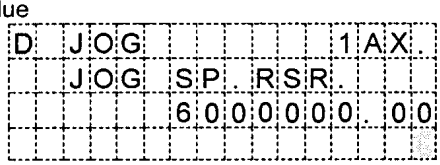
Drawing No.

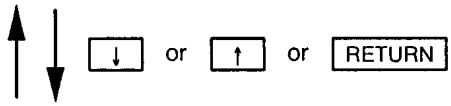
Mode	Data setting mode	Function	Axis data setting (JOG operation data)	7-6

JOG Operation Data Setting Procedure & Screen Switching

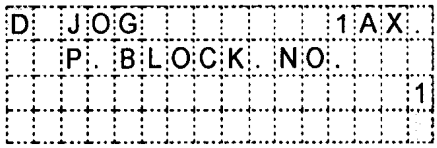
Operation Procedure & Explanations

JOG speed limit value





Parameter block designation



When using an A171S/A273UH (8-axis specs.), input a value within the range 1 to 16.
When using an A273UH (32-axis specs.), input a value within the range 1 to 64.

Drawing No.

Mode	Data setting mode	Function	Axis data setting (JOG operation data)	7-6.1

JOG Operation Data Input Ranges

System-of-units	mm	inch	deg	PLS
JOG speed limit value	0.01 to 6000000.00	0.001 to 600000.000	0.001 to 600000.000	1 to 1000000
Parameter block designation	1 to 16 (A171S/A273UH 8-axis specs.) 1 to 64 (A273UH 32-axis specs.)			

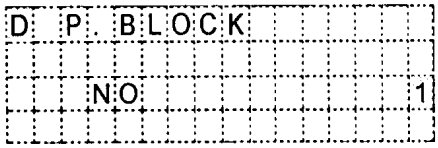
7.2 Setting the Parameter Block

Drawing No.

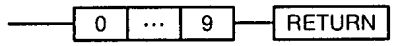
Mode	Data setting mode	Function	Parameter block	7-7

Parameter Block No. Designation Screen

Message



Key Operation



Operation Procedure & Explanations	Precautions/Remarks
A 1 to 16 (1 to 64 for A273UHCPU 32-axis specs.) parameter block No. is designated at this screen. After designating the parameter block No. by pressing the RETURN key, the parameter input screen for that block will be displayed. - - - ► Go to 7-8	

Notes

Drawing No.

Mode	Data setting mode	Function	Parameter block	7-8

Parameter Block Data Setting Procedure & Screen Switching

Operation Procedure & Explanations

Allowable error range for circular interpolation designation screen

↑ ↓ or RETURN

Interpolation control unit

D. P. BLOCK NO. 1
CONTROL UNIT
0 : mm

	Display
0: mm	u
1: inch	i
2: deg	°
3: PLS	P

Selected from the above

↑ ↓ or RETURN

Speed limit value

D. P. BLOCK NO. 1
SP. RSR.
60000000.00

↑ ↓ or RETURN

Acceleration time

D. P. BLOCK NO. 1
AC. TIME ms
65535

↑ ↓ or RETURN

Deceleration time

D. P. BLOCK NO. 1
DE. TIME ms
65535

↑ ↓ or RETURN

Rapid stop deceleration time

D. P. BLOCK NO. 1
S. STOP TIME ms
65535

↑ ↓ or RETURN

S-curve ratio

D. P. BLOCK NO. 1
S RATIO %
100
100

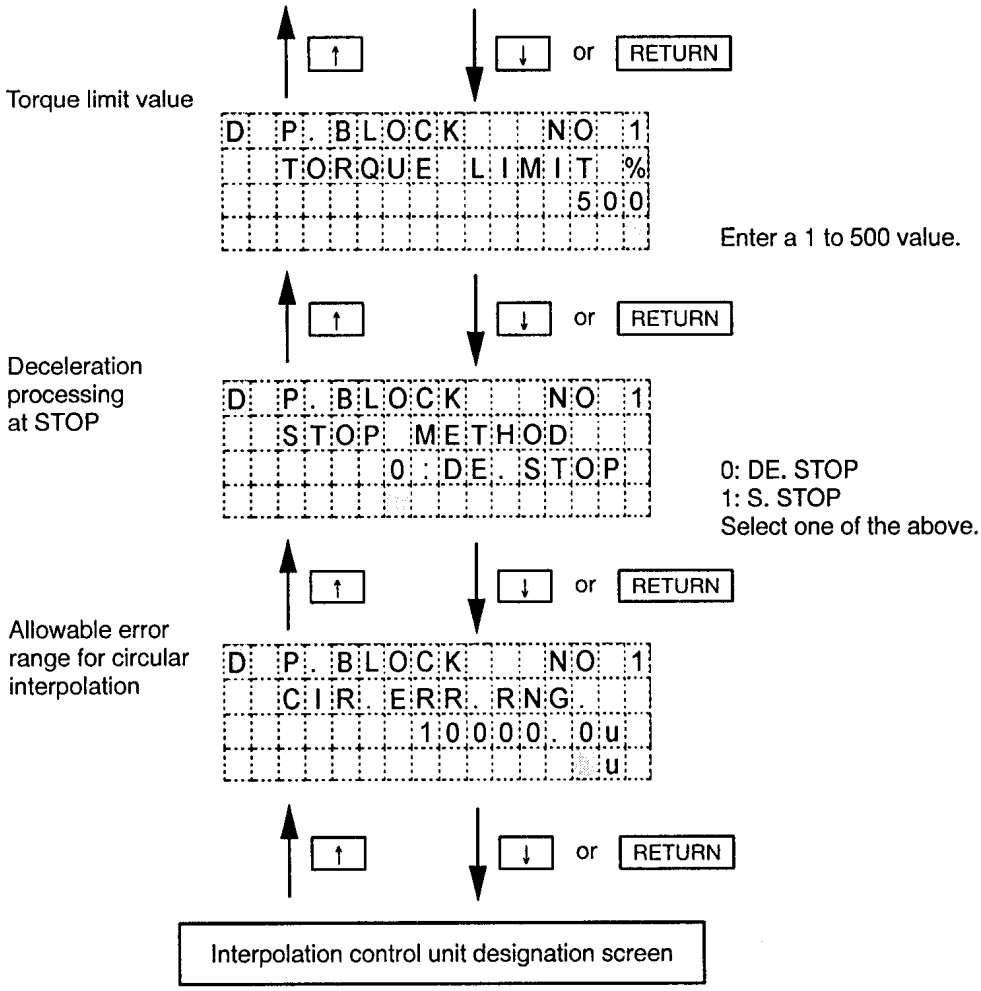
Enter a value in the range 1 to 100.

Drawing No.

Mode	Data setting mode	Function	Parameter block	7-8.1

Parameter Block Data Setting Procedure & Screen Switching

Operation Procedure & Explanations



System-of-unit	mm	inch	deg	PLS
Speed limit value	0.01 to 6000000.00	0.001 to 600000.000	0.001 to 600000.000	1 to 1000000
Acceleration time	1 to 65535			
Deceleration time	1 to 65535			
Rapid stop deceleration time	1 to 65535			
Torque limit value	1 to 500			
Deceleration processing at STOP	0: DE. STOP 1: S. STOP			
Allowable error range for circular interpolation	0.0 to 10000.0	0.00000 to 1.00000	0.00000 to 1.00000	0 to 100000
S-curve ratio	0 to 100 %			

7.3 Auxiliary Functions

Drawing No.

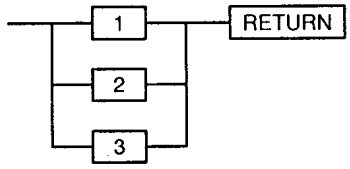
Mode	Data setting mode	Function	Auxiliary functions	7-9

Auxiliary Function Item Selection Screen

Message

```
H SUB FUNCTION
 1 BACKLIGHT
 2 ALARM
 3 LAN SELECTION
```

Key Operation



Operation Procedure & Explanations	Precautions/Remarks

Selecting "backlight:"

[1] [RETURN] - - - ► Go to 7-10

Selecting "alarm":

[2] [RETURN] - - - ► Go to 7-11

Selecting "language":

[3] [RETURN] - - - ► Go to 7-12

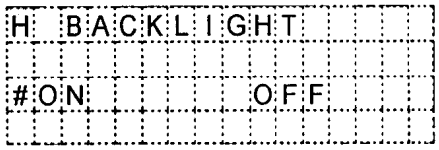
Notes

Drawing No.

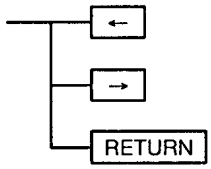
Mode	Data setting mode	Function	Auxiliary functions (backlight)	7-10

Backlight Setting Screen

Message



Key Operation



Operation Procedure & Explanations	Precautions/Remarks
A "#" mark is displayed at current setting. Use the →, ← keys to designate the desired setting, then press the RETURN key. When the RETURN key is pressed, the system returns to the data setting item selection screen.	

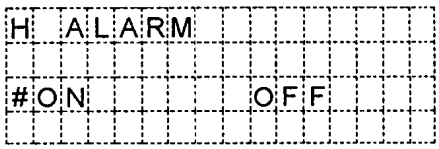
Notes

Drawing No.

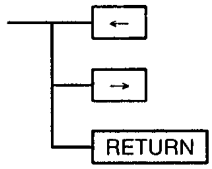
Mode	Data setting mode	Function	Auxiliary functions (alarm)	7-11

Alarm Setting Screen

Message



Key Operation



Operation Procedure & Explanations	Precautions/Remarks
A "#" mark is displayed at current setting. Use the →, ← keys to designate the desired setting, then press the RETURN key. When the RETURN key is pressed, the system returns to the data setting item selection screen.	

Notes

Drawing No.

Mode	Data setting mode	Function	Auxiliary functions (language)	7-12

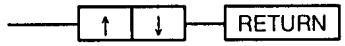
Language Setting Screen

Message

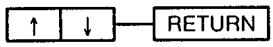
```
T LAN SELECTION

#JAPANESE
 ENGLISH
```

Key Operation



Operation Procedure & Explanations



A "#" mark is displayed at current setting. Use the ↑, ↓ keys to designate the desired language, then press the RETURN key.
When the RETURN key is pressed, if the language selection is unchanged, the system returns to the data setting item selection screen. If the language selection is changed, the mode selection screen for the selected language will be displayed.

- - - ► Go to 4-1

Precautions/Remarks

Notes

8. PROGRAM

Drawing No.

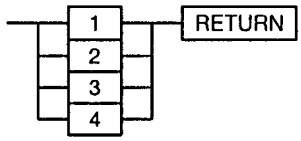
Mode	Program mode	Function	Function selection	8-1

Selecting Program Mode Functions

Message

```
P PROGRAM
 1READ/WR/DELETE
 2SORT
 3COPY  4ALL CLR
```

Key Operation



Operation Procedure & Explanations	Precautions/Remarks

Program mode functions are selected at this screen.

Selecting "program readout":

[1] [RETURN] - - -► Go to 8-2

Selecting "sort":

[2] [RETURN] - - -► Go to 8-22

Selecting "copy":

[3] [RETURN] - - -► Go to 8-23

Selecting "all-clear":

[4] [RETURN] - - -► Go to 8-24

Notes

When the No. of an item is keyed in, that item No. is highlighted.

8

8

⚠ CAUTION

⚠ Instructions used in programs must conform to the conditions described in this manual.

⚠ Device settings used in programs must be within the ranges given in this manual. Since some devices – such as special devices – have fixed applications, devices suitable for the intended application must be used.

8.1 Readout

Drawing No.

Mode	Program mode	Function	Program readout	8-2

Program Readout

Message

Key Operation

Screen 1

```
P PROGRAM
PROG.    1234/4096
STEP 12345/13312
  PROG. NO    4095
```

CAN

After entering program No.
RETURN

Screen 2

```
PK4095        ABS-1
AX.   1
SP.   60000000.00
  1 -2147483648.8u
```

If the designated program No. exists, that program content is displayed.

Screen 3

```
PK4095
PROG.  NOT FOUND
```

CAN

If the designated program does not exist, the message shown at left is displayed, and switching to the program write mode is then possible.

Key Operation

0 … 9 — RETURN

CLEAR

WRITE

DELETE

STEP+

STEP–

↑

↓

INSTRUCTION

Notes

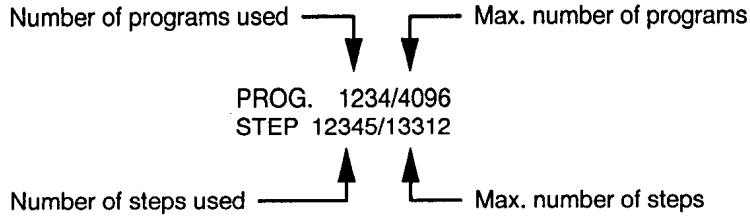
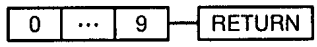
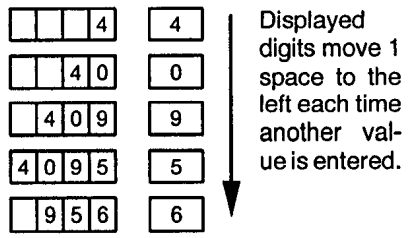
8

8

Drawing No.

Mode	Program mode	Function	Program readout	8-2.1

Program Readout

Operation Procedure & Explanations	Precautions/Remarks
<Screen 1> Screen 1 is displayed when the program readout, write, or delete function is selected. The number of programs and steps being used are displayed, and the status in which program numbers can be input status is established.  Entering the program No.:  Use the 0 to 9 keys to designate the number of the program which is to be read out or checked. The program No. range is 0 to 4095. Only the 4 most recent digits entered as the program No. will be valid. All other information digits will be ignored. To correct an entered value, press the CLEAR key to clear the input field. If the program readout occurs successfully when the RETURN key is pressed, the first part of that program content will be displayed.  Displayed digits move 1 space to the left each time another value is entered. <Screen 2> Program write: WRITE — The program write function is selected to edit the designated program. - - - ► Go to 8-3	

Notes

If the program readout is unsuccessful, the following messages are displayed:
- When the instruction code is incorrect (not an SV13 code):
  "I.COD ERROR"

Drawing No.

Mode	Program mode	Function	Program readout	8-2.2

Program Readout

Operation Procedure & Explanations	Precautions/Remarks
Deleting a program: DELETE — Press the DELETE key to delete the designated program NO. - - - ► Go to 8-21 Displaying the next step: STEP+ — Press the STEP+ key to display the beginning of the next step. Displaying the previous step: STEP– — Press the STEP– key to display the beginning of the previous step. Program scrolling: ↑ / ↓ — Use the ↑, ↓ keys to scroll in 1-line units. <Screen 3> This screen is used to either cancel the operation or to create a program when the designated program No. did not exist. Switching to the instruction class setting screen: INSTRUCTION Switch to the servo instruction class setting screen in order to create a program. - - - ► Go to 8-4	The STEP+ and STEP– keys are only operative for speed switching control and constant-speed control.

Notes

8.2 Write

Drawing No.

Mode	Program mode	Function	Program write	8-3

Creating a Program

Message

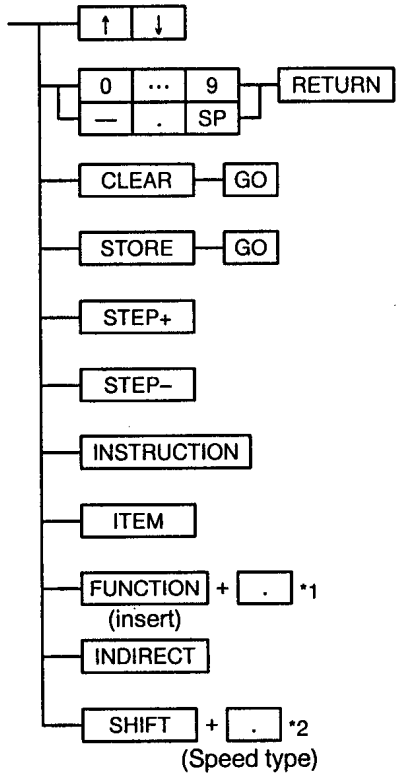
I / insert mode *
R / overwrite mode (default setting)

Screen 1

```
PK4095R      ABS-1
AX.   1
SP.   60000000.00
  1  -2147483648.  8u
.....
.....
.....
```

The above screen is displayed when "program write" is selected after a successful program readout.

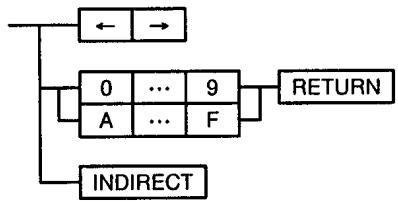
Key Operation



INDIRECT

Screen 2

```
P  INDIRECT SPC.
#D       W
                500
```



Devices used by the system (for positioning, etc.) cannot be used for indirect designation purposes.
The following devices are used exclusively for positioning:
A273UHCPU (8-axis specs.) & A171SCPU ..... D800 to D1023
A273UHCPU (32-axis specs.) ..... D0 to D799
Designation of an improper device can result in abnormal positioning, or an error.

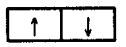
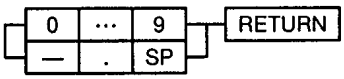
Notes

*1. The "insert" and "overwrite" modes are only operative during speed switching control or constant-speed control.
*2. The "speed type" procedure can only be used with ABS–2, 3, 4 and INC–2, 3, 4.

Drawing No.

Mode	Program mode	Function	Program write	8-3.1

Creating a Program

Operation Procedure & Explanations	Precautions/Remarks
<Screen 1> Moving the cursor to the position where a correction is desired:  Use the ↑, ↓ keys to scroll in 1-line units. Note that the cursor moves to positions beside, not over, axis Nos. Making the correction:  Although the new (correction) value is set when the RETURN key is pressed, it will not be registered at the program until the STORE and GO keys are pressed. Deleting a line (step deletion):  Press the CLEAR and GO keys to delete the program instruction (line) at the cursor position. The next instruction will then be displayed. This procedure can only be used with VABS, VINC, VEND in speed switching control, and with ABS–XXX, INC–XX, CPEND in constant-speed control. Registering (storing) a program:  When all the required program modifications have been made or program creation is completed, press the STORE key to register the program number and program data. When the STORE key is pressed, the screen appears as follows:  After correcting or creating a program, a matching check is conducted for that program content. If the result is OK, the program will be registered. When program registration is completed, the program mode's "program readout" screen (8-2, screen 1) is displayed.	

Notes

Drawing No.

Mode	Program mode	Function	Program write	8-3.2

Creating a Program

Operation Procedure & Explanations	Precautions/Remarks
Displaying the next step: [STEP+] Press the STEP+ key to display the beginning of the next step. Displaying the previous step: [STEP–] Press the STEP– key to display the beginning of the previous step. Switching to the instruction class setting screen: [INSTRUCTION] Switch to the servo instruction class setting screen in order to execute program inputs. If the overwrite mode is in effect at this time, the entered servo instruction will be written over the displayed program step. If the insert mode is in effect, the entered instruction will be inserted in front of the displayed program step. - - - ► Go to 8-4 Switching to the setting item screen: [ITEM] Press the ITEM key to switch to the item selection & input screen in order to designate the item settings required for the servo instruction in question. - - - ► Go to 8-19 Switching to the speed type screen: [SHIFT] + [.] The screen which allows selection of the speed type (resultant, reference axis, long axis) will be displayed. - - - ► Go to 8-20 Changing input modes: [FUNCTION] + [.] Press the FUNCTION + . key to switch from the "overwrite" to the "insert" mode, and vice-versa.	The [STEP+] and [STEP–] keys are only operative for speed switching control and constant-speed control.

Notes

Mode	Program mode	Function	Program write	8-3.3

Creating a Program

Operation Procedure & Explanations	Precautions/Remarks
<Screen 2> Screen 2 is displayed when the INDIRECT key is pressed. Selecting the setting device: [←] [→] Use the →, ← keys to move the "#" mark to either the "D" or "W" indirect designation device position. Entering the device No.: [0] ··· [9] / [A] ··· [F] → [RETURN] Enter a decimal value if the indirect designation device is a "D" device, and a hexadecimal value if it is a "W" device. Canceling the indirect designation: [INDIRECT] Press the INDIRECT key again at the indirect designation input screen to cancel the indirect designation.	

Notes

Drawing No.

Mode	Program mode	Function	Program write	8-4

Instruction Class Setting Screen (Servo Instruction Selection)

Message

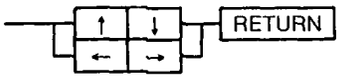
Key Operation

Screen 1

```
P COMMAND
#POSITIONING
 CIRCLE
 FEED
 SPEED
 SPEED/POSITION
 SPEED CHANGE
 CP
 POSITION FOLLOW
 ZERO RETURN
 START
```

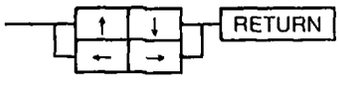
Positioning <for linear interpolation> Screen 2

```
P POSITIONING
#ABS-1      INC-1
 ABS-2      INC-2
 ABS-3      INC-3
 ABS-4      INC-4
```



Positioning <circular> Screen 3

```
P CIRCLE
 ABS      #INS
 ABS      INS
 ABS      INS
 ABS      INS
 ABS      INS
 ABS      INS
 ABS      INS
 ABS      INS
```



Notes

Drawing No.

Mode	Program mode	Function	Program write	8-4.1

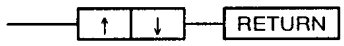
Instruction Class Setting Screen (Servo Instruction Selection)

Message

Key Operation

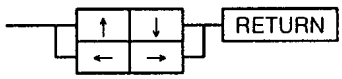
Fixed-pitch feed Screen 4

```
P  FEED
#FEED-1
 FEED-2
 FEED-3
```



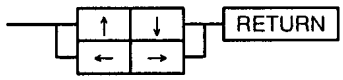
Speed Screen 5

```
P  SPEED
#VF      VR
 VVF     VVR
```



Speed/position switching control Screen 6

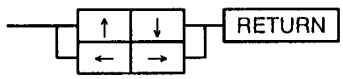
```
P  SPEED/POSITION
#VPF
 VPR
 VPSTART
```



Speed switching control Screen 7

```
P  SPEED CHANGE
#VSTART   VEND
 FOR-ON   FOR-OFF
 FOR-TIM  NEXT
```

VABS	VINC
ABS-1	INC-1
ABS-2	INC-2
ABS-3	INC-3



Notes

Drawing No.

Mode	Program mode	Function	Program write	8-4.2

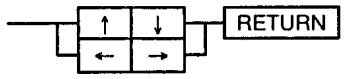
Instruction Class Setting Screen (Servo Instruction Selection)

Message

CP. <constant-speed control> Screen 8

```
P  CP.
#CP-1      CP-2
 CP-3      CP-4
 FOR-ON    FOR-OFF
 FOR-TIM   NEXT
 ABS-1     INC-1
 ABS-2     INC-2
 ABS-3     INC-3
 ABS-4     INC-4
 ABS       INC
 ABS       INC
 ABS       INC
 ABS       INC
 ABS       INC
 ABS       INC
 ABS       INC
 CPEND
```

Key Operation



Notes

Drawing No.

Mode	Program mode	Function	Program write	8-4.3

Instruction Class Setting Screen (Servo Instruction Selection)

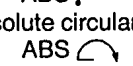
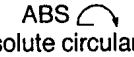
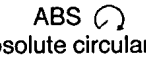
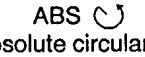
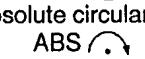
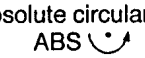
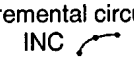
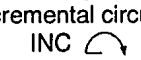
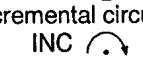
Operation Procedure & Explanations	Precautions/Remarks
<Screen 1> In order to select a servo instruction, that servo instruction's class must first be designated at the instruction class setting screen. At this screen, the currently selected instruction class is indicated by a "#" mark. Use the ↑, ↓ keys to scroll the screen, and press the RETURN key at the desired instruction class position. The system then proceeds to the servo instruction selection screen for that instruction class. POSITIONING → Go to screen 2 CIRCLE → Go to screen 3 FEED → Go to screen 4 SPEED → Go to screen 5 SPEED/POSITION → Go to screen 6 SPEED CHANGE → Go to screen 7 CP → Go to screen 8 ZERO RETURN → Go to 8-14 START → Go to 8-15 POSITION FOLLOW → Go to 8-16 <Screen 2> This screen is displayed when "POSITIONING" is selected at screen 1. The currently selected servo instruction is indicated by a "#" mark. Use the ↑, ↓, ←, → keys to move the "#" mark to the desired servo instruction position, then press the RETURN key. The system then proceeds to the program creation screen for that servo instruction. The required settings should be designated at this screen. ABS–1 (absolute 1-axis positioning) → Go to 8-5 ABS–2 (absolute 2-axis linear interpolation) → Go to 8-6 ABS–3 (absolute 3-axis linear interpolation) → Go to 8-7 ABS–4 (absolute 4-axis linear interpolation) → Go to 8-8 INC–1 (incremental 1-axis positioning) → Go to 8-5 INC–2 (incremental 2-axis linear interpolation) → Go to 8-6 INC–3 (incremental 3-axis linear interpolation) → Go to 8-7 INC–4 (incremental 4-axis linear interpolation) → Go to 8-8	When zero return or simultaneous start is selected, the system returns to the program creation screen (there will be no servo instruction selection).

Notes

Drawing No.

Mode	Program mode	Function	Program write	8-4.4

Instruction Class Setting Screen (Servo Instruction Selection)

Operation Procedure & Explanations	Precautions/Remarks
<Screen 3> This screen is displayed when "CIRCLE" is selected at screen 1. The currently selected servo instruction is indicated by a "#" mark. Use the ↑, ↓, ←, → keys to move the "#" mark (screen will scroll) to the desired servo instruction position, then press the RETURN key. The system then proceeds to the program creation screen for that servo instruction. The required settings should be designated at this screen. Absolute circular interpolation by auxiliary point designation ABS  → Go to 8-9 Absolute circular interpolation by radius designation (less than CW 180 °) ABS  → Go to 8-11 Absolute circular interpolation by radius designation (CW 180 ° or more) ABS  → Go to 8-11 Absolute circular interpolation by radius designation (less than CCW 180 °) ABS  → Go to 8-11 Absolute circular interpolation by radius designation (CCW 180 ° or more) ABS  → Go to 8-11 Absolute circular interpolation by center point designation (CW) ABS  → Go to 8-10 Absolute circular interpolation by center point designation (CCW) ABS  → Go to 8-10 Incremental circular interpolation by auxiliary point designation INC  → Go to 8-9 Incremental circular interpolation by radius designation (less than CW 180 °) INC  → Go to 8-11 Incremental circular interpolation by radius designation (CW 180 ° or more) INC → Go to 8-11 Incremental circular interpolation by radius designation (less than CCW 180 °) INC  → Go to 8-11 Incremental circular interpolation by radius designation (CCW 180 ° or more) INC  → Go to 8-11 Incremental circular interpolation by center point designation (CW) INC  → Go to 8-10 Incremental circular interpolation by center point designation (CCW) INC  → Go to 8-10	

Notes

Mode	Program mode	Function	Program write	8-4.5

Instruction Class Setting Screen (Servo Instruction Selection)

Operation Procedure & Explanations	Precautions/Remarks
<Screen 4> This screen is displayed when "FEED" is selected at screen 1. The currently selected servo instruction is indicated by a "#" mark. Use the ↑, ↓, ←, → keys to move the "#" mark (screen will scroll) to the desired servo instruction position, then press the RETURN key. The system then proceeds to the program creation screen for that servo instruction. The required settings should be designated at this screen. 1-axis fixed-pitch feed start FEED–1 → Go to 8-5 2-axis linear interpolation fixed-pitch feed start FEED–2 → Go to 8-6 3-axis linear interpolation fixed-pitch feed start FEED–3 → Go to 8-7 <Screen 5> This screen is displayed when "SPEED" is selected at screen 1. The currently selected servo instruction is indicated by a "#" mark. Use the ↑, ↓ keys to move the "#" mark (screen will scroll) to the desired servo instruction position, then press the RETURN key. The system then proceeds to the program creation screen for that servo instruction. The required settings should be designated at this screen. VF (speed control forward start) → Go to 8-12 VR (speed control reverse start) → Go to 8-12 VVF (speed control (II) forward start) → Go to 8-12 VVR (speed control (II) reverse start) → Go to 8-12	

Notes

Drawing No.

Mode	Program mode	Function	Program write	8-4.6

Instruction Class Setting Screen (Servo Instruction Selection)

Operation Procedure & Explanations	Precautions/Remarks
<Screen 6> This screen is displayed when "SPEED/POSITION" is selected at screen 1. The currently selected servo instruction is indicated by a "#" mark. Use the ↑, ↓ keys to move the "#" mark (screen will scroll) to the desired servo instruction position, then press the RETURN key. The system then proceeds to the program creation screen for that servo instruction. The required settings should be designated at this screen. VPF (speed/position switching control forward START) → Go to 8-5 VPR (speed/position switching control reverse START) → Go to 8-5 VPSTART (speed/position switching control restart) → Go to 8-13 <Screen 7> This screen is displayed when "SPEED CHANGE" is selected at screen 1. The currently selected servo instruction is indicated by a "#" mark. Use the ↑, ↓, ←, → keys to move the "#" mark (screen will scroll) to the desired servo instruction position, then press the RETURN key. The system then proceeds to the program creation screen for that servo instruction. The required settings should be designated at this screen. If the overwrite mode is in effect at this time, the entered servo instruction will be written over the displayed program step. If the insert mode is in effect, the entered instruction will be inserted in front of the displayed program step. VSTART (speed switching control START) VEND (speed switching control END) FOR–ON (repeat range beginning designation) → Go to 8-17 FOR–OFF (repeat range beginning designation) → Go to 8-17 FOR–TIM (repeat range beginning designation) → Go to 8-18 NEXT (repeat range end designation) VABS (speed switching point absolute designation) ABS–1 (absolute 1-axis positioning) → Go to 8-5 ABS–2 (absolute 2-axis linear interpolation) → Go to 8-6 ABS–3 (absolute 3-axis linear interpolation) → Go to 8-7 VINC (speed switching point incremental designation) INC–1 (incremental 1-axis positioning) → Go to 8-5 INC–2 (incremental 2-axis linear interpolation) → Go to 8-6 INC–3 (incremental 3-axis linear interpolation) → Go to 8-7	*1 VSTART must be designated first, followed by ABS–1 to ABS–3, or INC–1 to INC–3. The screen 7 instructions will then be repeated until VEND is designated.

Notes

*1. • The ABS–1 to ABS–3 or INC–1 to INC–3 instruction selections (following VSTART) will be processed as insert mode inputs even if the overwrite mode is in effect.
• Other instruction selections (following ABS–1 to ABS–3 or INC–1 to INC–3) will be processed as insert mode inputs even if the overwrite mode is in effect.

Drawing No.

Mode	Program mode	Function	Program write	8-4.7

Instruction Class Setting Screen (Servo Instruction Selection)

Operation Procedure & Explanations	Precautions/Remarks
<Screen 8> This screen is displayed when "CP" is selected at screen 1. The currently selected servo instruction is indicated by a "#" mark. Use the ↑, ↓, ←, → keys to move the "#" mark (screen will scroll) to the desired servo instruction position, then press the RETURN key. The system then proceeds to the program creation screen (FOR–ON, FOR–OFF, FOR–TIM) for that servo instruction. The required settings should be designated at this screen. If the overwrite mode is in effect at this time, the entered servo instruction will be written over the displayed program step. If the insert mode is in effect, the entered instruction will be inserted in front of the displayed program step.	*2
CP–1 (1-axis constant-speed control START) CP–2 (2-axis constant-speed control START) CP–3 (3-axis constant-speed control START) CP–4 (4-axis constant-speed control START) CPEND (constant-speed control END) FOR–ON (repeat range beginning designation) → Go to 8-17 FOR–OFF (repeat range beginning designation) → Go to 8-17 FOR–TIM (repeat range beginning designation) → Go to 8-18 NEXT (repeat range end designation) ABS–1 (absolute 1-axis positioning) → Go to 8-5 ABS–2 (absolute 2-axis linear interpolation) → Go to 8-6 ABS–3 (absolute 3-axis linear interpolation) (less than CW 180 °) → Go to 8-7 ABS–4 (absolute 4-axis linear interpolation) (CW 180 ° or more) → Go to 8-8 ABS (Absolute circular interpolation by auxiliary point designation) (less than CCW 180 °) → Go to 8-9 ABS (Absolute circular interpolation by radius designation) (CCW 180 ° or more) → Go to 8-11 ABS (Absolute circular interpolation by radius designation) (CW) → Go to 8-11 ABS (Absolute circular interpolation by radius designation) (CCW) → Go to 8-11 ABS (Absolute circular interpolation by radius designation) → Go to 8-11 ABS (Absolute circular interpolation by center point designation) → Go to 8-10 ABS (Absolute circular interpolation by center point designation) → Go to 8-10 INC–1 (incremental 1-axis positioning) (less than CW 180 °) → Go to 8-5 INC–2 (incremental 2-axis linear interpolation) (CW 180 ° or more) → Go to 8-6	Selection must begin with CP–2 or CP–3. The screen 8 instructions will then be repeated until VCPEND is designated.

Notes

*2. Other instruction selections (following CP–2 or CP–3) will be processed as insert mode inputs even if the over-write mode is in effect.

Drawing No.

Mode	Program mode	Function	Program write	8-4.8

Instruction Class Setting Screen (Servo Instruction Selection)

Operation Procedure & Explanations	Precautions/Remarks
INC–3 (incremental 3-axis linear interpolation) (less than CCW 180 °) → Go to 8-7 INC–4 (incremental 4-axis linear interpolation) (CCW 180 ° or more) → Go to 8-8 INC  (Incremental circular interpolation by auxiliary point designation) (CW) → Go to 8-9 INC  (Incremental circular interpolation by radius designation) (CCW) → Go to 8-11 INC  (Incremental circular interpolation by radius designation) → Go to 8-11 INC  (Incremental circular interpolation by radius designation) → Go to 8-11 INC  (Incremental circular interpolation by radius designation) → Go to 8-11 INC  (Incremental circular interpolation by center point designation) → Go to 8-10 INC  (Incremental circular interpolation by center point designation) → Go to 8-10	

Notes

Drawing No.

Mode	Program mode	Function	Program write	8-5

After Selecting Servo Instruction (ABS–1, INC–1, FEED–1, VPF, VPR)

Message

Key Operation

<Default>

```
PK4095I      ABS-1
AX.  1
SP.          0.01
  1          0.0u
```

unit

```
PK4095I      ABS-1
AX.  32
SP.          0.01
32           0.0u
```

For details regarding key operation, see page 8-3.

Notes

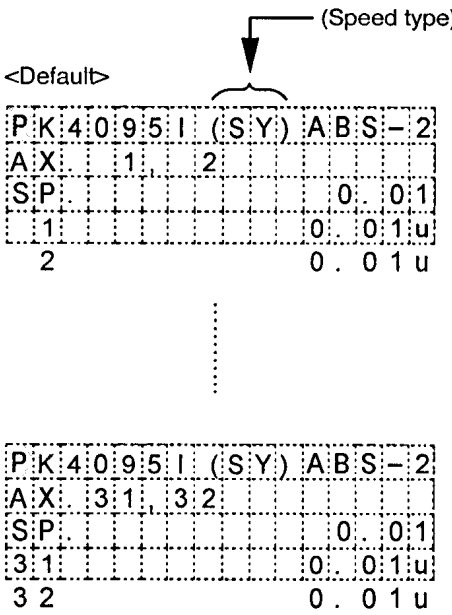
Drawing No.

Mode	Program mode	Function	Program write	8-6

After Selecting Servo Instruction (ABS–2, INC–2, FEED–2)

Message

Key Operation



For details regarding key operation, see page 8-3.

Notes

* Meanings of "speed type" screen abbreviations are as follows:
(SY) .... Resultant speed
(RE) .... Reference axis speed
(LO) .... Long axis speed

Drawing No.

Mode	Program mode	Function	Program write	8-7

After Selecting Servo Instruction (ABS–3, INC–3, FEED–3)

Message

Key Operation

<Default>

```
PK4095I (RE) ABS-3
AX.  1,  2,  3
SP.              0. 01
 1               0. 0u
 2               0. 0u
 3               0. 0u
REF. AX.            1
```

⋮

```
PK4095I (RE) ABS-3
AX. 30, 31, 32
SP.              0. 01
30               0. 0u
31               0. 0u
32               0. 0u
REF. AX.           30
```

For details regarding key operation, see page 8-3.

Notes

Drawing No.

Mode	Program mode	Function	Program write	8-8

After Selecting Servo Instruction (ABS–4, INC–4)

Message

Key Operation

<Default>

```
PK4095I (LO) ABS-4
AX.  1,  2,  3,  4
SP.                0.01
 1                 0.0u
 2                 0.0u
 3                 0.0u
 4                 0.0u
```

⋮

```
PK4095I (LO) ABS-4
AX. 29, 30, 31, 32
SP.                0.01
29                 0.0u
30                 0.0u
31                 0.0u
32                 0.0u
```

For details regarding key operation, see page 8-3.

Notes

Drawing No.

Mode	Program mode	Function	Program write	8-9

After Selecting Servo Instruction (Circular Interpolation by Auxiliary Point Designation ABS ⌒, INC ⌒)

Message

Key Operation

<Default>

```
PK4095I      ABS⌒
AX.  1,  2
SP.          0.01
AUX. P
  1          0.0u
  2          0.0u
END
  1          0.0u
  2          0.0u
```

For details regarding key operation, see page 8-3.

Notes

Drawing No.

Mode	Program mode	Function	Program write	8-10

After Selecting Servo Instruction (Circular Interpolation by Center Point Designation ABS ↻, INC ↻, ABS ↺, INC ↺)

Message

Key Operation

<Default>

```
PK4095I          ABS↻
AX  1  2
SP.           0.01
CETN
  1           0.0u
  2           0.0u
END
  1           0.0u
  2           0.0u
```

For details regarding key operation, see page 8-3.

Notes

Drawing No.

Mode	Program mode	Function	Program write	8-11

After Selecting Servo Instruction (Circular Interpolation by Radius Designation ABS↶, ABS↷, ABS⌒, ABS⌣, INC↶, INC↷, INC⌒, INC⌣)

Message

Key Operation

<Default>

```
PK4095I      ABS↶
AX.  1,  2
SP.          0.01
RAD.
                0.1
END
  1          0.0u
  2          0.0u
```

For details regarding key operation, see page 8-3.

Notes

Drawing No.

Mode	Program mode	Function	Program write	8-12

After Selecting Servo Instruction (Speed Control, Speed/Position Switching Control VF, VR, VVF, VVR)

Message	Key Operation
<Default> PK4095 VF AX. 1 SP. 0.01	For details regarding key operation, see page 8-3.

Notes

Drawing No.

Mode	Program mode	Function	Program write	8-13

After Selecting Servo Instruction (Speed/Position Switching Control, Restart VPSTART)

Message	Key Operation
PK4095I VPS AX. 1	For details regarding key operation, see page 8-3.

Notes

Drawing No.

Mode	Program mode	Function	Program write	8-14

After Selecting Servo Instruction (Home Position Return Zero ZERO)

Message	Key Operation
PK4095I ZERO AX. 1	For details regarding key operation, see page 8-3.

Notes

Drawing No.

Mode	Program mode	Function	Program write	8-15

After Selecting Servo Instruction (Simultaneous START START)

Message	Key Operation
PK4095I START K K K	For details regarding key operation, see page 8-3.

Notes

Drawing No.

Mode	Program mode	Function	Program write	8-16

After Selecting Servo Instruction (Position Follow-Up PFSTART)

Message

<Default>

```
PK4095I      PFSTR
AX.  1
SP.          0. 01
  1        D      0
```

Screen 2

STORE

```
P  INDIRECT SPC.
#D        W
          500
```

Devices used by the system (for positioning, etc.) cannot be used for indirect designation purposes.
The following devices are used exclusively for positioning:
A273UHCPU (8-axis specs.) & A171SCPU ..... D800 to D1023
A273UHCPU (32-axis specs.) ..... D0 to D799
Designation of an improper device can result in abnormal positioning, or an error.

Key Operation

For details regarding key operation, see page 8-3.
Address inputs are only possible by indirect designation.
Numerical value inputs (0 to 9) are invalid.

Notes

Drawing No.

Mode	Program mode	Function	Program write	8-17

After Selecting Servo Instruction (Repeat Same Control FOR–ON, FOR–OFF)

Message

Key Operation

Screen 1

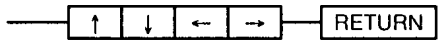
```
PFOR-ON
#X          Y
 M          L
 B          F
```

Screen 2

```
PK4095RP    0CP-2
 FOR-ON
          X    0000
```

FOR–ON repeat operation is ended when the trigger at the corresponding device switches ON.
FOR–OFF repeat operation is ended when the trigger at the corresponding device switches OFF.

A hexadecimal number input is required at X, Y, B devices.
A decimal number input is required at M, L, F devices.



For details regarding key operation, see page 8-3.

Notes

A return to screen 1 is impossible after screen 2 is displayed. If a device change is required at this time, FOR–ON or FOR–OFF must be selected again in the replace mode.

Drawing No.

Mode	Program mode	Function	Program write	8-18

After Selecting Servo Instruction (Repeat Same Control FOR–TIMES)

Message

Key Operation

Screen 1

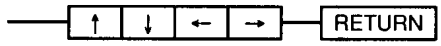
```
PFOR-TIMES
 D       W
#K       H
```

Screen 2

```
PK4095RP  0CP-2
 FOR-TIMES
        K     1
```

FOR–TIMES repeat operation is ended when the designated repeat count is reached.

If "K" is selected at screen 1, the count value is entered directly as a decimal value.
If "H" is selected at screen 1, the count value is entered directly as a hexadecimal value.
If "D" is selected at screen 1, the "D" device address is entered as a decimal value.
If "W" is selected at screen 1, the "W" device address is entered as a hexadecimal value.



For details regarding key operation, see page 8-3.

Notes

A return to screen 1 is impossible after screen 2 is displayed. If a device change is required at this time, FOR–TIMES must be selected again in the replace mode.

Drawing No.

Mode	Program mode	Function	Program write	8-19

Setting Items

Message

Key Operation

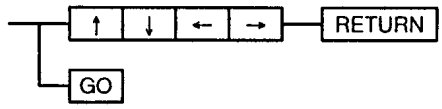
Screen 1

```
P SETTING ITEM
#●DWELL    ○M CODE
  TRQ.     ○P. BLK.
  UNIT     ○S. R.
○AC.       ○DE.
○S. STOP   ○P. TRQ.
●STOP      ○C. E. R.
○SPEED     ●S RATE
```

Screen 2

```
PK4095I
DWELL        5000ms
M CODE          255
TRQ             500%
P.B.             16
UNIT         1:inch
S.R.  60000000.00
AC.          65535ms
DE.          65535ms
S.STOP       65535ms
P.TRQ           500%
STOP    0:DE.STOP
C.E.R.   10000PLS
SP.   60000000.00
S RATIO         100%
```

The set value range for positioning data is indicated in 8-19.2.



For details regarding key operation, see page 8-3.

Notes

The ON/OFF indication is displayed only at selectable positioning data items.

Drawing No.

Mode	Program mode	Function	Program write	8-19.1

Setting Items

Operation Procedure & Explanations	Precautions/Remarks
<Screen 1> Selecting the positioning data: ↑ ↓ ← → — RETURN Use the ↑, ↓, ←, → keys to move the "#" mark to the positioning data item to be set at the program. The item is switched ON and OFF by pressing the RETURN key. Note that setting errors may be caused with some instructions. Registering the positioning data: GO The system returns to the program creation screen when the GO key is pressed. Positioning data is entered at the bottom line of the program creation screen.	

Notes	

Drawing No.

Mode	Program mode	Function	Program write	8-19.2

Setting Items

Positioning data setting ranges

Setting Items	Default	mm	inch	degree	PULSE
DWELL (dwell time)	0 (ms)	0 to 5000 (ms)			
M CODE (M–code)	0	0 to 255			
TRQ. (torque limit value)	According to parame-ter block 1	1 to 500 (%)			
P.B. (parameter block)	1	1 to 16 (A171S/A273UH 8-axis specs.) 1 to 64 (A273UH 32-axis specs.)			
UNIT (control units)	3	0	1	2	3
S.R. (speed limit)	200.000 (PLS/sec)	0.01 to 6000000.00 (mm/min)	0.001 to 600000.000 (inch/min)	0.001 to 600000.000 (degree/min)	1 to 1000000 (PLS/sec)
AC. (acceleration time)	1000 (ms)	1 to 65535 (ms)			
DE. (deceleration time)	1000 (ms)	1 to 65535 (ms)			
S.STOP (rapid stop deceleration time)	1000 (ms)	1 to 65535 (ms)			
P.TRQ. (parameter torque limit value)	300 (%)	1 to 500 (%)			
STOP (deceleration time at STOP input)	0	0: DE. STOP 1: S. STOP			
C.E.R. (allowable error range for circular interpolation)	100 (PLS)	0.0 to 10000.0	0.00000 to 1.00000	0.00000 to 1.00000	0 to 100000
SPEED (speed command (constant–speed))	—	0.01 to 6000000.00 (mm/min)	0.001 to 600000.000 (inch/min)	0.001 to 600000.000 (degree/min)	1 to 1000000 (PLS/sec)
S RATE (S–curve ratio)	0	0 to 100 (%)			

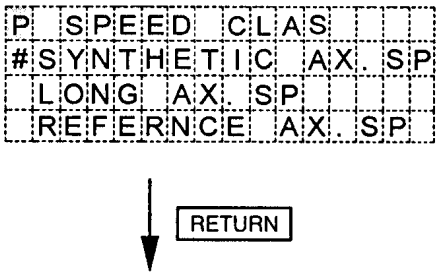
Notes

Drawing No.

Mode	Program mode	Function	Program write	8-20

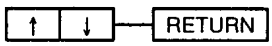
Speed Type Selection Screen

Operation Procedure & Explanations	Precautions/Remarks



To screen 1 at page 8-3

Selecting the speed type:



Use the ↑, ↓ keys to move the "#" mark to the desired speed type position, then press the RETURN key. The system then proceeds to screen 1 at page 8-3.

Notes

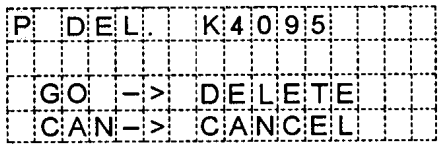
8.3 Deleting Programs

Drawing No.

Mode	Program mode	Function	Program delete	8-21

Deleting Programs

Message



Key Operation

GO

Operation Procedure & Explanations	Precautions/Remarks
Delete: GO Press the GO key to delete the designated program and return to the function selection screen.	

Notes

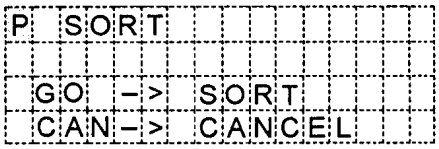
8.4 Sort

Drawing No.

Mode	Program mode	Function	Sort	8-22

Sorting Programs

Message



Key Operation

GO

Operation Procedure & Explanations	Precautions/Remarks

Sort:

GO — Press the GO key to execute program sorting. When sorting is completed, the system returns to the function selection screen.

The following message is displayed during the sorting operation:

"! EXECUTING"

Notes

8.5 Copy

Drawing No.

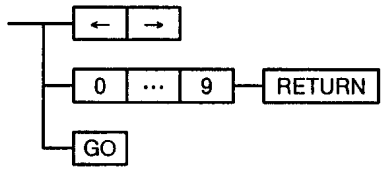
Mode	Program mode	Function	Copy	8-23

Copying Programs

Message

```
P COPY
 4095 ---> 4094
 GO  -> COPY
 CAN-> CANCEL
```

Key Operation



Operation Procedure & Explanations

Moving between input fields:

[←] [→] Use the ←, → keys to move between the copy source and copy destination program No. input fields.

Entering the program No.:

[0] [···] [9] — [RETURN]

Use keys 0 to 9 to enter the copy source and copy destination program Nos., then press the RETURN key.

Copy:

[GO] Press the GO key to execute copying. When completed, the function selection screen is displayed. If a designated program No. already exists, the message "PROG.ALR.STORED" is displayed, and the next screen is displayed. If the GO key is pressed at this time, the old data will replaced by the newly designated copy data (overwriting).

```
GO  -> REWRITE
CAN -> CANCEL
```

The following message is displayed during a copy operation:

"! EXECUTING"

Precautions/Remarks

Notes

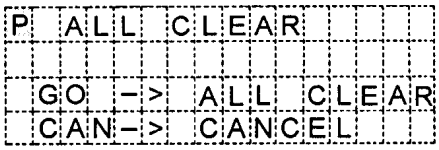
8.6 All-Clear

Drawing No.

Mode	Program mode	Function	All-Clear	8-24

All-Clear

Message



Key Operation

GO

Operation Procedure & Explanations	Precautions/Remarks

All-Clear:

GO — Press the GO key to execute an all–clear operation. When completed, the system returns to the function selection screen.

The following message is displayed during an all-clear operation:

"! EXECUTING"

Notes

9. ERROR MESSAGE LIST

Drawing No.

Mode		Function		9-1

When an error occurs, one of the error messages shown in this section is displayed at the bottom line of the screen. While an error message is displayed, processing is stopped and display content changes will be impossible.
Press the CLEAR key to clear the error message and resume processing.
Error messages are cleared by key inputs, and those key inputs are processed normally.

9

1) "! MIS OPERATION"

Causes:
- Displayed in response to a key input which is prohibited at the current screen.
- Displayed in response to a key input which is prohibited at the current status.
- Displayed during numeric inputs when a key for screen movement is pressed without first pressing the RETURN key.

* This error takes precedence over other errors.

Countermeasure: Press the correct keys.

2) "! SETTING ERROR"

Causes:
- Displayed in the following cases when inputting data (axis No., program No., setting data, program parameters, etc.):

1. When the data entered (by pressing RETURN key) is outside the applicable range.
2. When a negative value (minus key) is entered at a positive value input item.
3. When the decimal point key is used at an integer input item.
4. An inconsistency exists at system settings between the AMP slot setting and SB/SD servo settings.
5. When the following statuses occur while registering programs in the program mode:
   A. The same axis number is designated.
   B. No simultaneous START program number is designated.
   C. Abnormal FOR to NEXT relationship.
   D. When an ABS–1 to ABS–4, INC–1 to INC–4, VABS, or VINC is missing at a speed change.
   E. Constant-speed control does not end at CPEND.
   F. Speed change does not end at VEND.
6. When a key for screen movement is pressed at program mode constant-speed control or speed switching control after designating the same axis No. twice.
7. When an improper instruction is selected at the 2nd or later step of constant-speed control or speed switching control in the program mode.
8. When improper positioning data is selected for a given instruction in the program mode.
9. When an indirect designation data change is attempted in direct numeric input under the address teaching function.
10. When a key for screen movement or screen switching, etc., is pressed without entering the required data when using the program teaching function.
11. When a key for screen movement is pressed with the same axis number designated twice at the program teaching function.
12. When the START program number is larger than the END program number for a "continuous" program operation.
13. When no program number has been designated at a "random" program operation.

* Note: When this error occurs, a setting cannot be designated for the data item in question.

Countermeasure: Enter a correct value.

9

3) "! IN TEST MODE"

Cause:
- Displayed when a setting data (auxiliary data: backlight, buzzer ON/OFF, language selection) update is made in the test mode.

* Note: Data will not be updated if this error occurs.

Countermeasure: Execute the update after canceling the test mode.

4) "! NO SERVO SYSTEM"

Cause:
- Displayed when any of the following operations are executed at an axis where no servo amplifier is installed.

1. Axis monitoring
2. Torque trace
3. Servo monitoring
4. Servo monitoring (2-port memory)
5. JOG operation
6. Home position return
7. Present value setting

* Note: The operation in question will not be executed if this error occurs.

Countermeasure: Designate another axis.

5) "! CAN'T TRACE"

Cause:
- Displayed when a torque trace operation is already in progress when a torque trace start is attempted, making the trace request impossible.

* Note: The torque trace function will not be executed if this error occurs.

Countermeasure: Stop the trace operation which is in progress, then start the desired trace operation.

6) "! STARTING ERROR"

Causes:
- Displayed when switching to the test mode is impossible even after the prescribed period has elapsed. (See note 1)
- Displayed when the test mode cannot be canceled even after the prescribed period has elapsed. (See note 2)
- Displayed when a program operation start is attempted while operation is in progress. (See note 3)
- Displayed when address (designated by address teaching) writing is attempted while operation is in progress. (See note 4)
- Displayed when program (designated by program teaching) writing is attempted while operation is in progress. (See note 5)

* Notes:
1. The test mode cannot be established when this error occurs.
2. The test mode cannot be canceled when this error occurs.
3. Program start is impossible when this error occurs.
4. Address writing is impossible when this error occurs.
5. Program writing is impossible when this error occurs.

Countermeasure: Stop the operation in progress, then try again.

7) "! TIME CHECK OVER"

Cause:
- Displayed when any of the following SCPU operations are not completed within the prescribed period:

1. Bit device update
2. Word device update
3. Word device monitoring

Countermeasure: Look for malfunction at the SCPU.

8) "! DEVICE ERROR"

Cause:
- Displayed when a request to the SCPU ends in an error.

1. Bit device update
2. Word device update
3. Word device monitoring

Countermeasure: Check the device types and device addresses. If they are correct, there may be an SCPU malfunction.

9) "! WRITE ERROR"

Cause:
- Displayed when a ROM writing error occurred.

1. When a data update is attempted at data setting.
2. When address writing is attempted when using the address teaching function.
3. When program registration is attempted when using the program teaching function.
4. When a program change is attempted in the program mode.

* Note: Data being registered at the ROM cannot be guaranteed when this error occurs.

Countermeasure: Replace the ROM.

10) "! ERROR DETECTED"

Cause:
- Displayed if an error is detected when a "continuous" or "random" program operation is started.

* Note: Program operation is immediately stopped when this error occurs.

Countermeasure: Check the program and error content, eliminate the error cause, execute an error reset, then re-start the program.

11) "M.OVER–CAN'T WR"

Causes:
- Displayed at program registration in the "program teaching" or "program" mode when the number of instruction words which have been created exceed the available program space.
- Displayed at the program copy operation (in program mode) when the number of instruction words to be copied exceed the available program space.

* Note: This error also occurs at the program sort function, but only when the space required for the above operations cannot be secured. Program registration will be impossible if this error occurs.

Countermeasure: Delete unnecessary programs, execute the sort function, then repeat the registration operation.

12) "M.OVER–NEED SORT"

Causes:
- Displayed at program registration in the "program teaching" or "program" mode when the number of instruction words which have been created exceed the available program space.
- Displayed at a program copy operation (in program mode) when the number of instruction words to be copied exceed the available program space.

* Note: This error also occurs when using the program sort function, but only when the space required for the above operations cannot be secured. Program registration will be impossible if this error occurs.

Countermeasure: Execute the program sort function, then repeat the registration operation.

13) "! STEP NO. OVER"

Causes:
- Displayed during program creation in the "program teaching" or "program" mode when the number of instruction steps for constant-speed control or speed switching control exceeds 256.
- Displayed at program registration in the "program teaching" or "program" mode when the number of created instruction words for constant-speed control or speed switching control exceeds 768.

* Note: Program registration is impossible when this error occurs.

Countermeasure: Shorten the program.

14) "! KEY INVALID"

Cause:
- Displayed when key operation for a data change, a program change or program operation is attempted with the enabled/disabled switch set to disabled.

* Note: The above operations are impossible when this error occurs.

Countermeasure: Set the enable/disabled switch to "enabled", then repeat the desired key operation.

15) "TST.MOD.OFF ERR"

Cause:
- Displayed when the test mode is canceled during a "continuous" or "random" program operation.

* Note: Program operation is immediately stopped when this error occurs.

Countermeasure: Switch the test mode ON and start the program again.

16) "I.COD ERROR"

Cause:
- Displayed if an incorrect program code is read when modifying a program in the program mode.

1. When the program number is entered.
2. When the next step is read out in response to a STEP+ key input.
3. When the next step is read out after canceling a step.

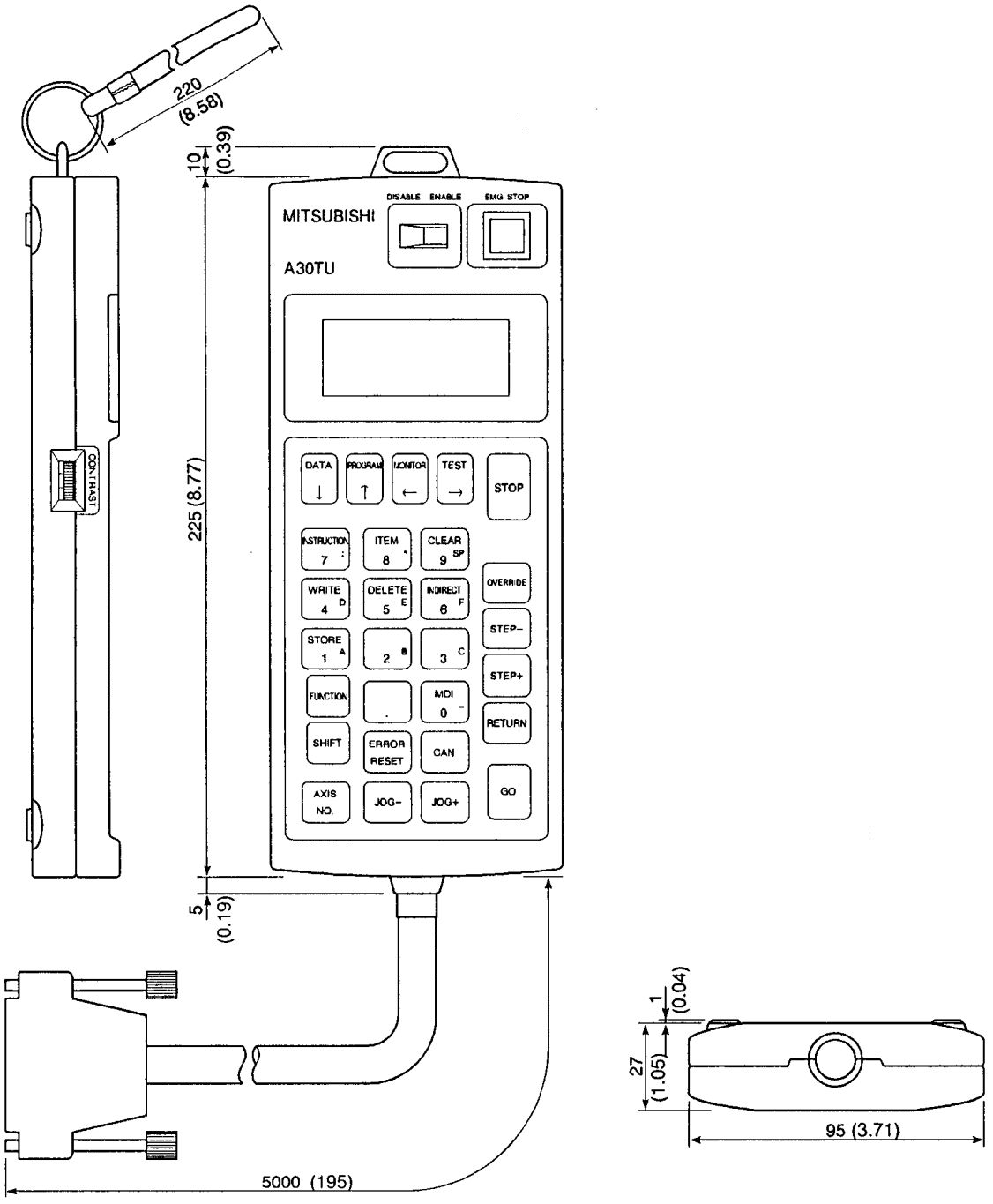
* Note: When an error occurs at status 2 or 3 above, all subsequent steps are abandoned. (If not registered, however, the program (ROM content) will not be changed.)

Countermeasure: Re-create the program.

APPENDIX. OUTLINE DRAWING

Drawing No.

Mode		Function		APP-1



mm : inch

APP