



EZS/EZC Series Controller

DATA SETTING MANUAL

Notes to the User

- This product must be handled by qualified personnel with expert knowledge of electrical and mechanical engineering.
- Should you require the inspection or repair of internal parts, please contact the Oriental Motor branch or sales office from which you purchased the product.
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Chapter 1 Overview

1.1 Introduction

This manual describes how to set data for the EZS/EZC Series controller using the EZT1 teaching pendant.

Operating any EZS/EZC Series slider or cylinder requires the setup of the slider/cylinder and controller, as well as the creation of operation data via a teaching pendant. Please refer to the following manuals for the EZS/EZC Series, and follow the instructions:

- EZS/EZC Series Controller Data Setting Manual (this document)
- EZS/EZC Series Slider/Cylinder Installation Manual
This manual explains the installation and troubleshooting of the slider and cylinder.
- EZS/EZC Series Controller User Manual
This manual explains the installation, wiring, I/O, setting and troubleshooting of the controller.
- Teaching Pendant EZT1 User Manual
This manual explains the key layout of the teaching pendant.

1.2 Functions of the Teaching Pendant

It is possible to create and monitor operation data for up to 16 controllers with one teaching pendant.

- A unique individual axis number (ID) must be set for each controller.
- Controller link cables (optional) are required for the connection of the controllers.

The following modes can be executed with the teaching pendant if a controller is set to the controller mode:

- External (EXT) mode: Perform operation via the controller's I/O and monitor command position, I/O status, alarms and alarm history.
- Program (PRG) mode: Create and modify operation data, as well as clear all data.
- Parameter (PAR) mode: Set and modify parameters for operation and function settings.
- Test (TST) mode: Perform manual operation and I/O checking.

The following modes can be executed with the teaching pendant if a controller is set to the driver mode:

- External (EXT) mode: Perform I/O status, alarms and alarm history.
- Parameter (PAR) mode: Set and modify parameters for operation and function settings.
- Test (TST) mode: Perform I/O checking.

Operation data can be created using any one of the following three options:

- Numerical value input: Enter numerical values using the numerical keys.
- Remote teaching input: Operate the slider/cylinder with the arrow keys to enter the stopping position.
- Direct teaching input: Move the slider/cylinder manually to enter the stopping position.



1.3 Contents of the Manual

This manual consists of chapters 1 through 8 and appendixes A. The table below gives a brief explanation of the content of each chapter and section.

Chapter	Description
Chapter 1 Overview	This chapter gives an overview of the functions of the teaching pendant and the contents of this manual.
Chapter 2 Startup and Operation	This chapter explains how to perform a self-check at startup and select each menu.
Chapter 3 Creating Operation Data and Starting Operation	This chapter provides examples of how to create operation data for sliders/cylinders, as well as examples of operation control.
Chapter 4 Creating and Modifying Operation Data	This chapter explains how to create and modify data for positioning operation.
Chapter 5 Setting and Modifying Parameters	This chapter explains how to set and modify common parameters for operation and parameters for setting controller functions.
Chapter 6 Monitoring Operation Data	This chapter explains the minimum maintenance required for the controller.
Chapter 7 Manual Operation and I/O Checking	This chapter explains how to perform manual operation and operation check of controller I/O via the teaching pendant.
Chapter 8 Troubleshooting	This chapter explains how to check error messages and alarm history, as well as the appropriate actions to be taken.
Appendix A Table of Operation Switching	This section describes the operations of the teaching pendant and how the screens shift.

1.4 Rules of Notation

The following symbols are used throughout this manual to indicate safety warnings, precautions, important notes and tips:

 Warning	Handling the product without observing the instructions that accompany a “Warning” symbol may result in death or serious bodily injury.
 Caution	Handling the product without observing the instructions that accompany a “Caution” symbol may result in bodily injury or property damage.
Note	These notes appear throughout the manual and describe items that must be observed by the user in certain situations to ensure correct use of the product.

Notation

The description of text in this manual follows the notation rules specified below:

- A sentence starting with a filled circle provides information, not an operating procedure.
- A sentence starting with a number indicates an operating procedure or a step in a procedure.
- Referenced titles are denoted in italics.

Chapter 2 Startup and Operation

This chapter describes the representative screens of the teaching pendant displayed in the controller mode, as well as the basic key operations using those screens.

2.1 Starting the Teaching Pendant

The power to the teaching pendant is supplied from the controller via the cable connecting the teaching pendant and controller. This means the power is supplied to the teaching pendant at the time the power supply to the controller is turned on if the teaching pendant is already connected to the controller and the pendant switch (PENDANT/PC) is turned to "ON".

Note

When the controller is of the absolute type, an alarm will be generated if power is supplied under the following conditions. Take an appropriate action by referring to "Alarm Codes" on p. 8-4.

- The battery is not connected
- The battery is not charged
- The battery is used for the first time

The startup screen shown in Figure 2-1 is displayed for approximately a second after turning on the power supply to the teaching pendant, followed by the screen (Figure 2-2) indicating that the axis number (ID) of the connected controller is being checked. The language setting screen (1) (Figure 2-3) is displayed after the ID checking screen has been displayed only when the power supply is turned on for the first time. Press the ← or → key to select a language, and press the ENT key.

When normal communication with the controller is established and there are no errors in ID settings, the default screen (Figure 2-4) will be displayed if one axis is used. The ID selection screen (Figure 2-5) will be displayed if multiple axes are used.

Note

Do not input the alarm clear signal via user I/O while starting up the pendant. This will cause a communication error.

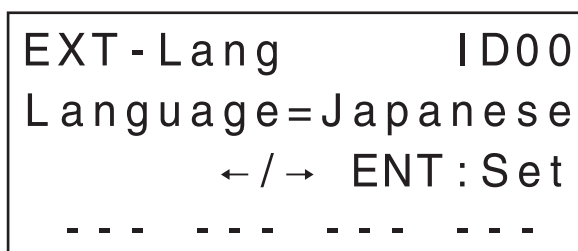
■ Figure 2-1 Startup Screen



■ Figure 2-2 ID Checking Screen



■ Figure 2-3 Language Setting Screen (1)



Either Japanese or English can be selected.

2.1.1 In the Case of One Axis

The ID number of the connected controller is displayed. (The example below shows the display when the ID is 00.)

■ Figure 2-4 Default Screen (EXT Mode: First Screen/Current Position Display) (when ID is 00)

EXT	ID00
Se l = #00	Act = #00
Pos = 0000.000mm	
Mode I/O	Alm Data

This screen is only displayed in the controller mode.

2.1.2 In the Case of Multiple Axes

The ID selection screen (Figure 2-5) is displayed for the selection of controllers operated via the teaching pendant.

■ Figure 2-5 ID Selection Screen

CONTROLLER ID								
0	1	2	3	4	5	6	7	8
9	10	11	12	13	14			
15	SELECT ID: 00							

This screen displays the IDs of the controllers for which connections have been established. IDs of controllers for which connections could not be established are not displayed.

- Enter an ID via the numerical keys, and press the **ENT** key. The screen changes to the one shown in Figure 2-4.

In the SELECT ID: nn field, the lowest ID among the controllers for which connections could be established during the ID checking performed immediately after power-up is displayed by default.

It is possible to perform ID checking as many times as necessary by pressing the **ESC** key while the first screen of the EXT or driver mode is displayed. If ID checking is performed with this operation, the ID previously selected is displayed in the SELECT ID field.

2.1.3 Switching Between Languages

To switch display languages, call up the first screen (Figure 2-4) of the EXT mode and press the **SHIFT** key continuously.

After confirming that the screen changes to the one shown in Figure 2-6, press the **F4** key to display the language setting screen (2) (Figure 2-7). Press the **←** or **→** key to select a language, and press the **ENT** key.

■ Figure 2-6 Default Screen (when switching language)

```

EXT                               ID00
Sel = #00 Act = #00
Pos = 0000.000mm
Mode - - - - - Lang
  
```

■ Figure 2-7 Language Setting Screen (2)

```

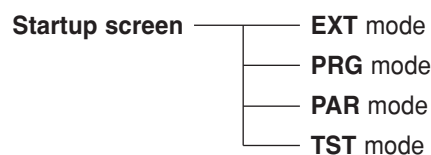
EXT - Lang                         ID00
Language = Japanese
                ← / → ENT : Set
Mode - - - - -
  
```

Either Japanese or English can be selected.

2.1.4 First Screen of Each Mode

When power is supplied to the teaching pendant and the ID checking of controllers has been completed, the default EXT mode main screen is displayed. Four modes—PRG, PAR, TST and EXT—are provided at the same hierarchy. Press the **F1** key in order to switch among these modes.

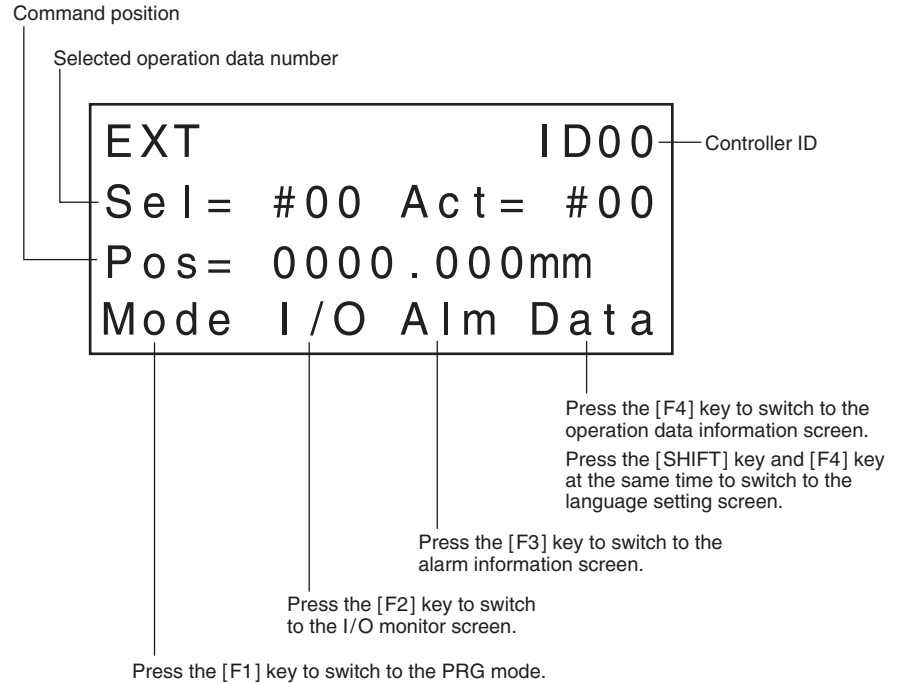
■ Figure 2-8 Operation Modes



(1) EXT Mode

Figure 2-9 shows the first screen of the EXT mode. The EXT mode is used to perform controller operations. It also allows the user to monitor I/O status and slider/cylinder operation, as well as to display alarm information.

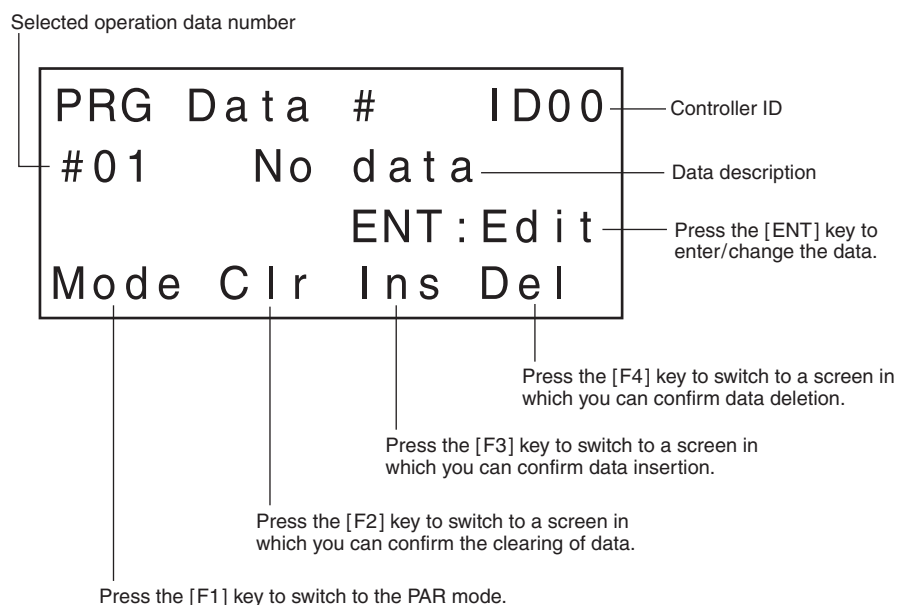
■ **Figure 2-9 First Screen of the EXT Mode/Current Position Display**



(2) PRG Mode

Figure 2-10 shows the first screen of the PRG mode. The PRG mode is used for the creation and editing of slider/cylinder operation data.

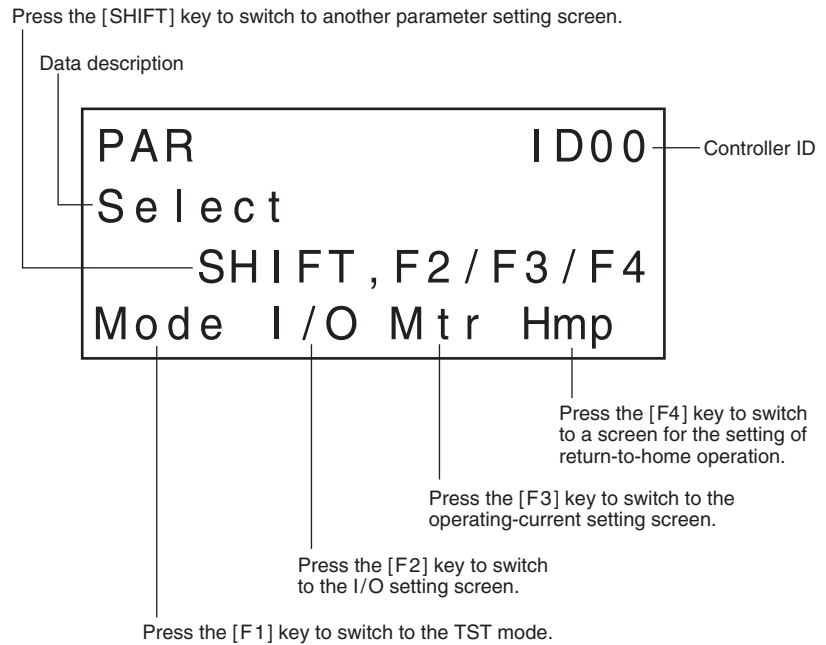
■ **Figure 2-10 First Screen of the PRG Mode/Number Selection 1**



(3) PAR Mode

Figure 2-11 shows the first screen of the PAR mode. The PAR mode is used for the creating/editing of common operation parameters and parameters for controller function settings.

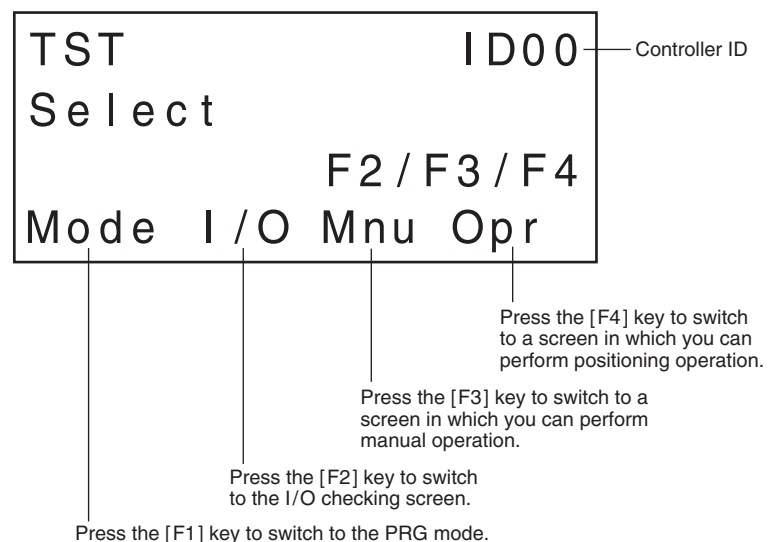
■ Figure 2-11 First Screen of the PAR Mode/Item Selection 1



(4) TST Mode

Figure 2-12 shows the first screen of the TST mode. The TST mode is used to perform manual operation of the slider/cylinder and check the I/O status.

■ Figure 2-12 First Screen of the TST Mode/Item Selection



2.1.5 Error Display Screens

The error screens shown in figures 2-13 to 2-16 are displayed if controller errors are detected. The red backlight turns on if an error screen is displayed.

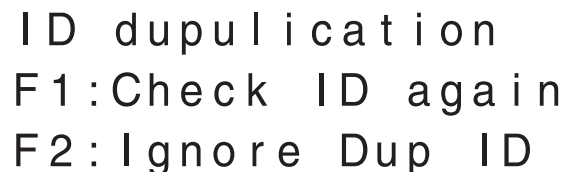
■ **Figure 2-13 No ID Connected**



No ID's detected1
F1:Check ID again

Check the connection between the teaching pendant and controllers, as well as the ID settings of the controllers, then press the **F1** key to return to the ID checking screen.

■ **Figure 2-14 ID Duplication**



ID duplication
F1:Check ID again
F2:Ignore Dup ID

Check the ID settings of the controllers, and press the **F1** key to return to the ID checking screen.

Press the **F2** key to disconnect a controller with a duplicate ID.

■ **Figure 2-15 Communication Error**



Com Error
F1:Check ID again
F2:Ignore Dup ID

Check the ID settings of the controllers, and press the **F1** key to return to the ID checking screen.

Press the **F2** key to disconnect a controller that generates communication errors.

■ **Figure 2-16 No ID Recognized**




No ID's detected2
F1:Check ID again

Change the duplicated ID or remove the cause of communication error, and press the **F1** key to return to the ID checking screen.

Chapter 3 Creating Operation Data and Starting Operation

This chapter describes the procedures used to create operation data and start the operation of the slider/cylinder via the teaching pendant. Operation data is created in the same way for both sliders and cylinders. However, it is necessary that you understand the principles of “push-motion operation” in order to create operation data for cylinders.

 Warning	<ul style="list-style-type: none"> ● In order to avoid injury and equipment damage, be sure that engineers having expert knowledge of the structure and operation of the EZS/EZC Series controllers and sliders/cylinders, along with an awareness of the degree of risk involved in the operation, perform the connection of the teaching pendant. ● In order to avoid injury and equipment damage, perform the following operation as the first operation after recovery of the power supply if the product is of the absolute type. <ul style="list-style-type: none"> ● Perform return-to-home operation or absolute positioning operation. ● If an incremental positioning operation is performed immediately after recovery of the power supply, the following accidents may occur: <ul style="list-style-type: none"> ● If the moving part of the slider/cylinder has shifted during the battery backup period due to an external force, the new position of the moving part will be recognized as the home in the positioning operation and the stopping position will deviate accordingly.
--	--

In this chapter the following operations are described in the sequence.

Note that the explanation here assumes that the installation and wiring of the slider, controller and power supply are complete.

It is also assumed that the controller has been started in the controller mode, and that two or more controllers are not connected via a daisy chain using controller link cables.

Please refer to *Chapter 2, “Startup and Operation”*, to fully understand the functions of the display screens on the teaching pendant.

- Turning on the power supply
- Checking slider operations
- Creating operation data
- Setting parameters
- Performing the positioning operation

For the purpose of the explanations provided in this chapter, the minimum numerical values and conditions are set for operation data and parameters. Default values are used for the data displayed in screen images.

For convenience, data values shown in this manual include both metric and (imperial) units.

However, the EZT1 Teaching Pendant only displays metric units.

Operation data and parameters are saved even after the power supply to the controller is turned off. Refer to the procedure explained below for the editing of operation data and parameters.

3.1 Procedure for Creating Slider Operation Data and Starting Operation

This section explains the steps involved in checking slider operation, creating data for positioning operation and performing positioning. The setting values for position data must be adjusted according to the slider's stroke. Turn the controller's switch (No. 4) to the "OFF" position (controller mode).

Step 1 Turning on the Power Supply to the Controller

Turn on the power supply to the controller and confirm that communication between the teaching pendant and controller is performed correctly. When the communication is being performed correctly, the teaching pendant is automatically placed in the external (EXT) mode, and it displays the current position.

Step	Operation and explanation	Screen display
1.1	Turn on the controller's power supply. The POWER LED of the controller lights in green. The startup screen is displayed and communication with the controller starts (ID check). When the ID check is complete, the RDY/ALM LED lights in green and the first screen of the EXT mode is displayed. In the EXT mode it is possible to perform operation via the controller I/O and monitor the operations.	<pre> EXT ID00 Sel = #00 Act = #00 Pos = 0000.000mm Mode I/O Alm Data </pre>

How to Enter Numerical Values in the Teaching Pendant

The basic operation for entry of numerical values is explained here, as it will be used to create operation data in step 3.

The operation mode used in this case is the program (PRG) mode.

When you enter a numerical value using the numerical keys, the numerical value entered shifts from the right edge toward the left in order each time a numerical key is pressed.

If you want to enter 15.000 for Pos (Position)

1. Press the **F1** key and then press the **ENT** key twice to call up the screen for position entry.

```

PRG - #01 Pos Inc
Pos = 0000.000mm
      key  ENT: Set
Mode - - - Rmt Dct
          
```

2. Press the **SHIFT** key to clear the previous numerical value. 0000.000 is displayed.

```

PRG - #01 Pos Inc
Pos = 0000.000mm
      key  ENT: Set
Mode - - - Rmt Dct
          
```

3. Press the numerical keys [1] and then [5] to display “15”.
The value 0000.015 mm (0.0006 inch) is displayed on the screen.

```
PRG-#01 Pos Inc
Pos= 0000.015mm
      key ENT:Set
Mode - - - Rmt Dct
```

4. Press the numerical key [0] three times.
The value 0015.000 mm (0.59 inch) is displayed on the screen.

```
PRG-#01 Pos Inc
Pos= 0015.000mm
      key ENT:Set
Mode - - - Rmt Dct
```

5. Press the **ENT** key to commit the numerical value you've entered.

If you want to enter -30.000 for Pos

1. Press the **F1** key and then press the **ENT** key twice to call up the screen for position entry.

```
PRG-#01 Pos Inc
Pos= 0045.000mm
      key ENT:Set
Mode - - - Rmt Dct
```

2. Press the **SHIFT** key to clear the previous numerical value.
0000.000 is displayed.

```
PRG-#01 Pos Inc
Pos= 0000.000mm
      key ENT:Set
Mode - - - Rmt Dct
```

3. Press the +/- key to display the “-” symbol.

```
PRG-#01 Pos Inc
Pos=-0000.000mm
      key ENT:Set
Mode - - - Rmt Dct
```

4. Press the numerical key [3] to display “3”.
The value -0000.003 mm (-0.0001 inch) is displayed on the screen.

```
PRG-#01 Pos Inc
Pos=-0000.003mm
      key ENT:Set
Mode - - - Rmt Dct
```

5. Press the numerical key [0] four times.
The value -0030.000 mm (-1.18 inch) is displayed on the screen.

```
PRG-#01 Pos Inc
Pos=-0030.000mm
      key ENT:Set
Mode - - - Rmt Dct
```

6. Press the ENT key to commit the numerical value you've entered.

Step 2 Checking Slider Operations

In this step you perform manual operation and the return-to-home operation of the slider in the test (TST) mode in order to confirm that there are no problems with slider operations.

Step	Operation and explanation	Screen display
2.1	Press the F1 key three times in the first screen of the EXT mode to select the TST mode. The first screen of the TST mode is displayed.	<pre>TST ID00 Select F2/F3/F4 Mode I/O Mnu Opr</pre>
2.2	Press the F3 key to select manual operation. The screen for performing manual operation is displayed. The absolute position relative to the home position is displayed in the Pos field on the screen.	<pre>TST-Mnu Mnu - Opr Pos= 0000.000mm ← / →, F4 Mode - - - - - HOME</pre>
2.3	Press the ← or → key to operate the slider. If you press the ← key, the slider will move to the motor side (default value). If you press the → key, the slider will move opposite the motor side (default value). Check the direction of movement. Proceed to the next step if it is confirmed that the slider moves in the correct directions. If you cannot operate the slider, check the wiring between the slider and controller.	

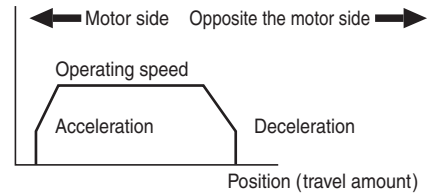
Step	Operation and explanation	Screen display
2.4	Press the F4 key for the slider to perform the return-to-home operation.	
2.5	If the slider has returned to the home position normally, the slider operation check is complete. Press the ESC key to switch to the first screen of the TST mode.	

Step 3 Creating Operation Data

In this step you create operation data for positioning operation in the program (PRG) mode.

It is necessary to create the following data. Note that the starting speed has been set separately and cannot be set via operation data. (It can be set in the parameter mode. Refer to 5.7, "Setting and Modifying Speed Parameters").

- Positioning method
- Position (distance of movement)
- Direction
- Acceleration
- Deceleration
- Operating speed
- Operation function



In this example the following two sets of positioning data are created:








No.1:














Positioning method: Absolute, Position/direction: 45 mm (1.77 inch),
Operating speed: 300 mm/s (11.81 in/sec), Operation function: Single-motion










No.2:

Positioning method: Incremental, Position/direction: -24 mm (-0.94 inch),
Operating speed: 150 mm/s (5.91 in/sec), Operation function: Single-motion

Step	Operation and explanation	Screen display
3.1	Press the F1 key twice to select the PRG mode. The first screen of the PRG mode is displayed.	<pre>PRG Data # ID00 #01 No data ENT:Edit Mode Clr Ins Del</pre>
3.2	Enter the following data in data No. 01. Positioning method: Absolute Position/direction: 45 mm (1.77 inch) opposite the motor side from home position Operating speed: 300 mm/s (11.81 in/sec) Acceleration: 1.5 m/s ² (4.92 ft/sec ²) Deceleration: 1.8 m/s ² (5.90 ft/sec ²) Operation function: Single-motion	
3.3	Press the ENT key to allow editing the operation data. The positioning-method setting screen is displayed. Abs: Absolute positioning Inc: Incremental positioning Press the ← or → key to select Abs or Inc . Here, select Abs and press the ENT key.	<pre>PRG- #01 OP Type Abs / Inc = Abs ← / → ENT: Set Mode - - - - - - - - -</pre>

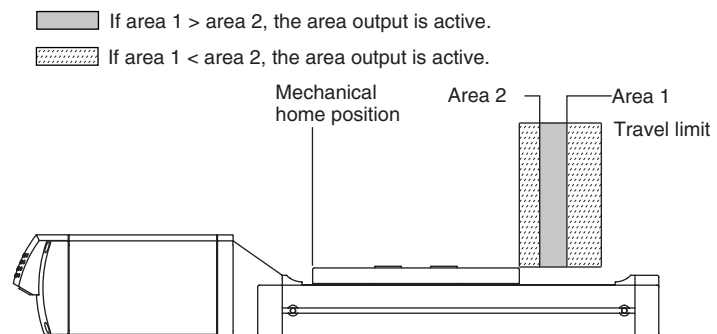
Step	Operation and explanation	Screen display
3.4	<p>The position setting screen is displayed. Enter the value 45 using the numerical keys. Check to see that the setting is correct and press the  key.</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <pre>PRG- #01 Pos Abs Pos= 0045.000mm key ENT:Set Mode - - - Rmt Dct</pre> </div>
3.5	<p>The operating-speed setting screen is displayed. Enter the value 300 using the numerical keys. Check to see that the setting is correct and press the  key.</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <pre>PRG- #01 Speed Spd=0300.000mm/s key ENT:Set Mode - - - - - - -</pre> </div>
3.6	<p>The acceleration setting screen is displayed. Enter the value 1.5 using the numerical keys. Check to see that the setting is correct and press the  key.</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <pre>PRG- #01 Acc Rate Acc=0001.500m/s2 key ENT:Set Mode - - - - - - -</pre> </div>
3.7	<p>The deceleration setting screen is displayed. Enter the value 1.8 using the numerical keys. Check to see that the setting is correct and press the  key.</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <pre>PRG- #01 Dec Rate Dec=0001.800m/s2 key ENT:Set Mode - - - - - - -</pre> </div>
3.8	<p>The operation-function setting screen is displayed. SingleMotion: Single-motion positioning operation LinkedMotion: Linked-motion positioning operation PushMotion: Push-motion operation Press the  or  key to select SingleMotion, LinkedMotion or PushMotion. Here, select SingleMotion and press the  key.</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <pre>PRG- #01 OP Func Func=SingleMotion ← / → ENT:Set Mode - - - - - - -</pre> </div>
3.9	<p>The data number is automatically incremented by one, and the setting screen for No. 02 is displayed. Enter the following data for data No. 02. Positioning method: Incremental positioning Position/direction: 24 mm (0.94 inch) to motor side Operating speed: 150 mm/s (5.91 in/sec) Acceleration: 1.8 m/s² (5.90 ft/sec²) Deceleration: 1.8 m/s² (5.90 ft/sec²) Operation function: Single-motion</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <pre>PRG Data # ID00 #02 No data ENT:Edit Mode Clr Ins Del</pre> </div>

Step	Operation and explanation	Screen display
3.10	Press the  key. The positioning-method setting screen is displayed. Abs: Absolute positioning Inc: Incremental positioning Press the  or  key to select Abs or Inc . Here, select Inc and press the  key.	<div style="border: 1px solid black; padding: 5px;"> <pre> PRG- #02 OP Type Abs / Inc=Inc ← / → ENT: Set Mode - - - - - - - - - </pre> </div>
3.11	The position setting screen is displayed. Enter the value -24 using the numerical keys. Set the direction of movement using the  key. Press the  key to display the “-” symbol. The default values are as follows: No display: Opposite the motor side -: Motor side Check to see that the setting is correct and press the  key.	<div style="border: 1px solid black; padding: 5px;"> <pre> PRG- #02 Pos Inc Pos=-0024.000mm key ENT: Set Mode - - - Rmt Dct </pre> </div>
3.12	The operating-speed setting screen is displayed. Enter the value 150 using the numerical keys. Check to see that the setting is correct and press the  key.	<div style="border: 1px solid black; padding: 5px;"> <pre> PRG- #02 Speed Spd=0150.000mm / s key ENT: Set Mode - - - - - - - - - </pre> </div>
3.13	The acceleration setting screen is displayed. Enter the value 1.8 using the numerical keys. Check to see that the setting is correct and press the  key.	<div style="border: 1px solid black; padding: 5px;"> <pre> PRG- #02 Acc Rate Acc=0001.800m / s² key ENT: Set Mode - - - - - - - - - </pre> </div>
3.14	The deceleration setting screen is displayed. Enter the value 1.8 using the numerical keys. Check to see that the setting is correct and press the  key.	<div style="border: 1px solid black; padding: 5px;"> <pre> PRG- #02 Dec Rate Dec=0001.800m / s² key ENT: Set Mode - - - - - - - - - </pre> </div>
3.15	The operation-function setting screen is displayed. SingleMotion: Single-motion positioning operation LinkedMotion: Linked-motion positioning operation PushMotion: Push-motion operation Press the  or  key to select SingleMotion , LinkedMotion or PushMotion . Here, select SingleMotion and press the  key.	<div style="border: 1px solid black; padding: 5px;"> <pre> PRG- #02 OP Func Func=SingleMotion ← / → ENT: Set Mode - - - - - - - - - </pre> </div>


Step	Operation and explanation	Screen display
3.16	<p>It is possible to enter up to 63 operation data from No. 01 to No. 63. Use the , ,  and  keys to select a certain data No.</p> <p> key: Data No. + 1  key: Data No. - 1  key: Data No. + 10  key: Data No. - 10</p> <p>It is also possible to select a data number using the numerical keys.</p>	
3.17	<p>The operation data is now created. Press the  key to switch to the first screen of the EXT mode.</p>	










Step 4 Setting Parameters

In this step you set parameters for areas 1 and 2 in the parameter (PAR) mode. It is possible to set up to 20 parameter items via the teaching pendant. Here, areas for area output are set. With area settings the controller activates the area output when the slider's table moves to a certain position.



Here the setting is made in such a way that the area output becomes active when the table is positioned between area 1 [45 mm (1.77 inch)] and area 2 [24 mm (0.94 inch)] from the home position.

Step	Operation and explanation	Screen display
4.1	<p>Press the  key twice to select the PAR mode. The first screen of the PAR mode is displayed.</p>	<pre> PAR ID00 Select SHIFT, F2 / F3 / F4 Mode I / O M tr Hmp </pre>

Step	Operation and explanation	Screen display
4.2	<p>Hold down the  key and press the  key to display the first screen for the setting of common parameters.</p> <p>The push-distance setting screen is displayed.</p>	<p>When the  key is pressed:</p> <pre data-bbox="983 286 1425 472"> PAR ID00 Select F2/F3/F4 Mode Ini Spd Com </pre> <p>When the  and  keys are pressed:</p> <pre data-bbox="983 551 1425 736"> PAR-Com Push Dis Dis=0012.000mm key ENT:Set Mode - - - - - - - - - </pre>
4.3	Press the  key five times to display the area 1 setting screen.	<pre data-bbox="983 797 1425 983"> PAR-Com Area1 Area1= 0000.000mm key ENT:Set Mode - - - - - - - - - </pre>
4.4	<p>Enter the value 45 using the numerical keys.</p> <p>Check to see that the setting is correct and press the  key.</p>	<pre data-bbox="983 1061 1425 1247"> PAR-Com Area1 Area1= 0045.000mm key ENT:Set Mode - - - - - - - - - </pre>
4.5	The area 2 setting screen is displayed.	<pre data-bbox="983 1326 1425 1512"> PAR-Com Area2 Area2= 0000.000mm key ENT:Set Mode - - - - - - - - - </pre>
4.6	<p>Enter the value 24 using the numerical keys.</p> <p>Check to see that the setting is correct and press the  key.</p>	<pre data-bbox="983 1590 1425 1776"> PAR-Com Area2 Area2= 0024.000mm key ENT:Set Mode - - - - - - - - - </pre>
4.7	<p>The area parameters are now set.</p> <p>Press the  key to switch to the first screen of the PAR mode.</p>	

Step 5 Performing the Positioning Operation

In this step you perform the slider positioning operation in the test (TST) mode. The operation data created in step 3 is called up and used to actually operate the slider.

Positioning is performed according to the following procedure:

- Return to mechanical home operation
- Positioning operation of data No. 01
- Positioning operation of data No. 02

Step	Operation and explanation	Screen display
5.1	Press the F1 key once to select the TST mode. The first screen of the TST mode is displayed.	<pre>TST ID00 Select F2 / F3 / F4 Mode I / O Mnu Opr</pre>
5.2	Press the F4 key to select positioning operation. The screen for performing positioning operation is displayed.	<pre>TST-Opr #01 Pos= 0000.000mm key , START / F4 Mode - - - - - HOME</pre>
5.3	Press the F4 key to perform the return-to-mechanical home operation.	<pre>TST-Opr #01 Pos= 0000.000mm key , START / F4 Mode - - - - - HOME</pre>
5.4	Check that data No. 01 is displayed, and press the START key to perform the positioning operation.	<pre>TST-Opr #01 Pos= 0045.000mm key , START / F4 Mode - - - - - HOME</pre>
5.5	Select data No. 02 using the ← , → , ↑ and ↓ keys. It is also possible to select a data number using the numerical keys. Press the START key to perform the positioning operation.	
5.6	Upon completion of the operations you've performed so far, the positioning-operation check is complete. Press the F1 key to switch to the EXT mode.	<pre>TST-Opr #01 Pos= 0021.000mm key , START / F4 Mode - - - - - HOME</pre>

3.2 Procedure for Creating Cylinder Operation Data and Starting Operation

This section explains the steps involved in checking cylinder operation, creating data for positioning operation and performing positioning. The setting values for position data must be adjusted according to the cylinder's stroke.

Step 1 Turning on the Power Supply to the Controller

Turn on the power supply to the controller and confirm that communication between the teaching pendant and controller is performed correctly.

When communication is being performed correctly, the teaching pendant is automatically placed in the external (EXT) mode, and it displays the current position.

Step	Operation and explanation	Screen display
1.1	<p>Turn on the controller's power supply.</p> <p>The POWER LED of the controller lights in green. The startup screen is displayed and communication with the controller starts (ID check). When the ID check is complete, the RDY/ALM LED lights in green and the first screen of the EXT mode is displayed.</p> <p>In the EXT mode it is possible to perform operation via the controller I/O and monitor operations.</p>	<pre> EXT ID00 Sel = #00 Act = #00 Pos = 0000.000mm Mode I/O Alm Data </pre>

Step 2 Checking Cylinder Operations

In this step you perform manual operation and the return-to-home operation of the cylinder in the test (TST) mode in order to confirm that there are no problems with cylinder operations.

Step	Operation and explanation	Screen display
2.1	<p>Press the F1 key three times to select the TST mode.</p> <p>The first screen of the TST mode is displayed.</p>	<pre> TST ID00 Select F2 / F3 / F4 Mode I/O Mnu Opr </pre>
2.2	<p>Press the F3 key to select manual operation.</p> <p>The screen for performing manual operation is displayed.</p> <p>The absolute position relative to the home position is displayed in the Pos field on the screen.</p>	<pre> TST-Mnu Mnu - Opr Pos = 0000.000mm ← / → , F4 Mode - - - - - HOME </pre>
2.3	<p>Press the ← or → key to operate the cylinder.</p> <p>If you press the ← key, the cylinder will move to the motor side (default value).</p> <p>If you press the → key, the cylinder will move opposite the motor side (default value).</p> <p>Check the direction of movement.</p> <p>Proceed to the next step if it is confirmed that the cylinder moves in the correct directions.</p> <p>If you cannot operate the cylinder, check the wiring between the cylinder and controller.</p>	

Step	Operation and explanation	Screen display
2.4	Press the F4 key for the cylinder to perform the return-to-home operation.	
2.5	If the cylinder returns to the home position normally, the cylinder operation check is complete. Press the ESC key to switch to the first screen of the TST mode.	

Step 3 Creating Operation Data

In this step you create operation data for positioning operation in the program (PRG) mode.

It is necessary to create the following data. Note that the starting speed and push-motion operating speed have been set separately and cannot be set via operation data. (They can be set in the parameter mode. Refer to 5-7, "Setting and Modifying Speed Parameters").

- Positioning method
- Position (distance of movement)
- Direction
- Acceleration
- Deceleration
- Operating speed
- Operation function

In this example the following two sets of positioning data are created:








No.1:














Positioning method: Absolute, Position/direction: 45 mm (1.77 inch),
Operating speed: 300 mm/s (11.81 in/sec), Operation function: Push-motion










No.2:

Positioning method: Incremental, Position/direction: -24 mm (-0.94 inch),
Operating speed: 150 mm/s (5.91 in/sec), Operation function: Single-motion

Step	Operation and explanation	Screen display
3.1	Press the F1 key twice to select the PRG mode. The first screen of the PRG mode is displayed.	<pre>PRG Data # ID00 #01 No data ENT:Edit Mode Clr Ins Del</pre>
3.2	Enter the following data in data No. 01. Positioning method: Absolute Position/direction: 45 mm (1.77 inch) opposite the motor side from home position Operating speed: 300 mm/s (11.81 in/sec) Acceleration: 1.5 m/s ² (4.92 ft/sec ²) Deceleration: 1.8 m/s ² (5.90 ft/sec ²) Operation function: Push-motion	
3.3	Press the ENT key to allow editing the operation data. The positioning-method setting screen is displayed. Abs: Absolute positioning Inc: Incremental positioning Press the ← or → key to select Abs or Inc . Here, select Abs and press the ENT key.	<pre>PRG - #01 OP Type Abs / Inc = Abs ← / → ENT: Set Mode - - - - - - - - -</pre>

Step	Operation and explanation	Screen display
3.4	<p>The position setting screen is displayed. Enter the value 45 using the numerical keys. Check to see that the setting is correct and press the  key.</p>	<pre>PRG- #01 Pos Abs Pos= 0045.000mm key ENT:Set Mode - - - Rmt Dct</pre>
3.5	<p>The operating-speed setting screen is displayed. Enter the value 300 using the numerical keys. Check to see that the setting is correct and press the  key.</p>	<pre>PRG- #01 Speed Spd=0300.000mm/s key ENT:Set Mode - - - - - - -</pre>
3.6	<p>The acceleration setting screen is displayed. Enter the value 1.5 using the numerical keys. Check to see that the setting is correct and press the  key.</p>	<pre>PRG- #01 Acc Rate Acc=0001.500m/s2 key ENT:Set Mode - - - - - - -</pre>
3.7	<p>The deceleration setting screen is displayed. Enter the value 1.8 using the numerical keys. Check to see that the setting is correct and press the  key.</p>	<pre>PRG- #01 Dec Rate Dec=0001.800m/s2 key ENT:Set Mode - - - - - - -</pre>
3.8	<p>The operation-function setting screen is displayed. SingleMotion: Single-motion positioning operation LinkedMotion: Linked-motion positioning operation PushMotion: Push-motion operation Press the  or  key to select SingleMotion, LinkedMotion or PushMotion. Here, select PushMotion and press the  key.</p>	<pre>PRG- #01 OP Func Func=PushMotion ← / → ENT:Set Mode - - - - - - -</pre>
3.9	<p>The data number is automatically incremented by one, and the setting screen for No. 02 is displayed. Enter the following data for data No. 02. Positioning method: Incremental positioning Position/direction: 24 mm (0.94 inch) to motor side Operating speed: 150 mm/s (5.91 in/sec) Acceleration: 1.8 m/s² (5.90 ft/sec²) Deceleration: 1.8 m/s² (5.90 ft/sec²) Operation function: Single-motion</p>	<pre>PRG Data # ID00 #02 No data ENT:Edit Mode Clr Ins Del</pre>

Step	Operation and explanation	Screen display
3.10	Press the  key. The positioning-method setting screen is displayed. Abs: Absolute positioning Inc: Incremental positioning Press the  or  key to select Abs or Inc . Here, select Inc and press the  key.	<div style="border: 1px solid black; padding: 5px;"> <pre> PRG- #02 OP Type Abs / Inc=Inc ← / → ENT: Set Mode - - - - - </pre> </div>
3.11	The position setting screen is displayed. Enter the value -24 using the numerical keys. Set the direction of movement using the  key. Press the  key to display the “-” symbol. The default values are as follows: No display: Opposite the motor side -: Motor side Check to see that the setting is correct and press the  key.	<div style="border: 1px solid black; padding: 5px;"> <pre> PRG- #02 Pos Inc Pos=-0024.000mm key ENT: Set Mode - - - Rmt Dct </pre> </div>
3.12	The operating-speed setting screen is displayed. Enter the value 150 using the numerical keys. Check to see that the setting is correct and press the  key.	<div style="border: 1px solid black; padding: 5px;"> <pre> PRG- #02 Speed Spd=0150.000mm / s key ENT: Set Mode - - - - - </pre> </div>
3.13	The acceleration setting screen is displayed. Enter the value 1.8 using the numerical keys. Check to see that the setting is correct and press the  key.	<div style="border: 1px solid black; padding: 5px;"> <pre> PRG- #02 Acc Rate Acc=0001.800m / s² key ENT: Set Mode - - - - - </pre> </div>
3.14	The deceleration setting screen is displayed. Enter the value 1.8 using the numerical keys. Check to see that the setting is correct and press the  key.	<div style="border: 1px solid black; padding: 5px;"> <pre> PRG- #02 Dec Rate Dec=0001.800m / s² key ENT: Set Mode - - - - - </pre> </div>
3.15	The operation-function setting screen is displayed. SingleMotion: Single-motion positioning operation LinkedMotion: Linked-motion positioning operation PushMotion: Push-motion operation Press the  or  key to select SingleMotion , LinkedMotion or PushMotion . Here, select SingleMotion and press the  key.	<div style="border: 1px solid black; padding: 5px;"> <pre> PRG- #02 OP Func Func=SingleMotion ← / → ENT: Set Mode - - - - - </pre> </div>

Step	Operation and explanation	Screen display
3.16	<p>It is possible to enter up to 63 operation data from No. 01 to No. 63. Use the , ,  and  keys to select a certain data No.</p> <p> key: Data No. + 1  key: Data No. - 1  key: Data No. + 10  key: Data No. - 10</p> <p>It is also possible to select a data number using the numerical keys.</p>	
3.17	<p>The operation data is now created. Press the  key to switch to the first screen of the EXT mode.</p>	

Step 4 Setting Parameters







In this step you set parameters for push distance, push current and areas 1 and 2 in the parameter (PAR) mode.



Step 4.1 Setting Push-Motion Operation Parameters

A “push-motion operation” is one in which the load is continuously subjected to pressure.

Push-motion operation is performed when “push-motion” is selected as the operation function.

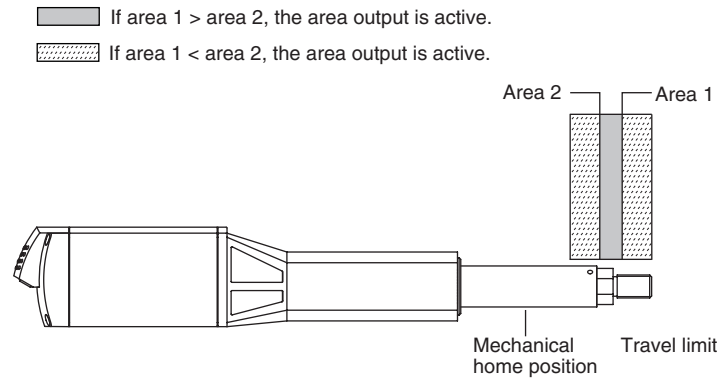
Here the push distance and push current are set to 4.5 mm (0.18 inch) and 30 per-cent, respectively.

Step	Operation and explanation	Screen display
4.1.1	<p>Press the  key twice to select the PAR mode. The first screen of the PAR mode is displayed.</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <pre> PAR ID00 Select SHIFT, F2 / F3 / F4 Mode I / O M tr Hmp </pre> </div>
4.1.2	<p>Hold down the  key and press the  key to display the first screen for the setting of common parameters.</p>	<p>When the  key is pressed:</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <pre> PAR ID00 Select F2 / F3 / F4 Mode Ini Spd Com </pre> </div> <p>When the  and  keys are pressed:</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <pre> PAR-Com Push Dis Dis=0012.000mm key ENT: Set Mode --- --- --- </pre> </div>


Step	Operation and explanation	Screen display
4.1.3	The push-distance setting screen is displayed. Enter the value 4.5 using the numerical keys. Check to see that the setting is correct and press the  key.	<pre> PAR-Com Push Dis Dis=0004.500mm key ENT:Set Mode - - - - - </pre>
4.1.4	The push-current setting screen is displayed. Enter the value 30 using the numerical keys. Check to see that the setting is correct and press the  key.	<pre> PAR-Com Push Cur. Push Cur. =30% key ENT:Set Mode - - - - - </pre>
4.1.5	The push-motion operation parameters are now set. Now perform step 4.2, "Setting Area Parameters".	




Step 4.2 Setting Area Parameters

In this step you set parameters for areas 1 and 2 in the parameter (PAR) mode. With area settings the controller activates the area output when the cylinder's rod moves to a certain position.



Here the setting is made in such a way that the area output becomes active when the rod is positioned between area 1 [45 mm (1.77 inch)] and area 2 [24 mm (0.94 inch)] from the home position.

Step	Operation and explanation	Screen display
4.2.1	Press the  key three times to display the area 1 setting screen.	<pre> PAR-Com Area1 Area1= 0000.000mm key ENT:Set Mode - - - - - </pre>

Step	Operation and explanation	Screen display
4.2.2	Enter the value 45 using the numerical keys. Check to see that the setting is correct and press the  key.	<pre> PAR-Com Area1 Area1= 0045.000mm key ENT:Set Mode - - - - - </pre>
4.2.3	The area 2 setting screen is displayed.	<pre> PAR-Com Area2 Area2= 0000.000mm key ENT:Set Mode - - - - - </pre>
4.2.4	Enter the value 24 using the numerical keys. Check to see that the setting is correct and press the  key.	<pre> PAR-Com Area2 Area2= 0024.000mm key ENT:Set Mode - - - - - </pre>
4.2.5	The area parameters are now set. Press the  key to switch to the first screen of the PAR mode.	

Step 5 Performing the Positioning Operation

In this step you perform the cylinder positioning operation in the test (TST) mode. The operation data created in step 3 is called up and used to actually operate the slider.

Positioning is performed according to the following procedure:

- Return to mechanical home operation
- Positioning operation of data No. 01
- Positioning operation of data No. 02

Step	Operation and explanation	Screen display
5.1	Press the F1 key once to select the TST mode. The first screen of the TST mode is displayed.	<pre>TST ID00 Select F2 / F3 / F4 Mode I / O Mnu Opr</pre>
5.2	Press the F4 key to select positioning operation. The screen for performing positioning operation is displayed.	<pre>TST-Opr #01 Pos= 0000.000mm key , START / F4 Mode - - - - - HOME</pre>
5.3	Press the F4 key to perform the return-to-home operation.	<pre>TST-Opr #01 Pos= 0000.000mm key , START / F4 Mode - - - - - HOME</pre>
5.4	Check that data No. 01 is displayed, and press the START key to perform the positioning operation.	<pre>TST-Opr #01 Pos= 0045.000mm key , START / F4 Mode - - - - - HOME</pre>
5.5	Select data No. 01 or No. 02 using the ← , → , ↑ and ↓ keys. It is also possible to select a data number using the numerical keys. Press the START key to perform the positioning operation.	
5.6	Upon completion of the operations you've performed so far, the positioning-operation check is complete. Press the F1 key to switch to the EXT mode.	<pre>TST-Opr #01 Pos= 0021.000mm key , START / F4 Mode - - - - - HOME</pre>

Chapter 4 Creating and Modifying Operation Data

This chapter explains the procedures involved in setting and modifying operation data, which are performed in the program (PRG) mode.



Warning

- In order to avoid injury and equipment damage, be sure that engineers having expert knowledge of the structure and operation of the EZS/EZC Series controllers and sliders/cylinders, along with an awareness of the degree of risk involved in the operation, perform the connection of the teaching pendant.

4.1 Operation Data

Operation data specifies the values necessary for positioning operations, such as position, direction and speed of movement.

Operation data created by the teaching pendant is stored in the controller's memory. It is possible to create up to 63 operation data from No. 1 to No. 63.

Table 4-1 lists the items that should be set for each data number.

■ Table 4-1 Items Set for Data Numbers

Item	Screen display	Description
ABS/INC	Abs/Inc	Positioning method
Position (travel amount)	Pos	Position of moving part (mm)
Operating speed	Spd	Operating speed (mm/s)
Acceleration	Acc	Acceleration (m/s ²)
Deceleration	Dec	Deceleration (m/s ²)
Operation function	Func	Setting of single-motion positioning operation, linked-motion positioning operation or push-motion operation

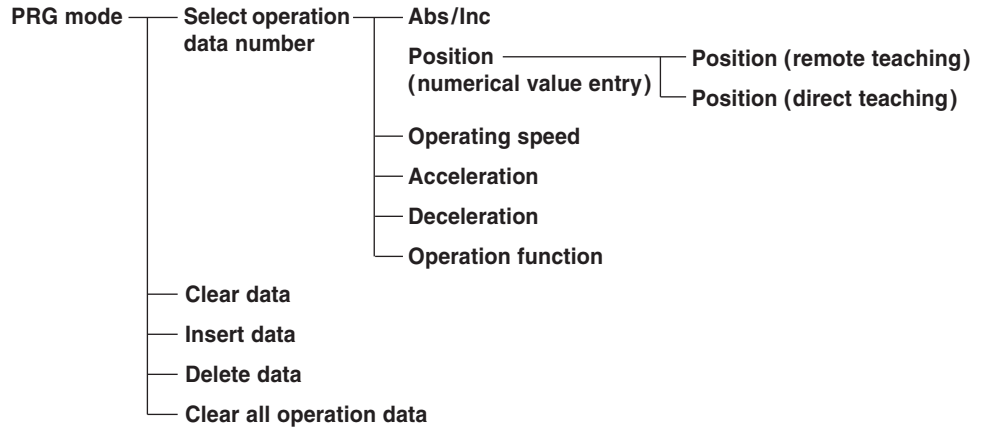
The position can be entered in one of the following three ways:

- Numerical value input: Enter numerical values using the numerical keys.
- Remote teaching input: Operate the slider/cylinder with the arrow keys to enter the stopping position.
- Direct teaching input: Move the slider/cylinder manually to enter the stopping position.

4.2 Functions Available in the PRG Mode

Functions available in the PRG mode are those to set and change the following operation data and clear all operation data. Figure 4-1 shows the items that can be set and changed in the PRG mode.

■ Figure 4-1 Parameters Set and Changed in the PRG Mode



4.3 Operation Data Creation Screens

Press the **F1** key once in the EXT mode to switch to the first screen of the PRG mode. There are two types of operation-data number selection screens: the first screen shown in Figure 4-2 and the screen shown in Figure 4-3. The screen shown in Figure 4-3 is displayed when the **SHIFT** key is pressed in the first screen.

■ Figure 4-2 First Screen of the PRG Mode/Number Selection 1

```

PRG Data #    ID00
#01      No data
                ENT:Edit
Mode Clr Ins Del
  
```

Press the **SHIFT** key to display the screen for number selection 2.

This screen is used to create and modify operation data, as well as to clear, insert and delete data.

■ Figure 4-3 Screen for Number Selection 2

```

PRG Data #    ID00
#01      No data

Mode Aclr - - -
  
```

Release the **SHIFT** key to display the screen for number selection 1.

This screen is used to clear all the data.

4.4 Creating New Operation Data

You can create operation data according to the following procedure:

1. Press the F1 key to switch to the first screen of the PRG mode.

■ Figure 4-4 First Screen of the PRG Mode/Number Selection 1

PRG Data #	ID00
#01	No data
	ENT: Edit
Mode	Clr Ins Del

— Select a data number

2. Press the \uparrow , \downarrow , \leftarrow or \rightarrow key to select the data number for which operation data is to be created.

Pressing the \uparrow and \downarrow keys causes the number of tens to increase and decrease, respectively. Pressing the \leftarrow and \rightarrow keys causes the number of units to increase and decrease, respectively. A data number can also be selected by the numerical keys.

In this example, the following data is set for data No. 01.

3. Press the ENT key.

The data of the selected data number can now be entered.

■ Figure 4-5 Positioning-Method Setting Screen

PRG - #01	OP Type
Abs / Inc = Inc	— Select either the absolute or incremental positioning method
\leftarrow / \rightarrow	ENT: Set
Mode	- - - - -

Press either the \leftarrow or \rightarrow key to select a positioning method, and press the ENT key.

4. The selected positioning method is saved and the position (travel amount) setting screen is displayed.

■ Figure 4-6 Position Setting Screen

PRG - #01	Pos Inc
Pos = 0000.000mm	— Enter the target position to which the moving part should travel in the positioning operation.
key	ENT: Set
Mode	- - - Rmt Dct

Enter the position via the numerical keys, and press the ENT key.

Press the F3 key to perform remote teaching (see 4.7, "Remote Teaching").

Press the F4 key to perform direct teaching (see 4.8, "Direct Teaching").

5. The position entered is saved and the operating-speed setting screen is displayed.

■ Figure 4-7 Operating-Speed Setting Screen

```

PRG - #01  Speed
Spd=0060 . 000mm / s
           key  ENT : Set
Mode  - - -  - - -  - - -
    
```

Enter the operating speed

Enter the operating speed via the numerical keys, and press the **ENT** key.

6. The set operating speed is saved and the acceleration setting screen is displayed.

■ Figure 4-8 Acceleration Setting Screen

```

PRG - #01  Acc Rate
Acc=0000 . 450m / s2
           key  ENT : Set
Mode  - - -  - - -  - - -
    
```

Enter the acceleration

Enter the acceleration via the numerical keys, and press the **ENT** key.

7. The set acceleration is saved and the deceleration setting screen is displayed.

■ Figure 4-9 Deceleration Setting Screen

```

PRG - #01  Dec Rate
Dec=0000 . 450m / s2
           key  ENT : Set
Mode  - - -  - - -  - - -
    
```

Enter the deceleration

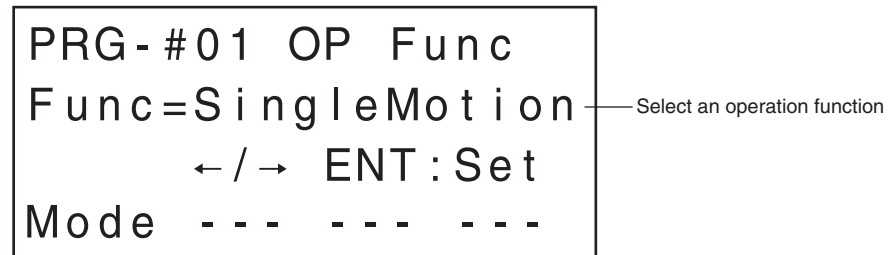
Enter the deceleration via the numerical keys, and press the **ENT** key.

Note

The maximum acceleration is 2 m/s². Do not set a value that exceeds the maximum value.

8. The set deceleration is saved and the operation-function setting screen is displayed.

■ Figure 4-10 Operation-Function Setting Screen



Note

Do not perform push-motion operation using sliders.

Press either the ← or → key to select an operation function, and press the **ENT** key.

SingleMotion: Single-motion positioning operation

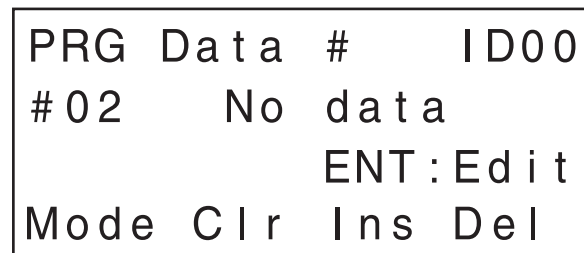
LinkedMotion: Linked-motion positioning operation

PushMotion: Push-motion operation

9. The operation function selected is saved and the setting of operation data for data No. 01 is complete.

The data number is incremented to data No. 02, and the screen returns to the first screen.

■ Figure 4-11 First Screen of the PRG Mode/Number Selection 1



In order to create operation data for another data number, repeat steps 3 through 9.

In order to stop creating operating data, press the **F1** key and switch to a mode other than the PRG mode.

Press the **F1** key once to switch to the first screen of the PAR mode.

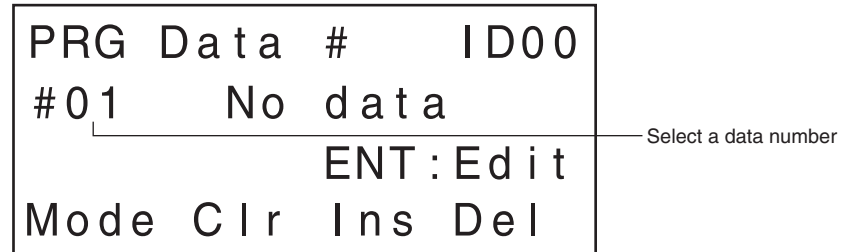
4.5 Editing Operation Data

4.5.1 Editing Existing Data

Information stored in existing operation data can be edited.

1. Press the F1 key to switch to the first screen of the PRG mode.

■ Figure 4-12 First Screen of the PRG Mode/Number Selection 1

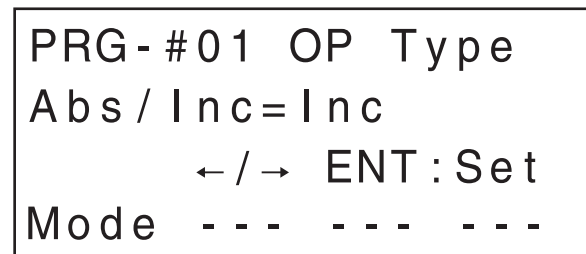


2. Press the \uparrow , \downarrow , \leftarrow or \rightarrow key to select the data number for which operation data is to be edited. The data number can also be selected using the numerical keys.
Pressing the \uparrow and \downarrow keys causes the number of tens to increase and decrease, respectively. Pressing the \leftarrow and \rightarrow keys causes the number of units to increase and decrease, respectively.

3. Press the ENT key.

The data of the selected data number can now be edited.

■ Figure 4-13 Positioning-Method Setting Screen



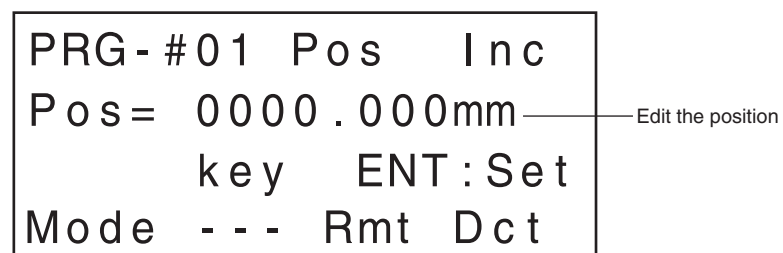
4. Continue pressing the \uparrow or \downarrow key until the item you want to edit is displayed.
5. When the item to be edited is displayed, the setting value can be changed

as explained in 4.3, “Operation Data Creation Screens”, on p. 4-2.

Example: To change the position

Enter the position via the numerical keys, and press the ENT key.
The set position is saved and the next item is displayed.

■ Figure 4-14 Position Setting Screen



6. Press the ENT key.

The changed value is saved.

7. Press the ESC or F1 key once you've finished editing.

If you press the **ESC** key, the screen will return to the first screen of the PRG mode.

If you press the **F1** key, the screen will switch to the first screen of the PAR mode.

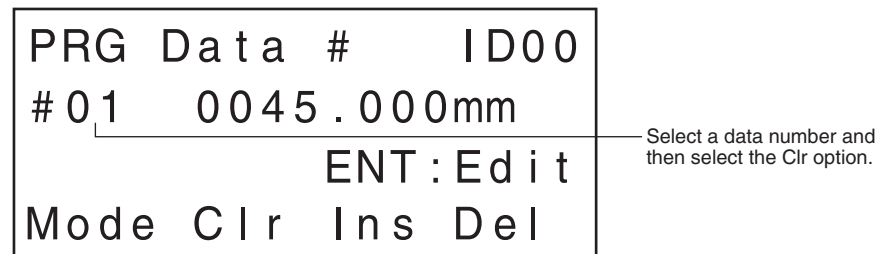
4.5.2 Clearing Data

The following operation clears data previously set.

1. Select the data number you want to clear from the first screen of the PRG mode.

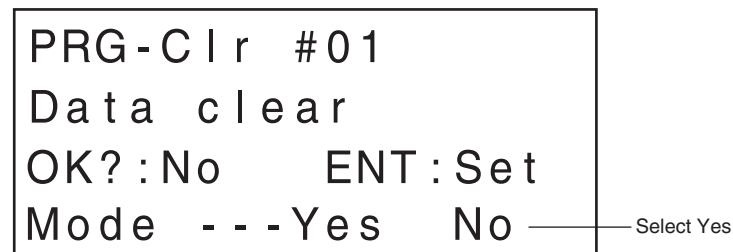
Press the \uparrow , \downarrow , \leftarrow or \rightarrow key to select the data number you want to clear. The data number can also be selected using the numerical keys.

■ Figure 4-15 First Screen of the PRG Mode/Number Selection 1

**2. Press the F2 key (corresponding to the Clr option) to clear the data number.**

The message "Data clear OK?: No" is displayed.

■ Figure 4-16 Data Clear Confirmation Screen

**3. Select "Yes" by pressing the F3 key, and press the ENT key.**

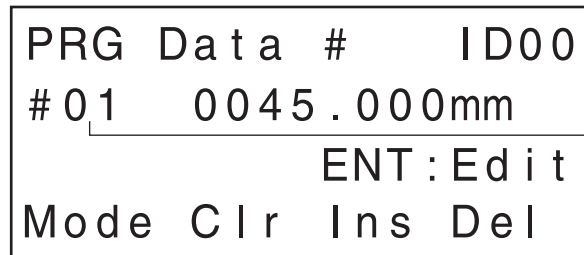
The data is cleared, and the screen returns to the first screen of the PRG mode.

4.5.3 Inserting Data

The following operation inserts new operation data between data numbers already set. The subsequent data numbers are automatically incremented by one.

- 1. Select the data number to be inserted from the first screen of the PRG mode.**
The operation data will be inserted before the data number you select in this step. Press the ↑, ↓, ← or → key to select the data number you want to insert. The data number can also be selected using the numerical keys.

■ Figure 4-17 First Screen of the PRG Mode/Number Selection 1



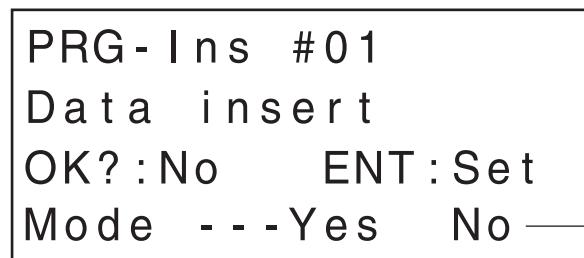
Select a data number and then select the Ins option.

Note

If operation data has already been set in No. 63, inserting any new operation data will delete the data in No. 63.

- 2. Press the F3 key (corresponding to the Ins option) to insert the data.**
The message "Data insert OK?: No" is displayed.

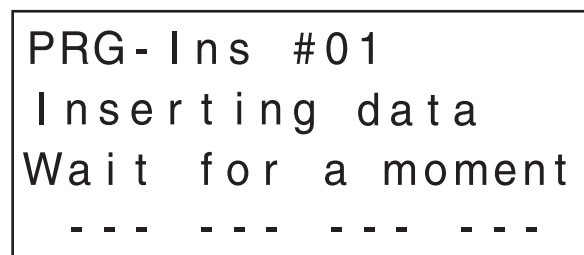
■ Figure 4-18 Data Insertion Confirmation Screen



Select Yes

- 3. Select "Yes" by pressing the F3 key, and press the ENT key.**
The data is inserted.

■ Figure 4-19 Data Insertion Screen



Screen displayed during the processing

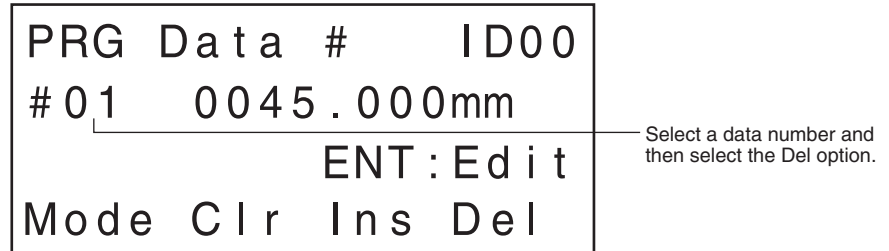
- 4. When the insertion is complete, the screen returns to the first screen of the PRG mode.**

4.5.4 Deleting Data

The following operation deletes a data number previously set.
The subsequent data numbers are automatically decremented by one.

- 1. Select the data number to be deleted from the first screen of the PRG mode.**
Press the \uparrow , \downarrow , \leftarrow or \rightarrow key to select the data number you want to delete. The data number can also be selected using the numerical keys.

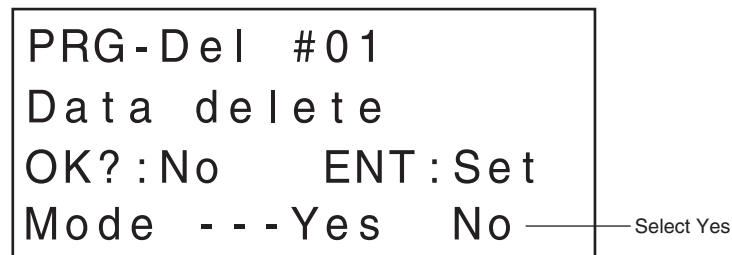
■ Figure 4-20 First Screen of the PRG Mode/Number Selection 1



- 2. Press the F4 key (corresponding to the Del option) in order to delete the data number.**

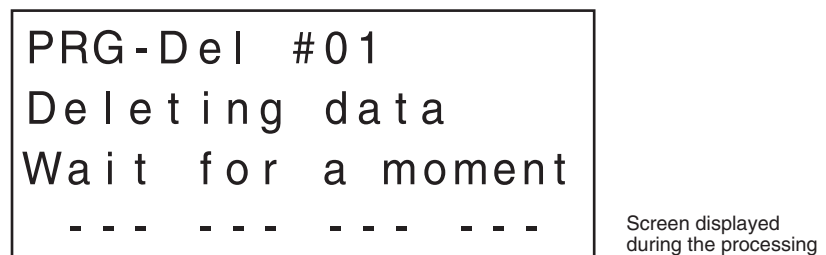
A message "Data delete OK?: No" is displayed.

■ Figure 4-21 Data Deletion Confirmation Screen



- 3. Select "Yes" by pressing the F3 key, and press the ENT key.**
The data is deleted.

■ Figure 4-22 Data Deletion Screen



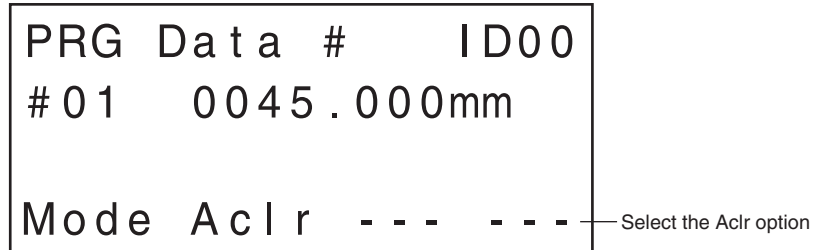
- 4. When the deletion is complete, the screen returns to the first screen of the PRG mode.**

4.6 Clearing All Operation Data

The following operation deletes all data previously set.

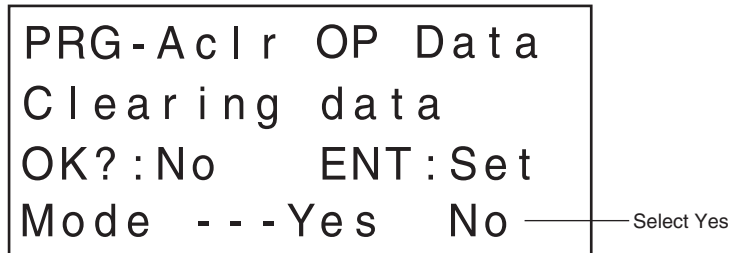
1. Continue pressing the SHIFT key while the first screen of the PRG mode is displayed.

■ Figure 4-23 Screen for Number Selection 2 of the PRG Mode



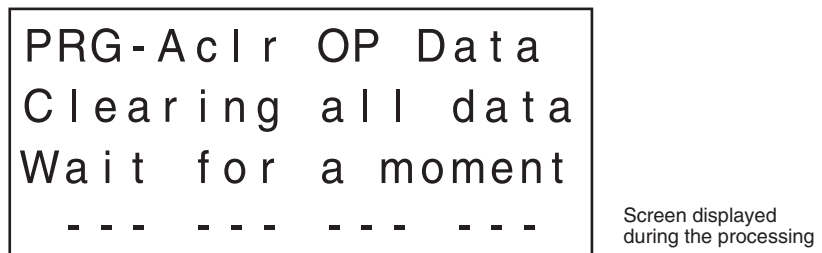
2. Hold down the SHIFT key, and press the F2 key (corresponding to the Aclr option).
The message “Clearing data OK?: No” is displayed.

■ Figure 4-24 Confirmation Screen for Clearing All Operation Data



3. Select “Yes” by pressing the F3 key, and press the ENT key.
All the operation data is cleared.

■ Figure 4-25 Screen for Clearing All Operation Data



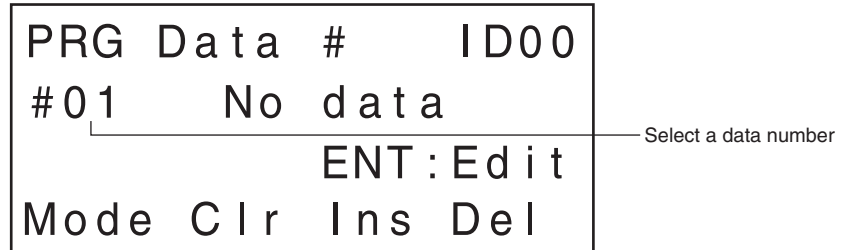
4. When all the operation data is cleared, the screen returns to the first screen of the PRG mode.

4.7 Remote Teaching

In the remote teaching method, you operate the slider/cylinder via the arrow keys of the teaching pendant and enter the stopping position.

1. Press the F1 key and switch to the first screen of the PRG mode.

■ Figure 4-26 First Screen of the PRG Mode/Number Selection 1



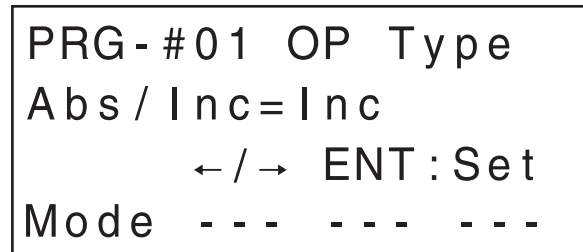
2. Press the ↑, ↓, ← or → key to select the data number for which you want to perform remote teaching.

Pressing the ↑ and ↓ keys causes the number of tens to increase and decrease, respectively. Pressing the ← and → keys causes the number of units to increase and decrease, respectively. The data number can also be selected using the numerical keys.

3. Press the ENT key.

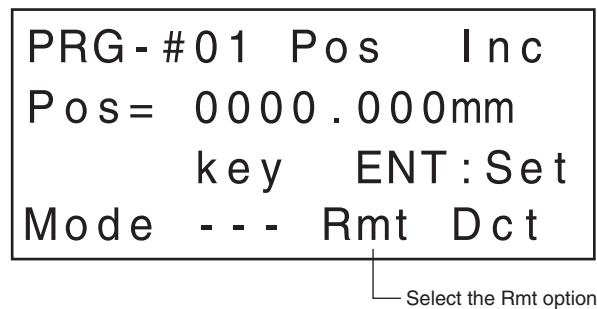
The data of the selected data number can now be edited.

■ Figure 4-27 Positioning-Method Setting Screen



4. Press the ↓ key to call up the position setting screen.

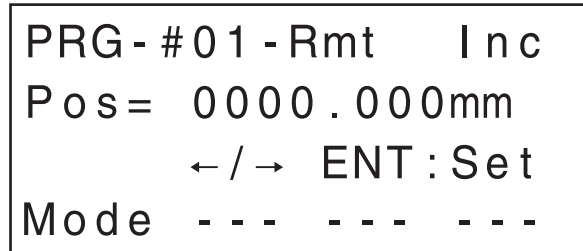
■ Figure 4-28 Position Setting Screen



5. Press the F3 key (corresponding to the Rmt option) to select remote teaching.

The slider/cylinder can now be moved by pressing the ← and → keys.

■ Figure 4-29 Remote Teaching Screen



Operate the slider/cylinder

6. Press the ← and → keys to change the position.

If you press one of the keys once, the slider/cylinder will move by 0.015 mm (0.0006 inch).

If you keep the key pressed for more than a second, the slider/cylinder will begin to move at low speed as long as the key is pressed. When the key is released, the slider/cylinder decelerates to a stop.

If the **SHIFT** key is pressed during operation, the slider/cylinder will accelerate and operate at high speed *1. When the **SHIFT** key is released, the slider/cylinder decelerates and returns to operation at low speed *2.

The current position is displayed on the screen in real time.

*1 The common operating speed (Vr) set in the speed parameters of the PAR mode


*2 The starting speed (Vs) set in the speed parameters of the PAR mode

7. Determine the position, and press the ENT key.

The current position is set as the positioning position, and the operating-speed input screen is displayed.

4.8 Direct Teaching

In the direct teaching method, you can move the moving part of the slider/cylinder directly in order to adjust the positioning position manually.

 Caution	<ul style="list-style-type: none"> ● In order to avoid injury and equipment damage, do not perform direct teaching unless the slider/cylinder is installed in the horizontal direction. When performing direct teaching, the motor will lose its holding brake force and the load may drop. (The motor's output current will be cut off, and the electromagnetic brake will be released as well.)
--	--

1. Press the F1 key and switch to the first screen of the PRG mode.

■ Figure 4-30 First Screen of the PRG Mode/Number Selection 1

PRG Data #	ID00	
#01	No data	
	ENT: Edit	Select a data number
Mode Clr	Ins Del	

2. Press the ↑, ↓, ← or → key to select the data number for which you want to perform direct teaching.

Pressing the ↑ and ↓ keys causes the number of tens to increase and decrease, respectively. Pressing the ← and → keys causes the number of units to increase and decrease, respectively. The data number can also be selected using the numerical keys.

3. Press the ENT key.

The data of the selected data number can now be edited.

■ Figure 4-31 Positioning-Method Setting Screen

PRG - #01	OP Type
Abs / Inc = Inc	
	← / → ENT: Set
Mode - - -	- - -

4. Press the ↓ key to call up the position setting screen.

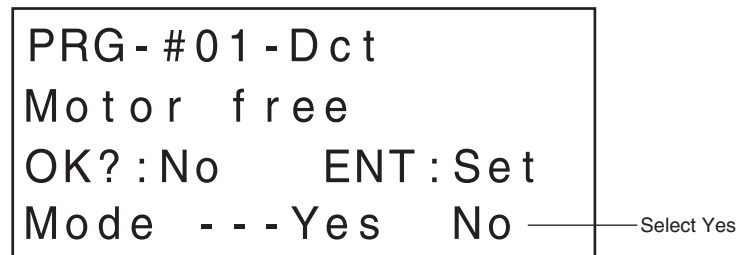
■ Figure 4-32 Position Setting Screen

PRG - #01	Pos Inc
Pos = 0000.000mm	
	key ENT: Set
Mode - - -	Rmt Dct

Select the Dct option

5. Press the F4 key (corresponding to the Dct option) to call up the direct teaching screen (1).
Select "Yes" by pressing the F3 key, and press the ENT key.

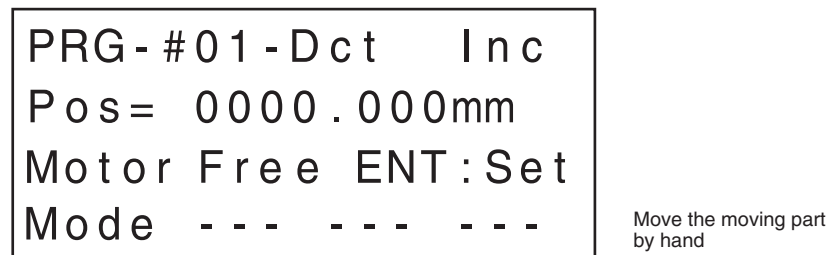
■ Figure 4-33 Direct Teaching Screen (1)



Press the F4 key to return to the position setting screen.

6. The screen switches to the one shown in Figure 4-34.
The moving part of the slider/cylinder can now be moved by hand.

■ Figure 4-34 Direct Teaching Screen (2)



7. Move the moving part manually and change the position.
The current position is displayed on the screen in real time.
8. Determine the position, and press the ENT key.
The current position is set as the positioning position, and the operating-speed input screen is displayed.

4.9 Setting Range of Operation Data

Table 4-2 lists the setting ranges of operation data that can be set and changed in the PRG mode.

■ Table 4-2 Data Setting Range of the PRG Mode

Data	Display	Description	Setting range	Initial value
Positioning method	Abs/Inc	<p>Sets the positioning method. There are two positioning methods that can be used for positioning operation: absolute (Abs) and incremental (Inc). In the absolute method, the travel amount (distance) from the mechanical home position is set. In the incremental method, the position to which the motor moved in the last operation (current position) is set as the start point of the next move. It is suitable when the same travel amount (distance) is repeated.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Absolute method (Abs)</p> <p>Mechanical home position</p> <p>-50mm (-1.97 inch) 0 100mm (3.94 inch) 200mm (7.87 inch)</p> </div> <div style="text-align: center;"> <p>Incremental method (Inc)</p> <p>Mechanical home position</p> <p>0 100mm (3.94 inch) 200mm (7.87 inch)</p> </div> </div>	Inc Abs	Inc
Position	Pos	Sets the position used for positioning operation	-9999.990 to 9999.990 mm (-393.70 to +393.70 inch)	0.000 mm
Operating speed	Spd	Sets the operating speed used for positioning operation	0.015 to 300.000 mm/s (0.0006 to 11.81 in/sec)	60.000 mm/s (2.36 in/sec)
Acceleration	Acc	Sets the acceleration used for positioning operation	0.015 to 150.000 m/s ² (0.05 to 492 ft/sec ²)	0.450 m/s ² (1.48 ft/sec ²)
Deceleration	Dec	Sets the deceleration used for positioning operation	0.015 to 150.000 m/s ² (0.05 to 492 ft/sec ²)	0.450 m/s ² (1.48 ft/sec ²)
Operation function	Func	<p>Sets an additional function used in the positioning operation.</p> <ul style="list-style-type: none"> <p>● SingleMotion: Single-motion positioning is performed. In this case, the positioning operation of the selected data number only is carried out.</p> <p>● LinkedMotion: Linked-motion positioning operation is performed. In this case, the positioning operations of the data numbers for which "linked-motion" is selected as the operation function are carried out in sequence. The operation ends when the positioning operation of a data number for which "single-motion" is selected is completed. Only operation data of the same direction can be linked.</p> <p>● PushMotion: Push-motion operation is performed. In this case, a push-motion operation is carried out after the positioning operation is completed. The push distance is set via parameters.</p> 	SingleMotion LinkedMotion PushMotion	SingleMotion

4.10 Performing Positioning Operation

Press the **F1** key or turn the power supply off and then on again, and select the EXT mode.

Run the data saved in the controller's memory.

The I/O connector to which the user-defined controller is connected has the M0 to M5 input used to select the data number and the START input used to start the operation.

Select the data numbers by setting the M0 to M5 input and activate the START input to perform the operation.

Data No.	M5	M4	M3	M2	M1	M0
No.1	OFF	OFF	OFF	OFF	OFF	ON
No.2	OFF	OFF	OFF	OFF	ON	OFF
:	:	:	:	:	:	:
:	:	:	:	:	:	:
No.62	ON	ON	ON	ON	ON	OFF
No.63	ON	ON	ON	ON	ON	ON

Chapter 5 Setting and Modifying Parameters

This chapter explains the procedures involved in setting and changing parameters, which are performed in the PAR mode.



Warning

- In order to avoid injury and equipment damage, be sure that engineers having expert knowledge of the structure and operation of the EZS/EZC Series controllers and sliders/cylinders, along with an awareness of the degree of risk involved in the operation, perform the connection of the teaching pendant.

5.1 Parameters

In order to operate sliders/cylinders, it is necessary to set not only operation data but data that defines the slider/cylinder operating environment. Such data is referred to as parameters.

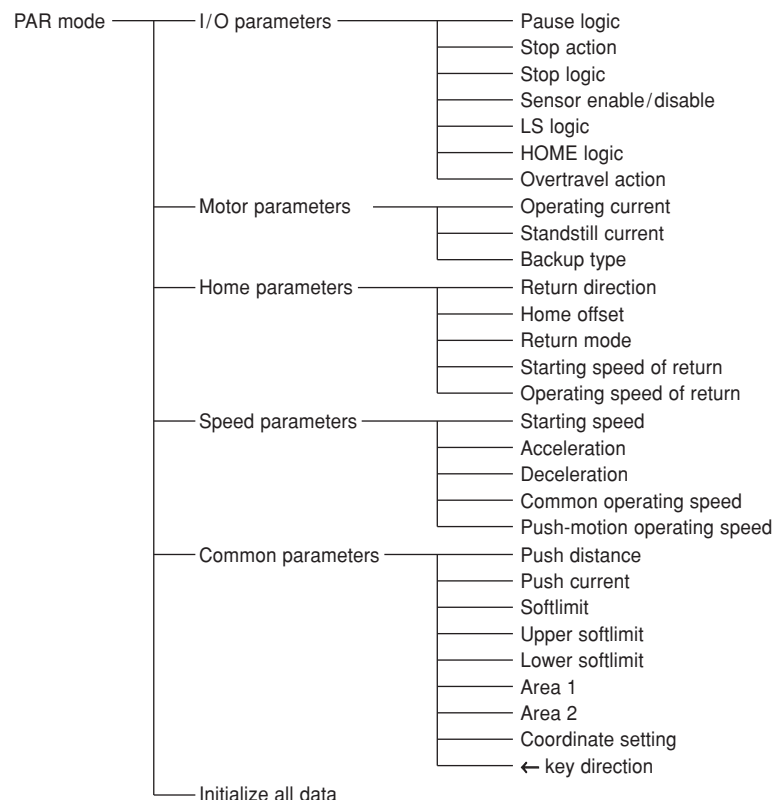
There are five types of parameters: common parameters intrinsic to the slider/cylinder; motor parameters that specify the motor current; speed parameters relating to the operating speed; I/O parameters relating to control; and home parameters relating to return-to-home operation. The speed parameters are commonly used in positioning and return-to-home operations.

5.2 Functions Available in the PAR Mode

Functions available in the PAR mode are those to set and change the following parameters and initialize all the data/parameters.

Figure 5-1 shows the items that can be set and changed in the PAR mode.

■ Figure 5-1 Parameters Set and Changed in the PAR Mode



5.3 Parameter Setting Screens

Press the **F1** key twice in the EXT mode to switch to the first screen of the PAR mode. There are two types of parameter-item selection screens: the first screen shown in Figure 5-2 and the screen shown in Figure 5-3. The screen shown in Figure 5-3 is displayed when the **SHIFT** key is pressed in the first screen.

■ Figure 5-2 First Screen of the PAR Mode/Item Selection 1

```

PAR                                ID00
Select
      SHIFT, F2 / F3 / F4
Mode I / O Mtr Hmp
  
```

Press the **SHIFT** key to display the screen for item selection 2.

This screen is used to set and change I/O parameters, motor parameters and home parameters.

■ Figure 5-3 Screen for Item Selection 2

```

PAR                                ID00
Select
                                F2 / F3 / F4
Mode Ini Spd Com
  
```

Release the **SHIFT** key to display the screen for number selection 1.

This screen is used to set and change speed parameters and common parameters, and to initialize all the data.

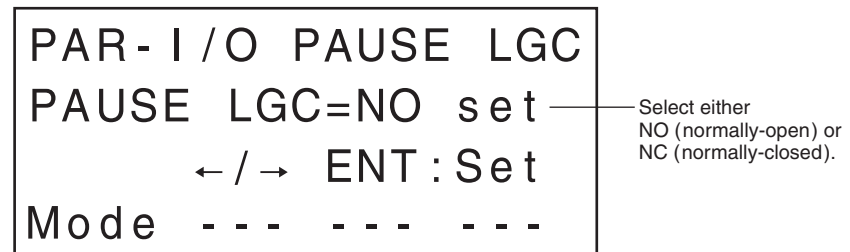
5.4 Setting and Modifying I/O Parameters

I/O parameters can be set and changed according to the following procedure. It is possible to set and change the logic of a controller's PAUSE input, STOP input, LS inputs and HOME input, the stop action used for the slider/cylinder at overtravel action and the enabling/disabling of sensor usage. Table 6-1 shows the parameters that can be set and changed by I/O parameters.

1. Press the F2 key (corresponding to the I/O option) in the screen for item selection 1.

2. The screen used to set and change the pause logic is displayed.

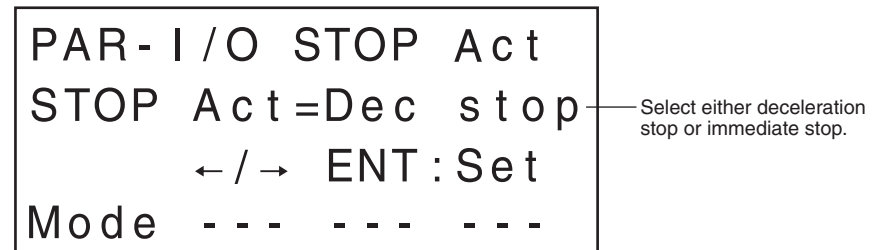
■ Figure 5-4 Pause Logic Setting/Modification Screen



Press either the ← or → key to select a pause-logic option, and press the **ENT** key.

3. The screen used to set and change the stop action is displayed.

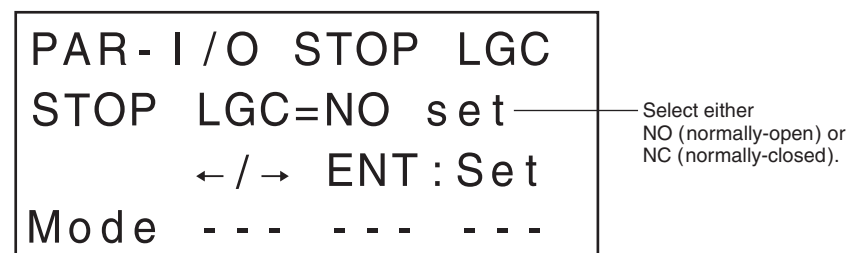
■ Figure 5-5 Stop Action Setting/Modification Screen



Press either the ← or → key to select a stop-action option, and press the **ENT** key.

4. The screen used to set and change the stop logic is displayed.

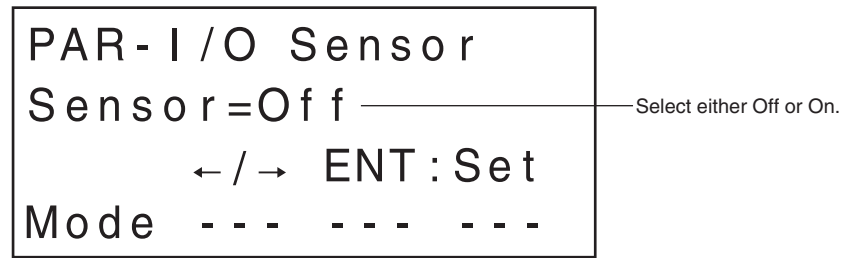
■ Figure 5-6 Stop Logic Setting/Modification Screen



Press either the ← or → key to select a stop-logic option, and press the **ENT** key.

5. The screen used to set and change the sensor enable/disable status is displayed.

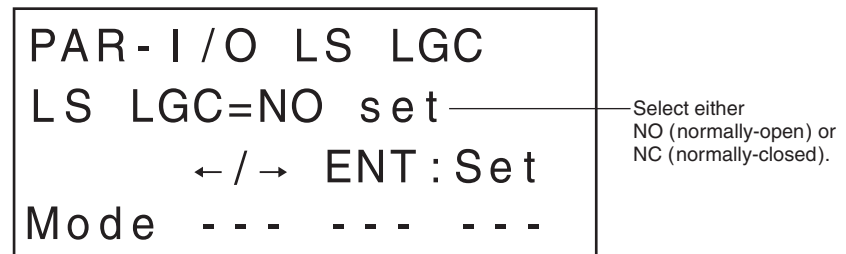
■ **Figure 5-7 Sensor Enable/Disable Setting/Modification Screen**



Press either the ← or → key to select the sensor enable/disable status, and press the ENT key.

6. The screen used to set and change the LS logic is displayed.

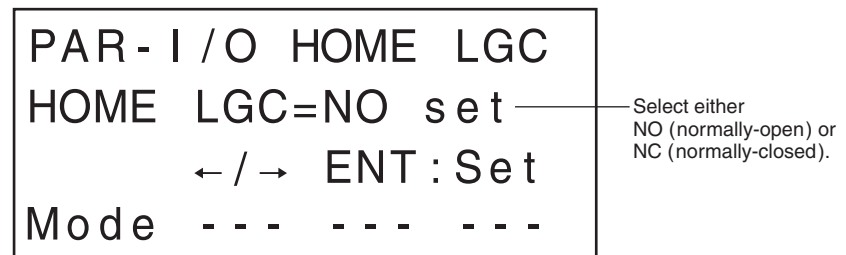
■ **Figure 5-8 LS Logic Setting/Modification Screen**



Press either the ← or → key to select an LS-logic option, and press the ENT key.

7. The screen used to set and change the HOME logic is displayed.

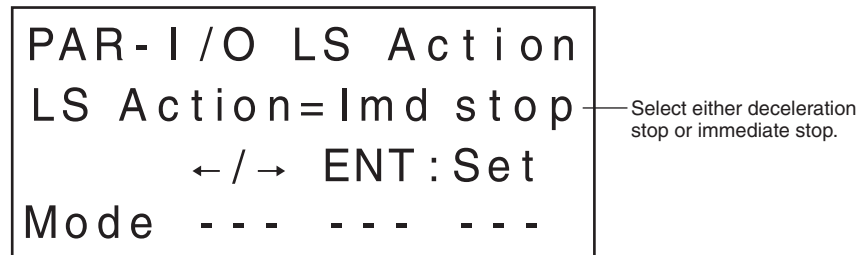
■ **Figure 5-9 HOME logic Setting/Modification Screen**



Press either the ← or → key to select a HOME-logic option, and press the ENT key.

8. The screen used to set and change the overtravel action is displayed.

■ Figure 5-10 Overtravel Action Setting/Modification Screen



Press either the ← or → key to select an overtravel-action option, and press the **ENT** key.

When the **ENT** key is pressed, the screen shown in Figure 5-4 is displayed.

■ Table 5-1 I/O Parameters

Parameter	Display	Description	Setting range	Initial value
Pause logic	PAUSE LGC	Sets the logic of the PAUSE input	NO set NC set	NO set
Stop action	STOP Act	Sets how the slider/cylinder is stopped when the STOP input becomes active	Dec stop Imd stop	Dec stop
Stop logic	STOP LGC	Sets the logic of the STOP input	NO set NC set	NO set
Sensor enable/disable	Sensor	Sets whether to enable or disable the sensor	On Off	Off
LS logic	LS LGC	Sets the logic of the LS sensor input	NO set NC set	NO set
HOME logic	HOME LGC	Sets the logic of the HOME sensor input	NO set NC set	NO set
Overtravel action	LS Action	Sets how the slider/cylinder is stopped when the sensor input becomes active	Dec stop Imd stop	Imd stop

5.5 Setting and Modifying Motor Parameters

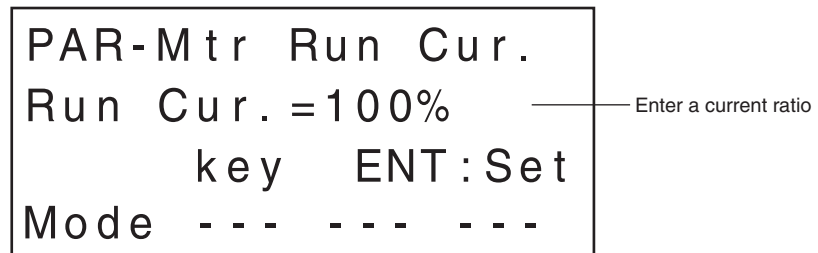
Motor parameters can be set and changed according to the following procedure. It is possible to set and change the operating current, standstill current and backup type* of the motor for driving the slider/cylinder (* only in the case of the absolute type).

These parameters represent the current values (internal setting values) used as references for the operating current and standstill current set by the RUN0 to RUN2 and STOP0 to STOP2 inputs, respectively. Table 5-2 lists the motor parameters that can be set and changed.

1. Press the F3 key (corresponding to the Mtr option) in the screen for item selection 1.

2. The screen used to set and change the operating current is displayed.

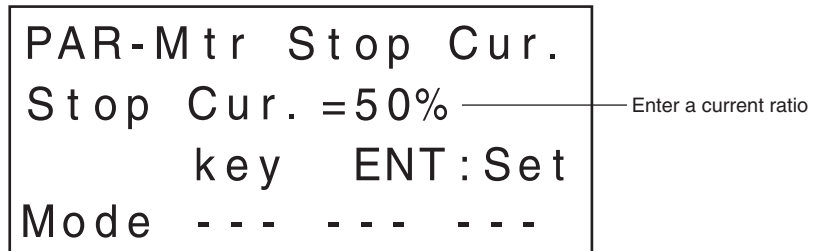
■ Figure 5-11 Operating Current Setting/Modification Screen



Enter the operating current via the numerical keys, and press the **ENT** key.

3. The screen used to set and change the standstill current is displayed.

■ Figure 5-12 Standstill Current Setting/Modification Screen



Enter the standstill current via the numerical keys, and press the **ENT** key.

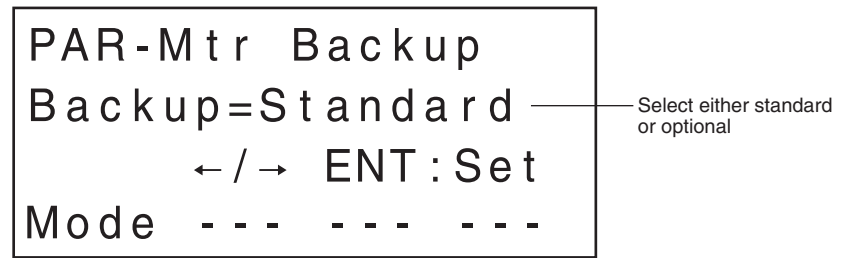
When the **ENT** key is pressed, the screen shown in Figure 5-11 is displayed if the incremental positioning method has been specified. The screen shown in Figure 5-13 will be displayed if the absolute positioning method has been specified.

Note

Decrease the operating current and standstill current when there is an allowance in the slider/cylinder's thrust force and you wish to reduce vibration during operation or suppress heat generation from the motor. However, be careful of an excessive decrease in current, since the thrust force and holding brake force will drop in rough proportion to the operating current.

4. The screen used to set and change the backup type is displayed.

■ Figure 5-13 Backup Type Setting/Modification Screen



Press either the ← or → key to select a backup-type option, and press the **ENT** key. When the **ENT** key is pressed, the screen shown in Figure 5-11 is displayed.

■ Table 5-2 Motor Parameters

Parameter	Display	Description	Setting range	Initial value
Operating current	Run Cur.	ets the operating current of the motor	10 to 100%	100%
Standstill current	Stop Cur.	Sets the standstill current of the motor	10 to 50%	50%
Backup type	Backup	Sets the backup type for the absolute positioning method	Standard Option	Standard

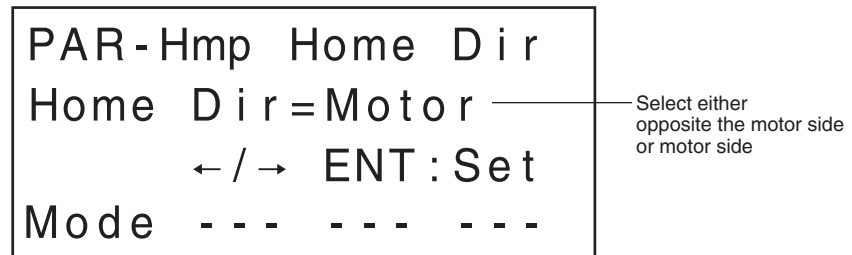
5.6 Setting and Modifying Home Parameters

Home parameters can be set and changed according to the following procedure. It is possible to set and change the return direction, home offset position, return mode, starting speed of return and operating speed of return to the return-to-home operation of the slider/cylinder. Table 5-3 lists the home parameters that can be set and changed.

1. Press the F4 key (corresponding to the Hmp option) in the screen for item selection 1.

2. The screen used to set and change the return direction is displayed.

■ Figure 5-14 Return Direction Setting/Modification Screen



Select either opposite the motor side or motor side

Note

Do not change the return direction of the cylinder's return-to-home operation.

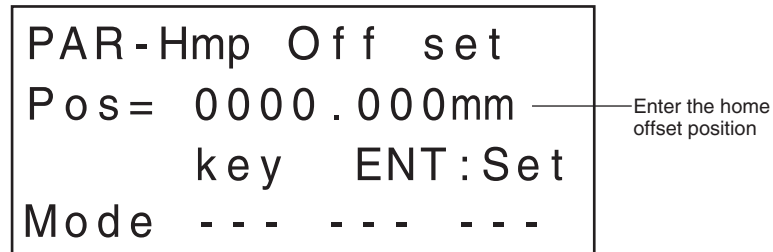
Press either the ← or → key to select a return-direction option, and press the **ENT** key.

Note

The values specified by the speed parameters are set for starting speed, acceleration, deceleration and operating speed at the return-to-home operation.

3. The screen used to set and change the home offset position is displayed.

■ Figure 5-15 Home Offset Position Setting/Modification Screen

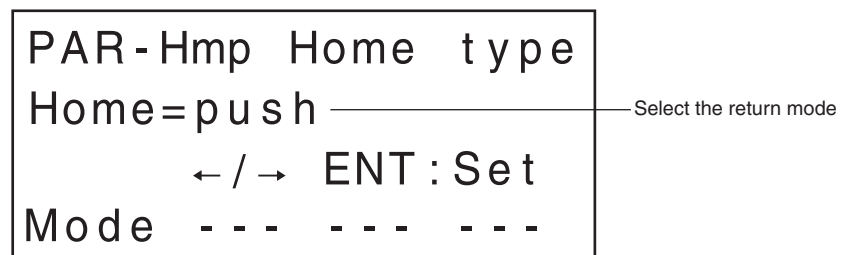


Enter the home offset position

Enter the home offset position via the numerical keys, and press the **ENT** key.

4. The screen used to set and change the return mode is displayed.

■ Figure 5-16 Return Mode Setting/Modification Screen



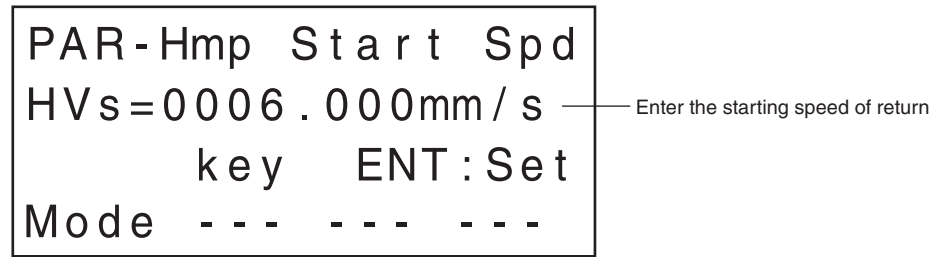
Select the return mode

Press either the ← or → key to select a return mode, and press the **ENT** key.

push: Push-motion
2: 2-sensor
3: 3-sensor

5. The screen used to set and change the starting speed of return is displayed.

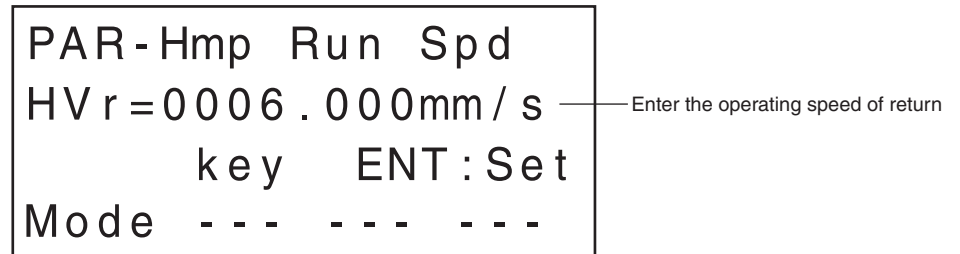
■ Figure 5-17 Return Starting Speed Setting/Modification Screen



Enter the starting speed of return via the numerical keys, and press the **ENT** key.

6. The screen used to set and change the operating speed of return is displayed.

■ Figure 5-18 Return Operating Speed Setting/Modification Screen



Enter the operating speed of return via the numerical keys, and press the **ENT** key.

When the **ENT** key is pressed, the screen shown in Figure 5-14 is displayed.

■ Table 5-3 Home Parameters

Parameter	Display	Description	Setting range	Initial value
Return direction	Home Dir	Sets the direction of the return-to-home operation	To Motor Opp motor	To Motor
Home offset position	Pos	Sets the offset position from the mechanical home position of the slider/cylinder	-9999.990 to 9999.990 mm (-393.70 to +393.70 inch)	0000.000 mm
Return mode	Home	Selects the return-to-home operation method, sensor-less or with sensors	Push 2 3	Push
Starting speed of return	HVs	Sets the starting speed of the return-to-home operation	0000.015 to 0300.000 mm/s (0.0006 to 11.81 in/sec) [up to 0006.000 mm/s (0.24 in/sec) in the case of a push-motion return]	0006.000 mm/s (0.24 in/sec)
Operating speed of return	HVr	Sets the operating speed of the return-to-home operation	0000.015 to 0300.000 mm/s (0.0006 to 11.81 in/sec) [up to 0006.000 mm/s (0.24 in/sec) in the case of a push-motion return]	0006.000 mm/s (0.24 in/sec)

5.7 Setting and Modifying Speed Parameters

Speed parameters can be set and changed according to the following procedure:

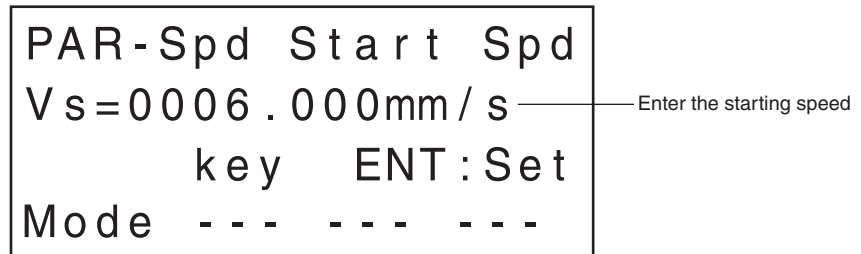
- Set and change the starting speed, which is commonly used when the slider/cylinder is operated.
- Set and change the acceleration, deceleration and operating speed, which are commonly used to return to mechanical home operation, manual operation and remote teaching.
- Set and change the operating speed, which is used during push-motion operation of the cylinder.

Table 5-4 lists the speed parameters that can be set and changed.

1. Press the F3 key (corresponding to the Spd option) in the screen for item selection 2 (displayed by pressing the SHIFT key).

2. The screen used to set and change the starting speed is displayed.

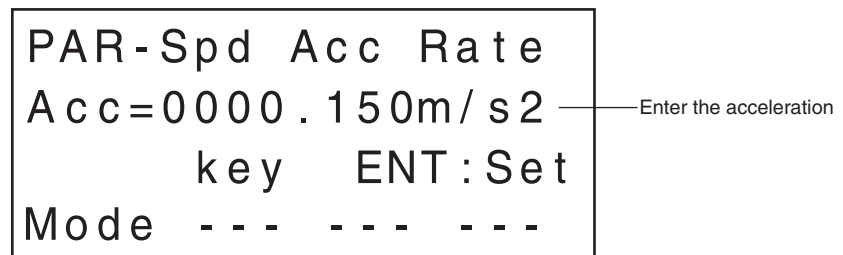
■ Figure 5-19 Starting Speed Setting/Modification Screen



Enter the starting speed via the numerical keys, and press the **ENT** key.

3. The screen used to set and change the acceleration is displayed.

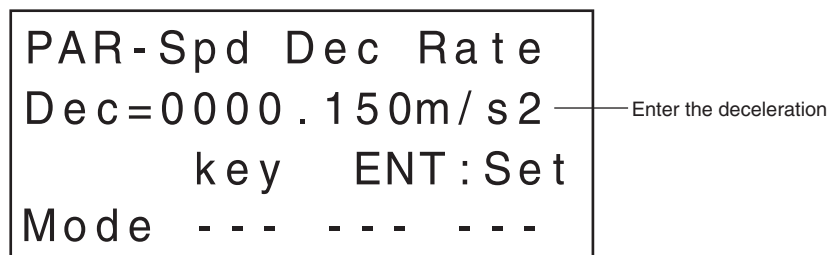
■ Figure 5-20 Acceleration Setting/Modification Screen



Enter the acceleration via the numerical keys, and press the **ENT** key.

4. The screen used to set and change the deceleration is displayed.

■ Figure 5-21 Deceleration Setting/Modification Screen



Enter the deceleration via the numerical keys, and press the **ENT** key.