HL-0126

LIMO™

EZ limo™
easy linear motion

EZHS/EZHC/EZHP Series Controller

DATA SETTING MANUAL

ORIENTAL MOTOR CO., LTD.

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Chapter 1 Overview

1.1 Introduction

This manual describes how to set data for the EZHS/EZHC/EZHP Series controller using the EZT1 teaching pendant.
Operating any EZHS/EZHC/EZHP 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 EZHS/EZHC/EZHP Series, and follow the instructions:

- EZHS/EZHC/EZHP Series Controller Data Setting Manual (this document)
- EZHS/EZHC/EZHP Series Slider/Cylinder Installation Manual
  This manual explains the installation and troubleshooting of the slider and cylinder.
- EZHS/EZHC/EZHP 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: Monitor current position, I/O status, alarms and alarm history, and operation data.
- Program (PRG) mode: Create and modify operation data, as well as clear all data.
- Parameter (PAR) mode: Set, modify and initialize parameters for operation and function settings.
- Test (TST) mode: Perform manual operation, I/O checking and test operation.

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

- External (EXT) mode: Monitor current position, 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 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.

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.

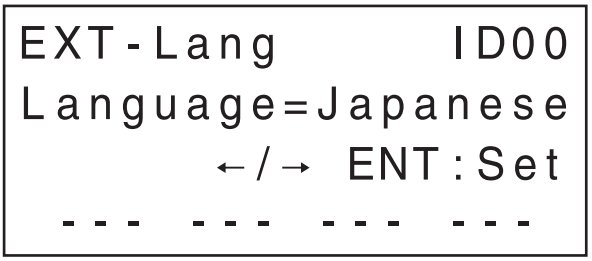
Note

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)**

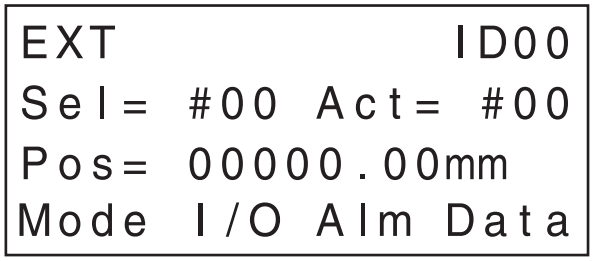


Either Japanese or English can be selected.

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)**

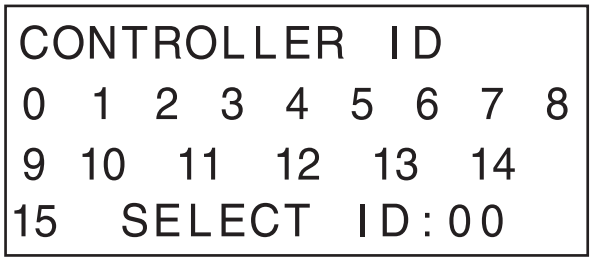


This screen is only displayed in the controller mode.

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**



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.

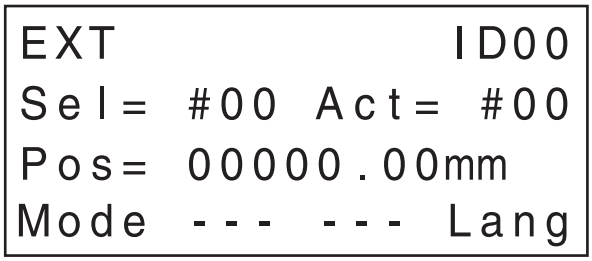
● Enter an ID via the numerical keys, and press the **ENT** key.
The screen changes to the one shown in Figure 2-4.

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.

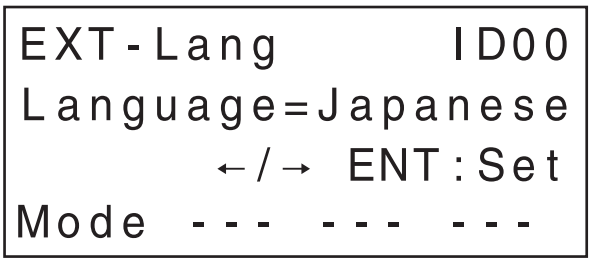
2.1.3 Switching Between Languages

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)**



■ **Figure 2-7 Language Setting Screen (2)**

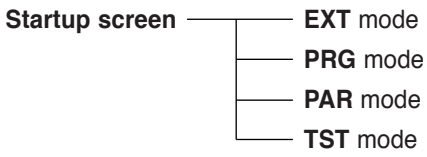


Either Japanese or English can be selected.

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.

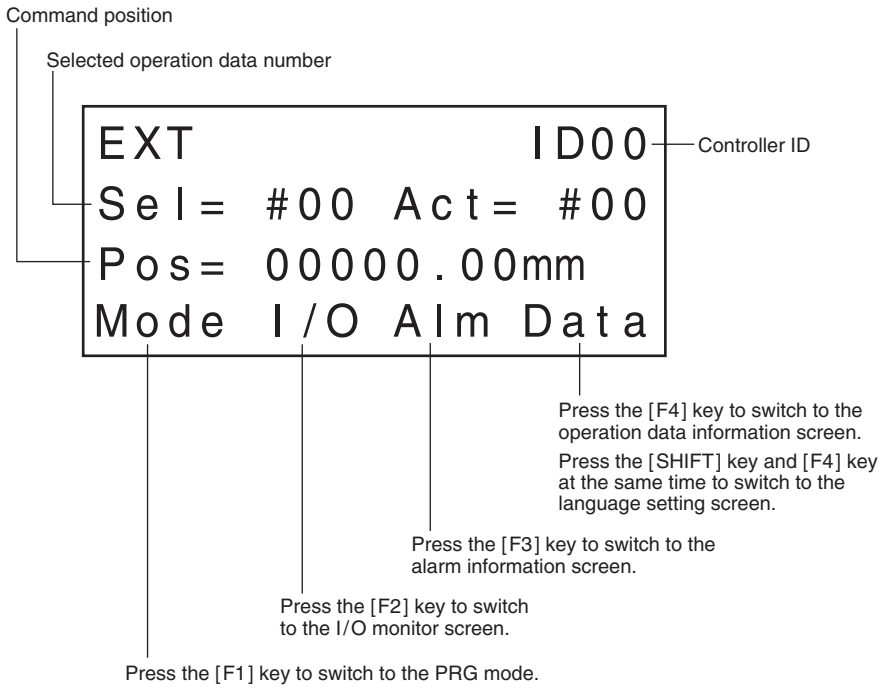
■ **Figure 4-9 Operation Modes**



(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.

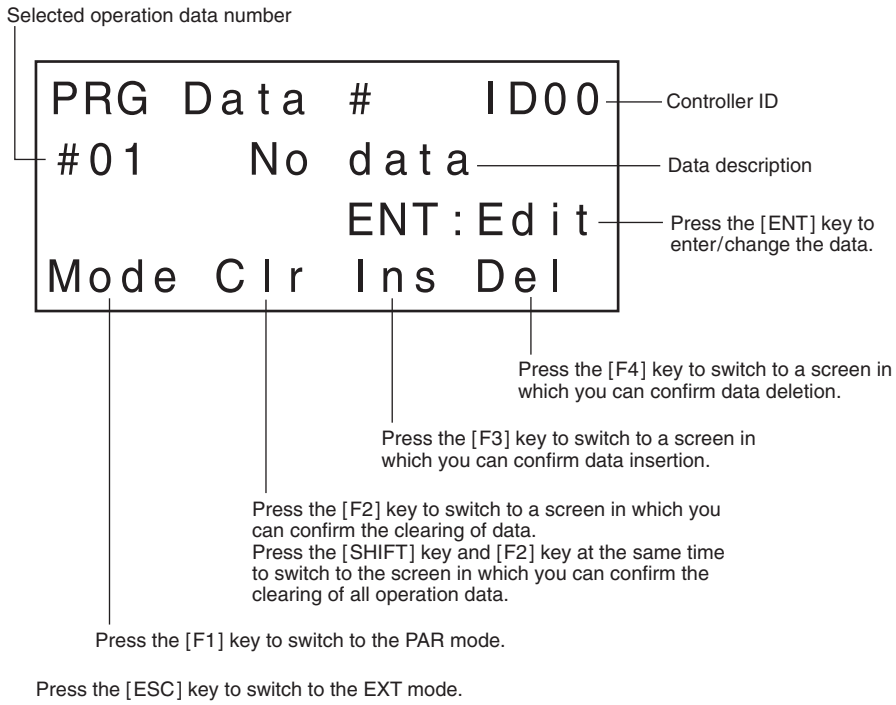
■ **Figure 2-9 First Screen of the EXT Mode/Current Position Display**



(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.

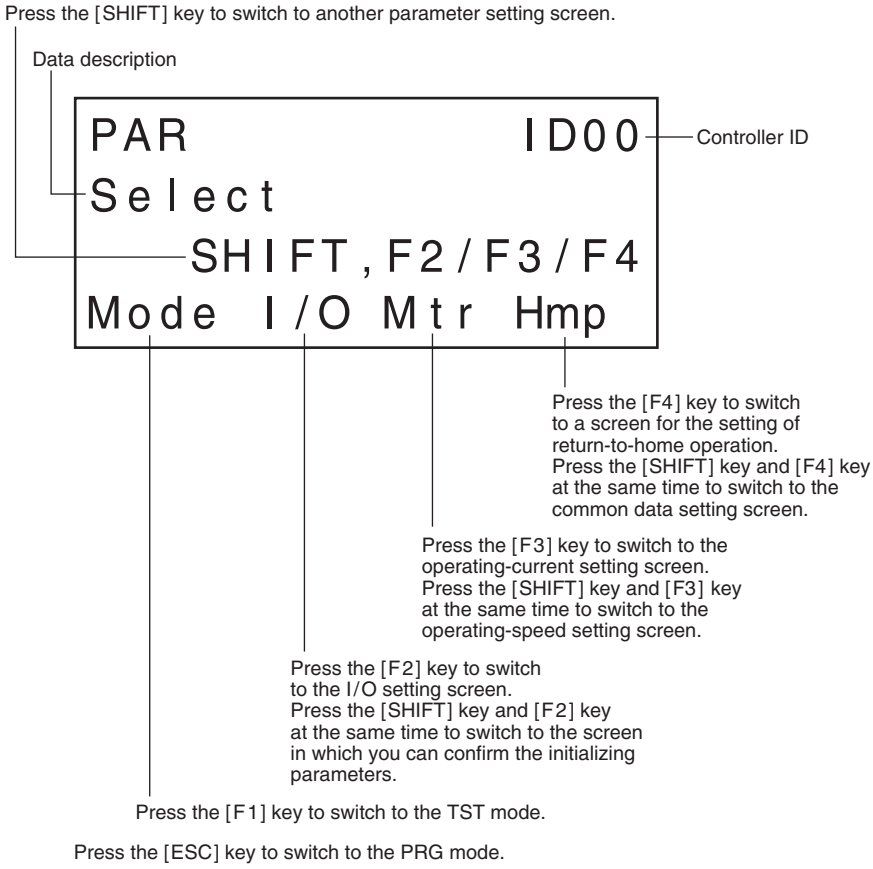
■ **Figure 2-10 First Screen of the PRG Mode/Number Selection 1**



(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.

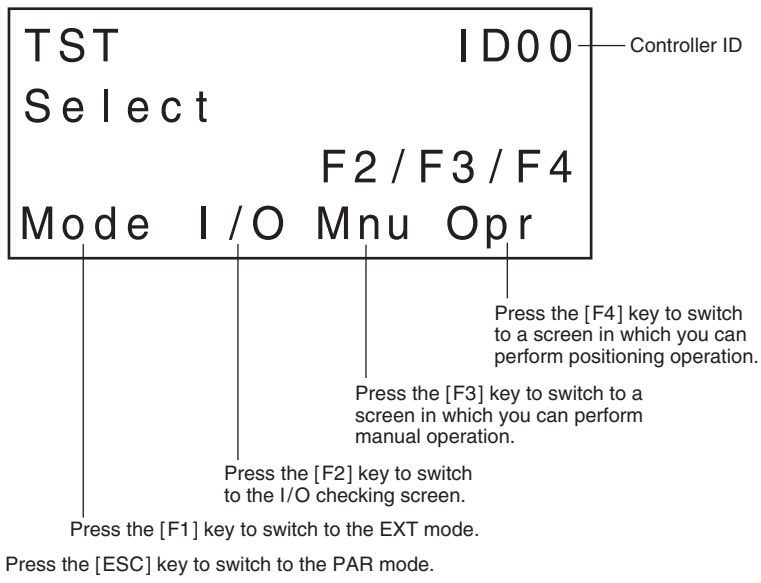
■ **Figure 2-11 First Screen of the PAR Mode/Item Selection 1**



(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.

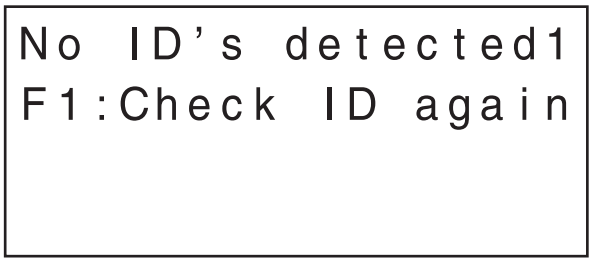
■ **Figure 2-12 First Screen of the TST Mode/Item Selection**



2.1.5 Error Display Screens

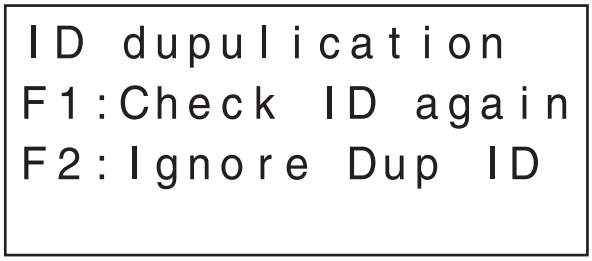
The error screens shown in figures 2-13 to 2-16 are displayed if controller errors are detected. The red backlight turns on if an error screen is displayed.

■ **Figure 2-13 No ID Connected**



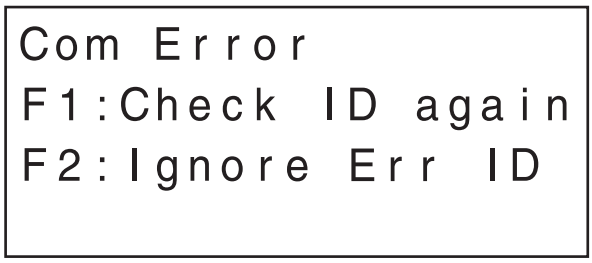
Check the connection between the teaching pendant and controllers, as well as the ID settings of the controllers, then press the **F1** key to return to the ID checking screen.

■ **Figure 2-14 ID Duplication**



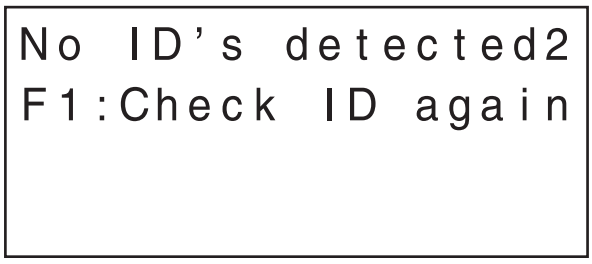
Check the ID settings of the controllers, and press the **F1** key to return to the ID checking screen.
Press the **F2** key to disconnect a controller with a duplicate ID.

■ **Figure 2-15 Communication Error**



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**



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

- In order to avoid injury and equipment damage, be sure that engineers having expert knowledge of the structure and operation of the EZHS/EZHC/EZHP 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.
  - 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:
  - 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 display screen of 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. 1) 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 OPERATION 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 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.	EXT ID00 Sel= #00 Act= #00 Pos= 00000.00mm Mode I/O Alm Data

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 15.00 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= 00000.00mm
     key  ENT:Set
Mode --- Rmt Dct
```

2. Press the **SHIFT** key to clear the previous numerical value.
00000.00 is displayed.

```
PRG-#01 Pos  Inc
Pos= 00000.00mm
     key  ENT:Set
Mode --- Rmt Dct
```

3. Press the numerical keys [1] and then [5] to display "15".
The value 00000.15 mm (0.006 inch) is displayed on the screen.

```
PRG-#01 Pos  Inc
Pos= 00000.15mm
  10keys  ENT:Set
Mode --- Rmt Dct
```

4. Press the numerical key [0] twice.
The value 00015.00 mm (0.59 inch) is displayed on the screen.

```
PRG-#01 Pos  Inc
Pos= 00015.00mm
  10keys  ENT:Set
Mode --- Rmt Dct
```

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

If you want to enter –30.00 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= 00045.00mm
  10keys  ENT:Set
Mode --- Rmt Dct
```

2. Press the **SHIFT** key to clear the previous numerical value.
00000.00 is displayed.

```
PRG-#01 Pos  Inc
Pos= 00000.00mm
  10keys  ENT:Set
Mode --- Rmt Dct
```

3. Press the **+/–** key to display the "–" symbol.

```
PRG-#01 Pos  Inc
Pos=-00000.00mm
  10keys  ENT:Set
Mode --- Rmt Dct
```

4. Press the numerical key [3] to display “3”.
The value −00000.03 mm (−0.001 inch) is displayed on the screen.

```
PRG-#01 Pos   Inc
Pos=-00000.03mm
  10keys  ENT:Set
Mode --- Rmt Dct
```

5. Press the numerical key [0] three times.
The value −00030.00 mm (−1.18 inch) is displayed on the screen.

```
PRG-#01 Pos   Inc
Pos=-00030.00mm
  10keys  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.

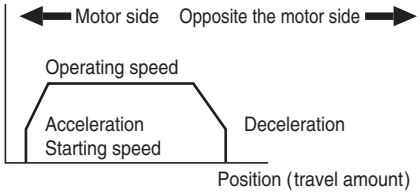
Step	Operation and explanation	Screen display
2.1	Press the F1 key three times in the first screen of the **EXT** mode to select the **TST** mode. The first screen of the **TST** mode is displayed.	TST ID00 Select F2/F3/F4 Mode I/O Mnu Opr
2.2	Press the F3 key to select manual operation. The screen for performing manual operation is displayed. The absolute position relative to the home position is displayed in the Pos field on the screen.	TST-Mnu Mnu- Opr Pos= 00000.00mm ←/→,F3/F4 Mode --- PRE HOME
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, acceleration and deceleration 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
- 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

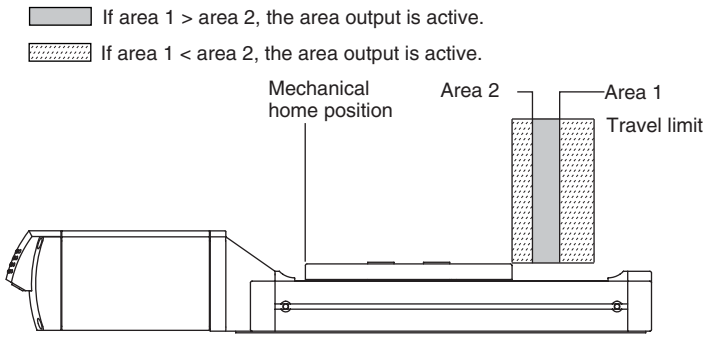
Step	Operation and explanation	Screen display
3.1	Press the F1 key twice to select the **PRG** mode. The first screen of the **PRG** mode is displayed.	PRG Data # ID00 #01 No data ENT:Edit Mode Clr Ins Del
3.2	Enter the following data in data No. 01. **Positioning method:** Absolute **Position/direction:** 45 mm (1.77 inch) opposite the motor side from home position **Operating speed:** 300 mm/s (11.81 in/sec) **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.	PRG-#01 OP Type Abs/Inc=Abs ←/→ ENT:Set Mode --- --- ---

Step	Operation and explanation	Screen display
3.4	The position setting screen is displayed. Enter the value **45.00** using the numerical keys. Set the direction of movement using the [+/-] key. 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 [ENT] key.	PRG-#01 Pos Abs Pos= 00045.00mm 10keys ENT:Set Mode --- Rmt Dct
3.5	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 [ENT] key.	PRG-#01 Speed Spd=00300.00mm/s 10keys ENT:Set Mode --- --- ---
3.6	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** or **LinkedMotion**. Here, select **SingleMotion** and press the [ENT] key.	PRG-#01 OP Func Func=SingleMotion ←/→ ENT:Set Mode --- --- ---
3.7	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) **Operation function:** Single-motion	PRG Data # ID00 #02 No data ENT:Edit Mode Clr Ins Del
3.8	Press the [ENT] 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 [ENT] key.	PRG-#02 OP Type Abs/Inc=Inc ←/→ ENT:Set Mode --- --- ---
3.9	The position setting screen is displayed. Enter the value **−24.00** 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 [ENT] key.	PRG-#02 Pos Inc Pos=-00024.00mm 10keys ENT:Set Mode --- Rmt Dct

Step	Operation and explanation	Screen display
3.10	The operating-speed setting screen is displayed. Enter the value **150.00** using the numerical keys. Check to see that the setting is correct and press the ENT key.	PRG-#02 Speed Spd=00150.00mm/s 10keys ENT:Set Mode --- --- ---
3.11	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 ENT key.	PRG-#02 OP Func Func=SingleMotion ←/→ ENT:Set Mode --- --- ---
3.12	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. → key: Data No. + 1 ← key: Data No. − 1 ↑ key: Data No. + 10 ↓ key: Data No. − 10 It is also possible to select a data number using the numerical keys.	
3.13	The operation data is now created. Press the ESC key to switch to the first screen of the **EXT** mode.	

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 24 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	Press the F1 key twice to select the **PAR** mode. The first screen of the **PAR** mode is displayed.	PAR ID00 Select SHIFT,F2/F3/F4 Mode I/O Mtr Hmp
4.2	Hold down the SHIFT key and press the F4 key to display the first screen for the setting of common parameters.	When the SHIFT key is pressed: PAR ID00 Select F2/F3/F4 Mode Ini Spd Com
	The softlimit setting screen is displayed.	When the SHIFT and F4 keys are pressed: PAR-Com Soft Lim Soft Lim=On ←/→ ENT:Set Mode --- --- ---
4.3	Press the ↓ key three times to display the area 1 setting screen.	PAR-Com Area1 Area1= 00000.00mm 10keys ENT:Set Mode --- --- ---
4.4	Enter the value **45.00** using the numerical keys. Check to see that the setting is correct and press the ENT key.	PAR-Com Area1 Area1= 00045.00mm 10keys ENT:Set Mode --- --- ---
4.5	The area 2 setting screen is displayed.	PAR-Com Area2 Area2= 00000.00mm 10keys ENT:Set Mode --- --- ---
4.6	Enter the value **24** using the numerical keys. Check to see that the setting is correct and press the ENT key.	PAR-Com Area2 Area2= 00024.00mm 10keys ENT:Set Mode --- --- ---
4.7	The area parameters are now set. Press the ESC key to switch to the first screen of the **PAR** mode.	

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.	TST ID00 Select F2/F3/F4 Mode I/O Mnu Opr
5.2	Press the F4 key to select positioning operation. The screen for performing positioning operation is displayed.	TST-Opr #01 Pos= 00000.00mm 10keys,START/F3/F4 Mode --- PRE HOME
5.3	Press the F4 key to perform the return-to-mechanical home operation. The display blinks HOME during operation.	TST-Opr #01 Pos= 00000.00mm 10keys,START/F3/F4 Mode --- PRE HOME
5.4	Check that data No. 01 is displayed, and press the START key to perform the positioning operation.	TST-Opr #01 Pos= 00045.00mm 10keys,START/F3/F4 Mode --- PRE HOME
5.5	Select data No. 02 using the ←, →, ↑ and ↓ keys. It is also possible to select a data number using the numerical keys or BS key. 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.	TST-Opr #02 Pos= 00021.00mm 10keys,START/F3/F4 Mode --- PRE HOME

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	Turn on the controller's power supply. The OPERATION 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 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 operations.	EXT ID00 Sel= #00 Act= #00 Pos= 00000.00mm Mode I/O Alm Data

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	Press the F1 key three times to select the **TST** mode. The first screen of the **TST** mode is displayed.	TST ID00 Select F2/F3/F4 Mode I/O Mnu Opr
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.	TST-Mnu Mnu- Opr Pos= 00000.00mm ←/→,F3/F4 Mode --- PRE HOME
2.3	Press the ← or → key to operate the cylinder. If you press the ← key, the cylinder will move to the motor side (default value). If you press the → key, the cylinder will move opposite the motor side (default value). Check the direction of movement. Proceed to the next step if it is confirmed that the cylinder moves in the correct directions. If you cannot operate the cylinder, check the wiring between the cylinder and controller.	

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, acceleration and deceleration have been set separately and cannot be set via operation data. (They can be set in the parameter mode. Refer to *6-7*, "*Setting and Modifying Speed Parameters*").

- Positioning method
- Position (distance of movement)
- Direction
- Operating speed
- Operation function
- Push current (when the operation function is set to PushMotion)

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: 6 mm/s (0.24 in/sec), Operation function: push-motion, Push current: 30%

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.	PRG Data # ID00 #01 No data ENT:Edit Mode Clr Ins Del
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:** 6 mm/s (11.81 in/sec) **Operation function:** Push-motion **Push current:** 30%	
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.	PRG-#01 OP Type Abs/Inc=Abs ←/→ ENT:Set Mode --- --- ---

Step	Operation and explanation	Screen display
3.4	The position setting screen is displayed. Enter the value **45.00** 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 [ENT] key.	PRG-#01 Pos Abs Pos= 00045.00mm 10keys ENT:Set Mode --- Rmt Dct
3.5	The operating-speed setting screen is displayed. After clearing the value by pressing the [SHIFT] key, enter the value **6.00** using the numerical keys. Check to see that the setting is correct and press the [ENT] key.	PRG-#01 Speed Spd=00006.00mm/s 10keys ENT:Set Mode --- --- ---
3.6	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 [ENT] key.	PRG-#01 OP Func Func=PushMotion ←/→ ENT:Set Mode --- --- ---
3.7	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 [ENT] key.	PRG-#01 Push Cur. Push Cur.=30% 10keys ENT:Set Mode --- --- ---
3.8	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) **Operation function:** Single-motion	PRG Data # ID00 #02 No data ENT:Edit Mode Clr Ins Del
3.9	Press the [ENT] 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 [ENT] key.	PRG-#02 OP Type Abs/Inc=Inc ←/→ ENT:Set Mode --- --- ---

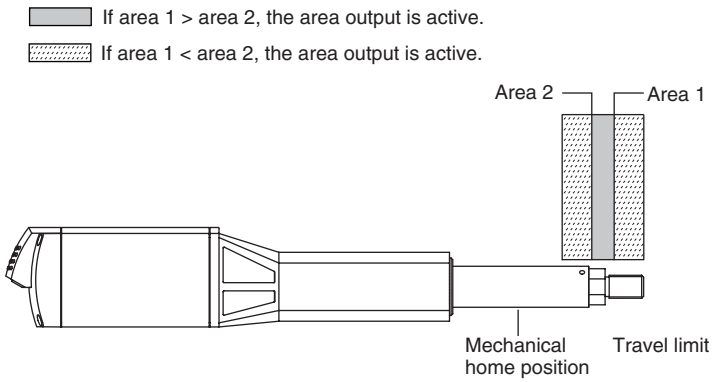
Step	Operation and explanation	Screen display
3.10	The position setting screen is displayed. Enter the value **– 24.00** using the numerical keys. Set the direction of movement using the [+/-] key. Press the [+/-] key to display the " – " symbol. The default values are as follows: No display: Opposite the motor side –: Motor side Check to see that the setting is correct and press the [ENT] key.	PRG-#02 Pos Inc Pos=-00024.00mm 10keys ENT:Set Mode --- Rmt Dct
3.11	The operating-speed setting screen is displayed. Enter the value **150.00** using the numerical keys. Check to see that the setting is correct and press the [ENT] key.	PRG-#02 Speed Spd=00150.00mm/s 10keys ENT:Set Mode --- --- ---
3.12	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 [ENT] key.	PRG-#02 OP Func Func=SingleMotion ←/→ ENT:Set Mode --- --- ---
3.13	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. [→] key: Data No. + 1 [←] key: Data No. – 1 [↑] key: Data No. + 10 [↓] key: Data No. – 10 It is also possible to select a data number using the numerical keys.	
3.14	The operation data is now created. Press the [ESC] key to switch to the first screen of the **EXT** mode.	

Step 4 Setting Parameters

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

Step 4.1 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
4.1.1	Press the F1 key twice to select the **PAR** mode. The first screen of the **PAR** mode is displayed.	PAR ID00 Select SHIFT,F2/F3/F4 Mode I/O Mtr Hmp
4.1.2	Hold down the SHIFT key and press the F4 key to display the first screen for the setting of common parameters.	When the SHIFT key is pressed: PAR ID00 Select F2/F3/F4 Mode Ini Spd Com When the SHIFT and F4 keys are pressed: PAR-Com Soft Lim Soft Lim=On ←/→ ENT:Set Mode --- --- ---

Step	Operation and explanation	Screen display
4.1.3	Press the ↓ key three times to display the area 1 setting screen.	PAR-Com Area1 Area1= 00000.00mm 10keys ENT:Set Mode --- --- ---
4.1.4	Enter the value **45.00** using the numerical keys. Check to see that the setting is correct and press the ENT key.	PAR-Com Area1 Area1= 00045.00mm 10keys ENT:Set Mode --- --- ---
4.1.5	The area 2 setting screen is displayed.	PAR-Com Area2 Area2= 00000.00mm 10keys ENT:Set Mode --- --- ---
4.1.6	Enter the value **24.00** using the numerical keys. Check to see that the setting is correct and press the ENT key.	PAR-Com Area2 Area2= 00024.00mm 10keys ENT:Set Mode --- --- ---
4.1.7	The area parameters are now set. Press the ESC 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.	TST ID00 Select F2/F3/F4 Mode I/O Mnu Opr
5.2	Press the F4 key to select positioning operation. The screen for performing positioning operation is displayed.	TST-Opr #01 Pos= 00000.00mm 10keys,START/F3/F4 Mode --- PRE HOME
5.3	Press the F4 key to perform the return-to-home operation. The HOME display blinks during operation.	TST-Opr #01 Pos= 00000.00mm 10keys,START/F3/F4 Mode --- PRE HOME
5.4	Check that data No. 01 is displayed, and press the START key to perform the positioning operation. The Pos display blinks during push-motion operation.	TST-Opr #01 Pos= 00045.00mm 10keys,START/F3/F4 Mode --- PRE HOME
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.	TST-Opr #02 Pos= 00021.00mm 10keys,START/F3/F4 Mode --- PRE HOME

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 EZHS/EZHC/EZHP 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)
Operation function	Func	Setting of single-motion positioning operation, linked-motion positioning operation or push-motion operation
Push-motion operation	Push Cur.	Setting of operating current during push-motion operation

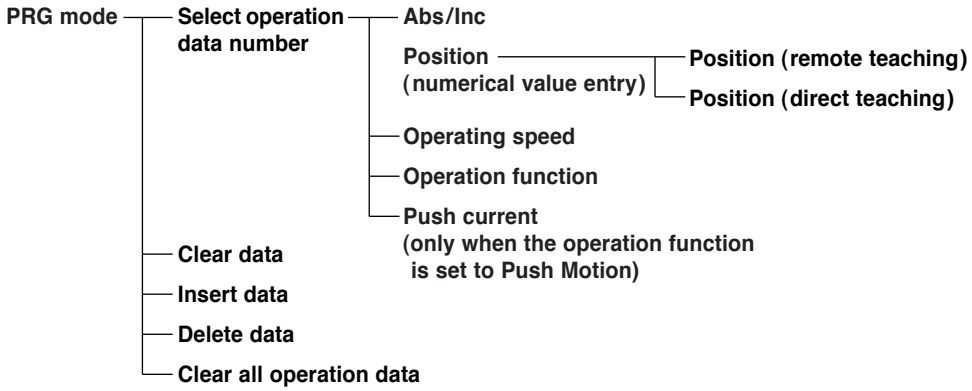
The position can be entered in one of the following three ways:

- 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.

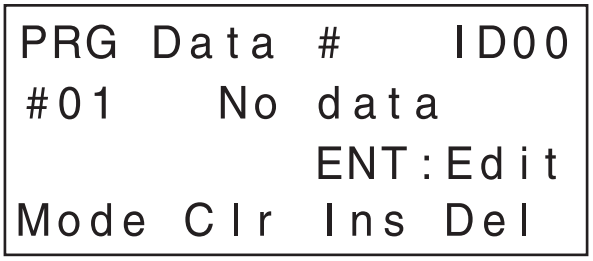
■ **Figure 4-1 Parameters Set and Changed in the PRG Mode**



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.

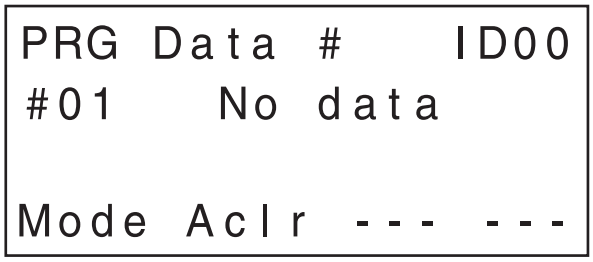
■ **Figure 4-2 First Screen of the PRG Mode/Number Selection 1**



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**



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

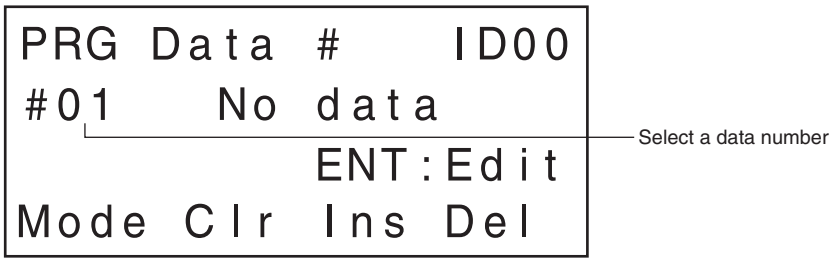
This screen is used to clear all the data.

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.

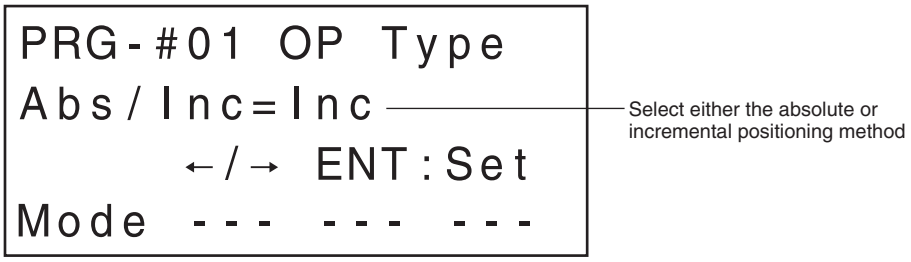
■ **Figure 4-4 First Screen of the PRG Mode/Number Selection 1**



2. Press the ↑, ↓, ← or → key to select the data number for which operation data is to be created.
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. 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.

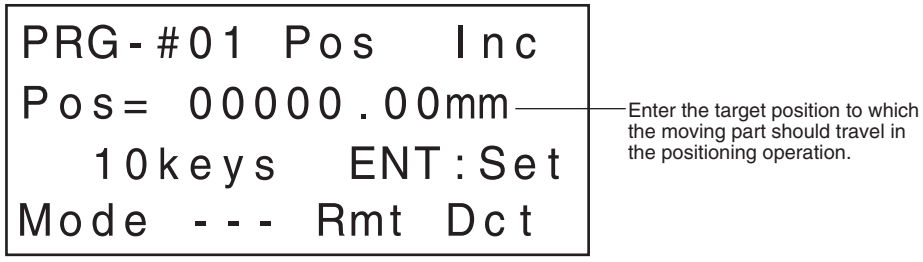
■ **Figure 4-5 Positioning-Method Setting Screen**



Press either the ← or → 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**

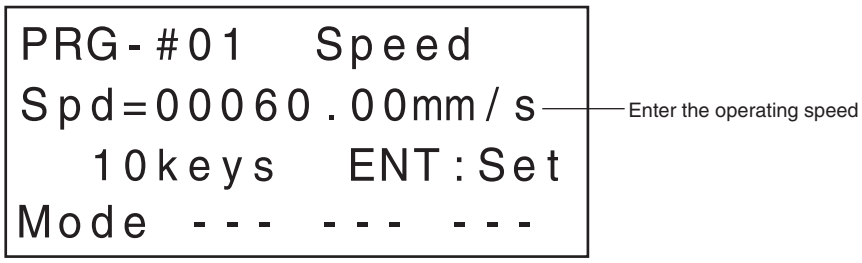


Enter the position via the numerical keys, and press the **ENT** key.

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**



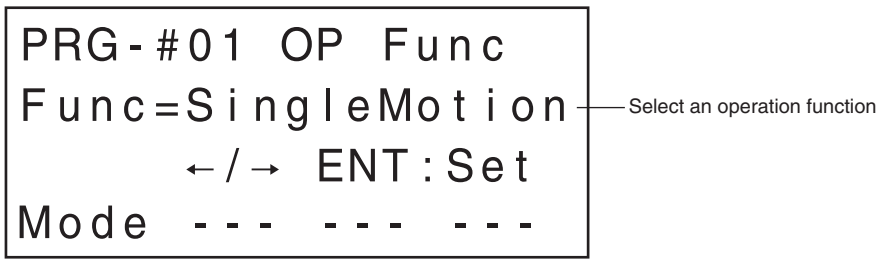
Enter the operating speed via the numerical keys, and press the **ENT** key.

Note

When performing push-motion operation, set the operating speed to 6.00 mm/s (0.24 in/sec) or less.
If a value exceeding 6.00 mm/s (0.24 in/sec) is entered, an error will occur during operation.

6. The set operating speed is saved and the operation-function setting screen is displayed.

■ **Figure 4-8 Operation-Function Setting Screen**



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

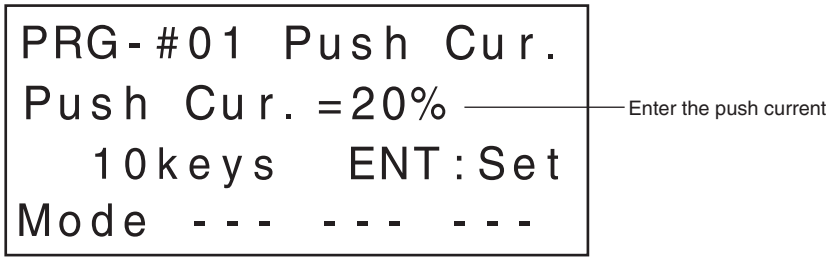
SingleMotion: Single-motion positioning operation
LinkedMotion: Linked-motion positioning operation
PushMotion: Push-motion operation

Note

Do not perform push-motion operation using sliders.

7. The push-current setting screen is displayed only when PushMotion is selected.

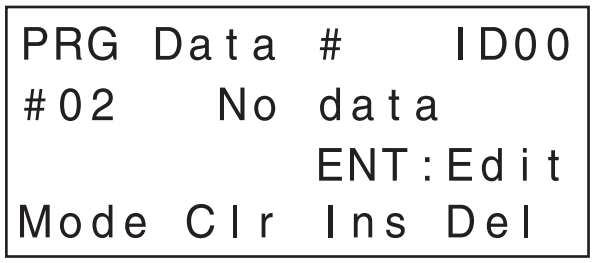
■ **Figure 4-9 Push-current setting screen**



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

8. 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 4-10 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.

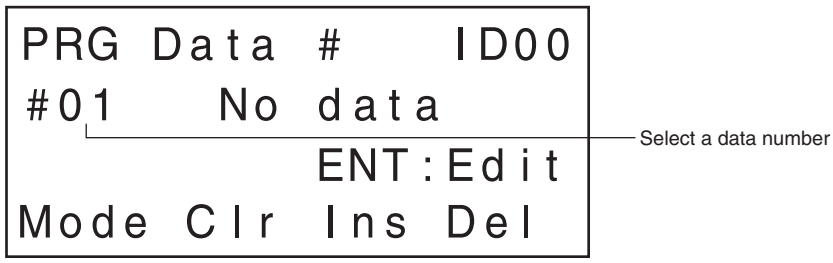
4.5 Editing Operation Data

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



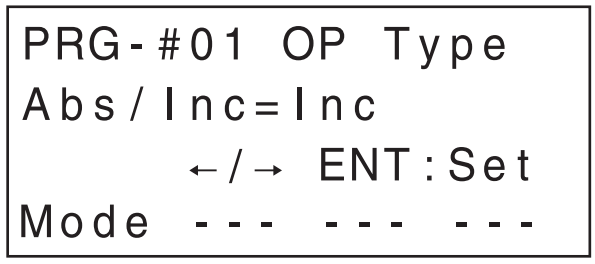
2. Press the ↑, ↓, ← or → key to select the data number for which operation data is to be edited. The data number can also be selected using the numerical keys.

Pressing the ↑ 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.

3. Press the ENT key.

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

■ **Figure 4-12 Positioning-Method Setting Screen**

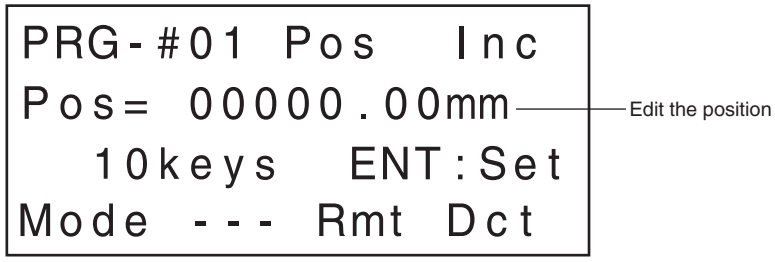


4. Continue pressing the ↑ or ↓ key until the item you want to edit is displayed.

5. When the item to be edited is displayed, the setting value can be changed as explained in *4.4*, "*Creating New Operation Data*", on p. 4-3.

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 4-13 Position Setting Screen**



6. Press the ENT key.
The changed value is saved.

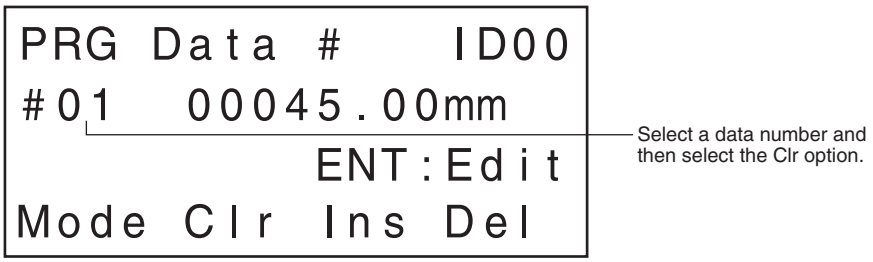
7. Press the ESC or F1 key once you've finished editing.
If you press the **ESC** key, the screen will return to the first screen of the PRG mode.
If you press the **F1** key, the screen will switch to the first screen of the PAR mode.

4.5.2 Clearing Data

The following operation clears data previously set.

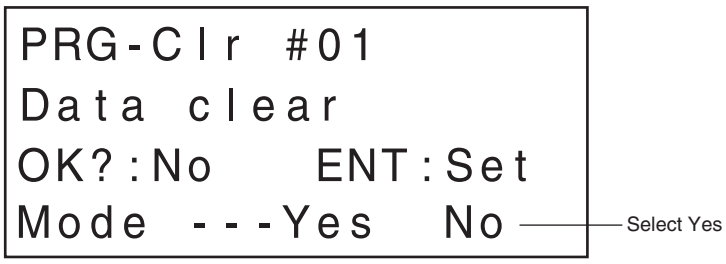
1. Select the data number you want to clear from the first screen of the PRG mode.
Press the ↑, ↓, ← or → key to select the data number you want to clear. The data number can also be selected using the numerical keys.

Figure 4-14 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 4-15 Data Clear Confirmation Screen



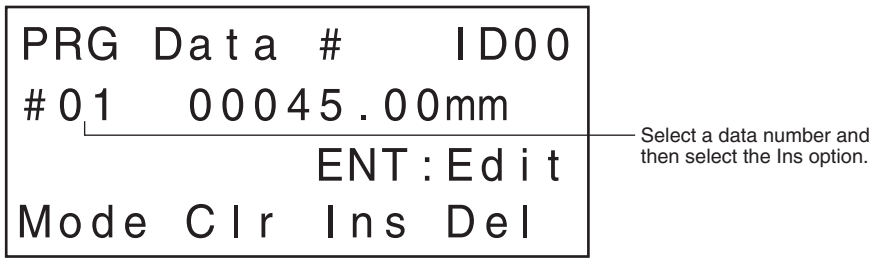
3. Select "Yes" by pressing the F3 key, and press the ENT key.
The data is cleared, and the screen returns to the first screen of the PRG mode.

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 4-16 First Screen of the PRG Mode/Number Selection 1**

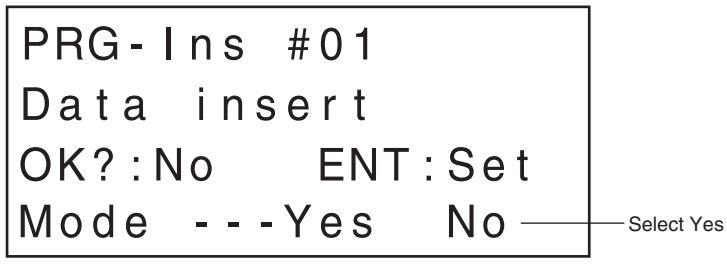


Note

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

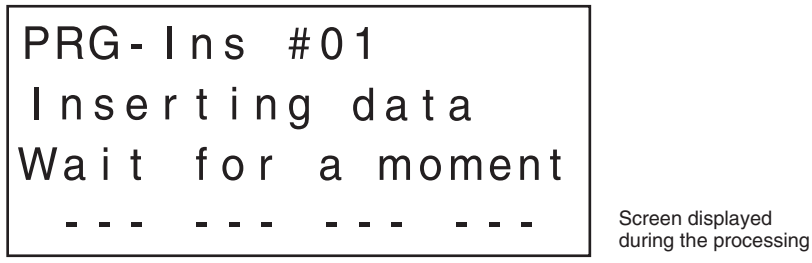
2. Press the F3 key (corresponding to the Ins option) to insert the data.
The message "Data insert OK?: No" is displayed.

■ **Figure 4-17 Data Insertion Confirmation Screen**



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

■ **Figure 4-18 Data Insertion Screen**



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