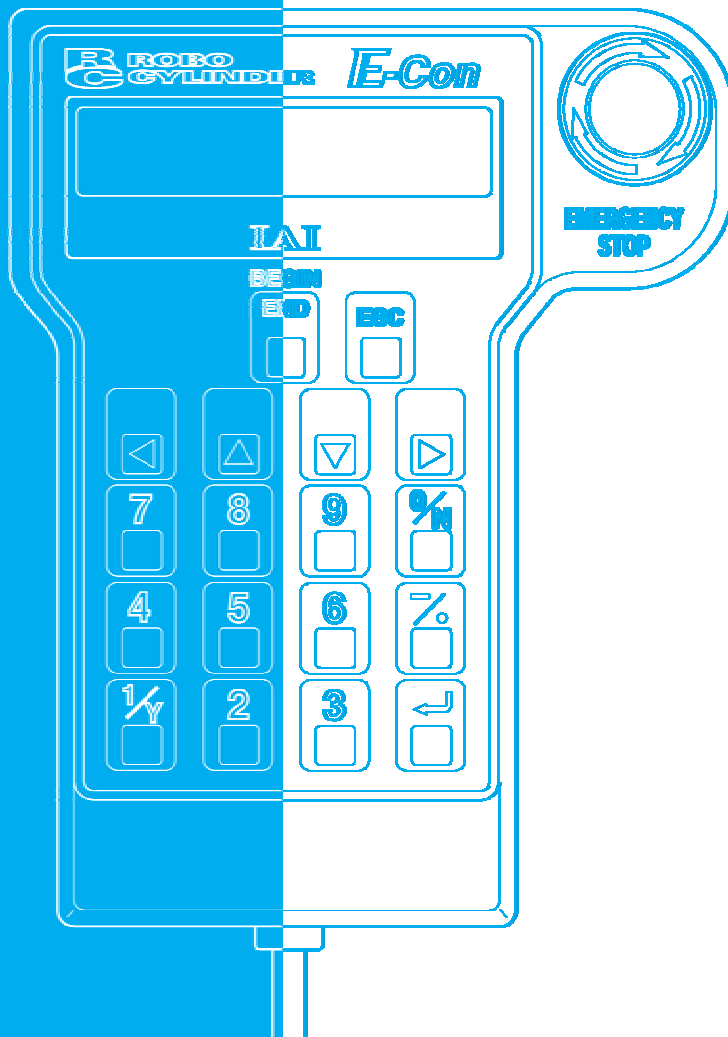




Easy Type Teaching Pendant RCM-E

Operating Manual First edition



IAI America Inc.

Disconnection of the Teaching Pendant from the PCON/ACON/SCON/ERC2 Controller

- * After disconnecting the Teaching Pendant from the PCON/ACON/SCON controller with the AUTO/MANU switch, always turn the AUTO/MANU switch to AUTO.

- * For the PCON/ACON/ERC2 controller without AUTO/MANU switch, always set the TP Operation Mode to “Monitor 2” before disconnecting the Teaching Pendant from the controller.
(Refer to “8.10 TP Operation Mode.”)
(Note) When the controller is set by connecting the Teaching Pendant to ERC2, the conditions shown below occur.
When the controller is set by connecting the Teaching Pendant to the gateway unit/SIO converter, the conditions shown below occur.
 - If the Teaching Pendant is disconnected while the setting of “Teach 1” or “Teach 2” remains, I/O will become invalid and control from PLC will become impossible.
 - If the Teaching Pendant is disconnected while the setting of “Monitor 1” remains, the maximum speed will become the safety speed set for the parameter regardless of a command from PLC.

Support Models

Versions of the Easy Type Teaching Pendant RCM-E which have started support for each model are as follows.

Table 1 List of Support Models

Model Name	Support Started Version
RCP * ¹	V1.00
RCS * ¹	V1.31
E-Con * ¹	V1.44
RCP2 * ¹	V1.61
ERC * ¹	V1.61
ERC2	V2.00
PCON	V2.00
ACON	V2.00
SCON	V2.00

*1: This Teaching Pendant also supports the RCP, RCS, E-Con, RCP2, and ERC controllers.

* Confirm the connected model and version of this application (8.1 Initial Screen During Power-UP).
If any unsupported model is connected, it may operate unexpectedly.

* The software reset function is effective for models corresponding to 1.63 or later of the support started version.

* ERC2, PCON, ACON, or SCON cannot be used by linking to any model of those shown in *1.

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1. Foreword

Thank you very much for purchasing the Easy Type Teaching Pendant (RCA-P) for the Robo Cylinder Controller. Without knowing beforehand how to correctly use or operate the Easy Type Teaching Pendant, not only will the user be unable to take full advantage of all the functions built into this product but the user might also inadvertently cause damage to the Controller or shorten its life. Please carefully read this manual as well as other manuals pertaining to the product to acquire an understanding of the proper method of handling and operating the controller. Keep this manual handy so that you can refer to the appropriate sections as the need arises.

For the actuator and controller to be used, be sure to refer to the Instruction Manuals attached to the products.

<p>Caution: Do not edit position data while the actuator is operating by PLC, etc. Also, do not edit any position number not actually operated.</p>
--

2. Before You Begin

- (1) Please read this manual carefully to operate the controller properly.
- (2) You are not allowed to reproduce this manual or any portion thereof without permission.
- (3) For any handling and operating methods other than those described in this Instruction Manual, interpret them as “don’t” or “can’t.”
- (4) We cannot accept any responsibility for possible damage resulting from the use of this manual.
- (5) We reserve the right to change the information contained in this manual without prior notice.

3. Safety Precautions

- (1) Use a genuine product specified by us for wiring between the actuator and controller.
- (2) Stand clear of the operating range of the machine when it is in motion or is ready to operate. Surround the system with safety partitions if there is a possibility that people can enter the area where the machine is being used.
- (3) When assembling, adjusting, or performing maintenance on the machine, always disengage the power supply to the controller. During work, display a sign stating work in progress where it is readily visible. Also, keep the power cable close to the operator so that another person cannot inadvertently switch on the power. Alternatively, lock the power plug or receptacle and direct the operator to hold the key or prepare a safety plug.
- (4) When more than one person is working on the system, agree on signals beforehand to ensure everyone's safety before beginning work. In particular, when doing work involving axis movement, always call out for everyone's safety regardless of whether power is ON or OFF, or the axis is to be mechanically driven or manually moved.
- (5) When the user needs to lengthen the cables, check the wiring carefully to make sure it is correct before turning the power ON since miswiring can lead to misoperation.

4. Warranty and Scope of Warranty

The Easy Type Teaching Pendant undergoes stringent testing before it is shipped from our factory. IAI provides the following warranty.

1. Warranty Period

The warranty period shall be either the following period, whichever is reached first.

- 18 months after our shipment
- 12 months after delivery to the place designated by you

2. Scope of Warranty

If within the period specified above, a breakdown occurs while operating the controller under normal conditions and is clearly the responsibility of the manufacturer, IAI will repair the unit at no cost. However, the following items are not covered by this warranty.

- Faded paint or other changes that occur naturally over time.
- Consumable components that wear out (such as a cable).
- Unit seems to be noisy or similar impressions that do not affect machinery performance.
- Damage resulting from improper handling or use.
- Damage resulting from user error or failure to perform proper maintenance.
- Damage resulting from the use of any part other than our genuine parts.
- Any alterations not authorized by IAI or its representatives.
- Damage caused by fire and other natural disasters or accidents.

The warranty pertains to the purchased product itself and does not cover any loss that might arise from a breakdown of the product. Any repairs will be done at our factory.

3. Service

The purchase price of the product does not include programming or expenses for sending technicians to the customer's site. Even if the product is still under the warranty period, separate charges will be assessed for the following services.

- Inspection and maintenance.
- Technical guidance and technical training in operating instructions.
- Technical guidance and technical training on program-related matters such as program creation.

5. Application Environment

- In order to avoid breakdown, please do not apply any type of machinery impact to the Easy Type Teaching Pendant.
- Always hold onto the entire Easy Type Teaching Pendant Body so that the Easy Type Teaching Pendant Cable does not get pulled by unwanted cables.

Caution: This Easy Type Teaching Pendant is designed exclusively for IAI RC Controller, and should not be used to connect with other devices.

Caution: Turn the controller front side PORT switch OFF before connecting to controller equipped with a PORT switch.

6. Easy Type Teaching Pendant Functions and Specifications

This Easy Type Teaching Pendant was created exclusively for the RCP, RCS, E-Con, RCP2, ERC, ERC2, PCON, ACON, and SCON Controllers.

Through the communication between the controller, the RC Teaching Pendant is designed to function as a Display Operation.

Unit to edit or display the data (common data, move point data, etc.,) that is stored inside the controller, as well as to execute teaching without using the PC Interface Software.

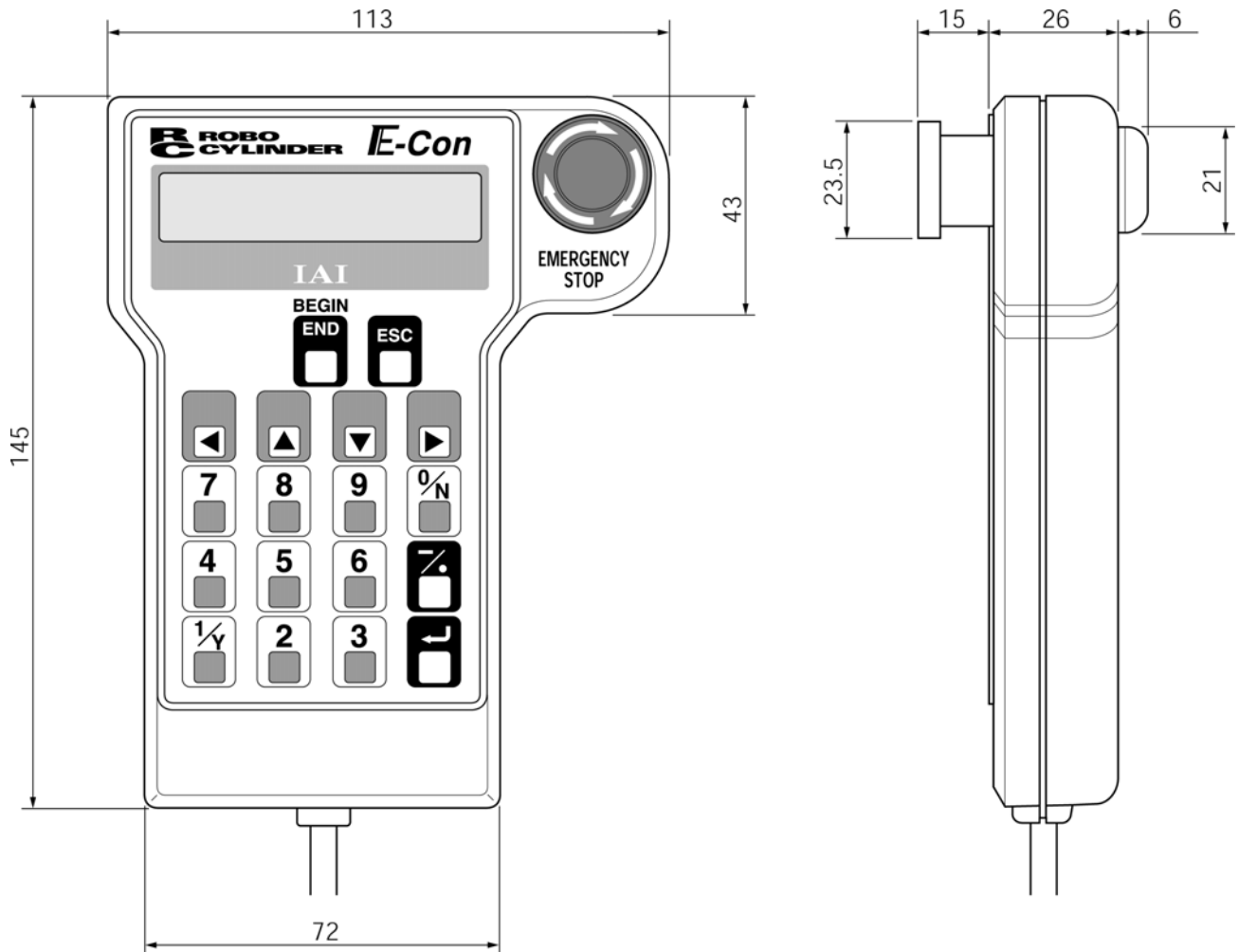
LCD: Horizontal 16 characters Vertical 2 lines

6-1 Specifications

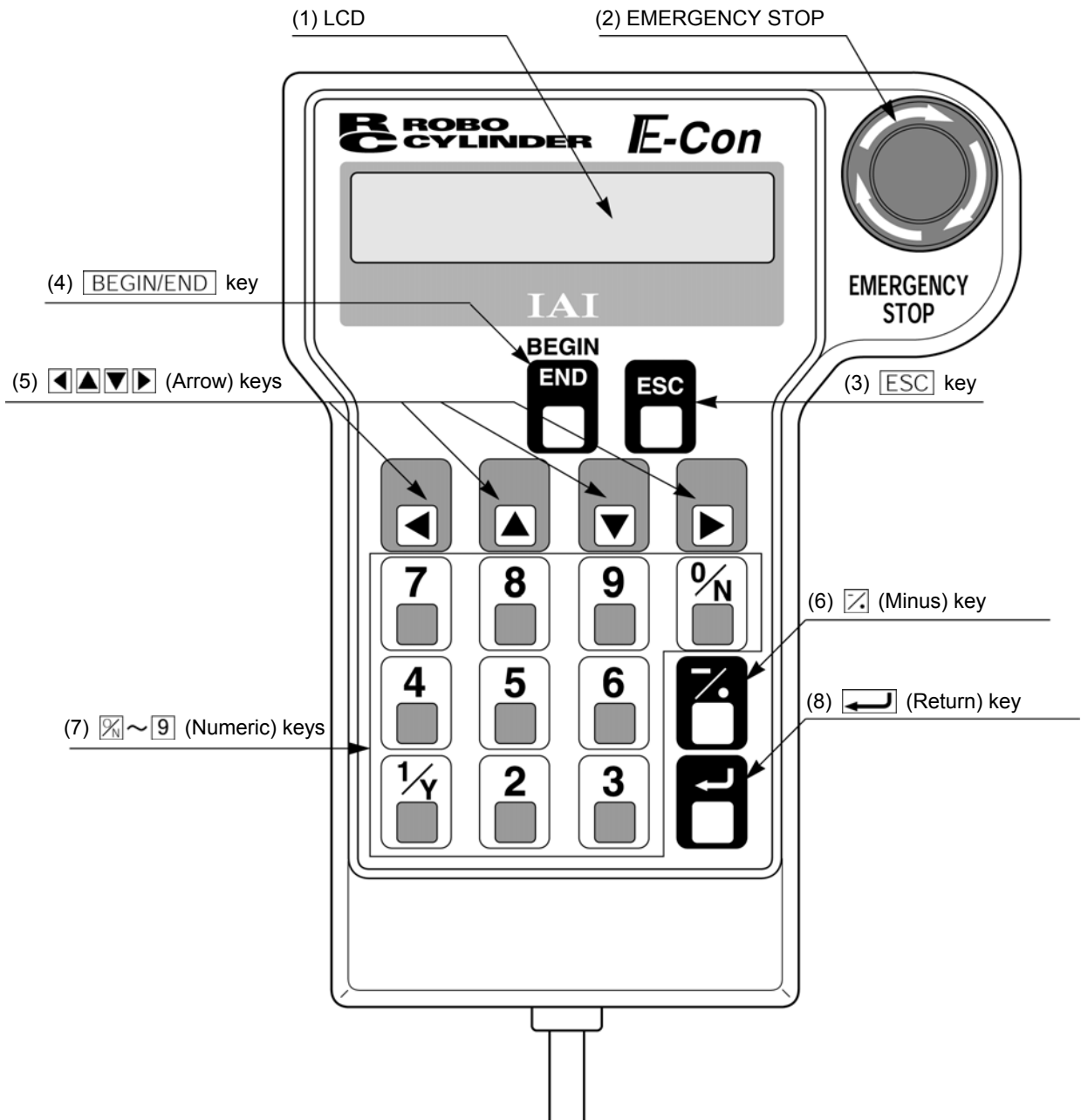
Item	Specification
Ambient Temperature & Humidity	Temperature: 0°~40°C Humidity: 85% RH or less * RH relative humidity
Operating Environment	Free of corrosive gas, especially, no excessive dust
Weight	400g
Cable Length	5m

6-2 External View

External Dimensions



6-3 Description of Each Part



(1) LCD Display

This is a liquid crystal display with a maximum of horizontal: 16 characters per column, and vertical: 2 columns per row.

This displays edit and teaching contents of various set values.

(2) EMERGENCY STOP

This switch connects serially with the controller emergency stop signal line. Once pushed down, this switch will be in an emergency stop status and the power supply to the motor will be cut off (normally, closed: b contact).


(* For information on the Emergency Stop Line and its status, please refer to the RC Robo Cylinder Operating Manual.)

Caution: If multiple controllers are connected using link cables, the EMERGENCY STOP switch is enabled only for the axis of the controller which is connected to the Teaching Pendant.

Caution: For the RCP2-CG (cutout relay external type) and ERC/ERC2 series, the EMERGENCY STOP switch is enabled only when the emergency stop circuit is externally installed. Always read the operating manual of the controller carefully.

(3) key

- Although Teaching Pendant operation is composed of several screens, using this key will return the user to the previous screen.

When you don't understand the operation, undo the operation by pressing the  key.

(4) key

- By pressing this key for more than 2.5 seconds, the screen will change into the "BEGIN/END" screen and you will be able to reconnect the axis and execute Teaching Pendant configuration.
- If entering data via key pad, you may cancel midway using this key.
- You may clear error warning.
- When an error occurs, a message for this error will appear at the very bottom of the display screen. Use this key to clear the error and to clear this message.



(5) (Arrow) keys:



Every time you press the cursor key of the Selection Display Column Selection and the cursor Move key of the Position Display Table Main

Display Area, the cursor will move to the first item. When pressed for more than one second, the cursor will move consecutively. When the content display is composed of more than two screens (position table and monitor display), these keys scroll to the next screen.


- This is used for selection of the mode, the contents of data and changing position No.

(6)  (Minus) key

- Position Table Column: When you push this in an area such as positioning width which allows minus input, the key functions as the “-” (minus), and the rest as “.” (point). When you input either  or  in the beginning of the number, within the proper area, the key will automatically recognize it as 0.

(7) ~ (Numeric) keys

- This key is used for numeric input.

(8)  (Return) key

- This is used for data input and operation confirm.

7. Connection With the Controller

7-1 Connection with the Easy Type Teaching Pendant

- (1) Connect the Easy Type Teaching Pendant Cable to the “PORT IN” connector which is located on the front of the controller. Always turn OFF the controller Port Switch first before connecting with regard to a controller equipped with a PORT switch.
- (2) After connecting, turn the controller PORT Switch ON with regard to a controller equipped with a PORT switch.

7-2 How to Disengage the Easy Type Teaching Pendant

Hold down the BEGIN/END key which is located in the upper of the key pad. Select “Complete” to finish. Afterwards, turn the controller front SW side to OFF, and remove the Data input pendant connector.

Afterwards, turn the controller front PORT switch to OFF, and remove the Easy Type Teaching Pendant connector with regard to a controller equipped with a PORT switch.

Operation:

1. Hold down the **BEGIN/END** key for more than 2.5 seconds.
2. Use the Arrow keys to select “Complete” Screen, and then press the Return key.
3. Turn the RC Controller PORT SW OFF with regard to a controller equipped with a PORT switch.
4. Remove the Easy Type Teaching Pendant connector.

Caution: In the case of PCON, ACON, SCON, or ERC2, an instantaneous stop will be made when the Teaching Pendant is disconnected. However, this is not an error.

Caution: In the case of the PCON, ACON, or ERC2 controller not having the AUTO/MANU switch, set the TP Operation Mode to “Monitor 2” before disconnecting the Teaching Pendant from the controller. (Refer to “8.10 TP Operation Mode.”)

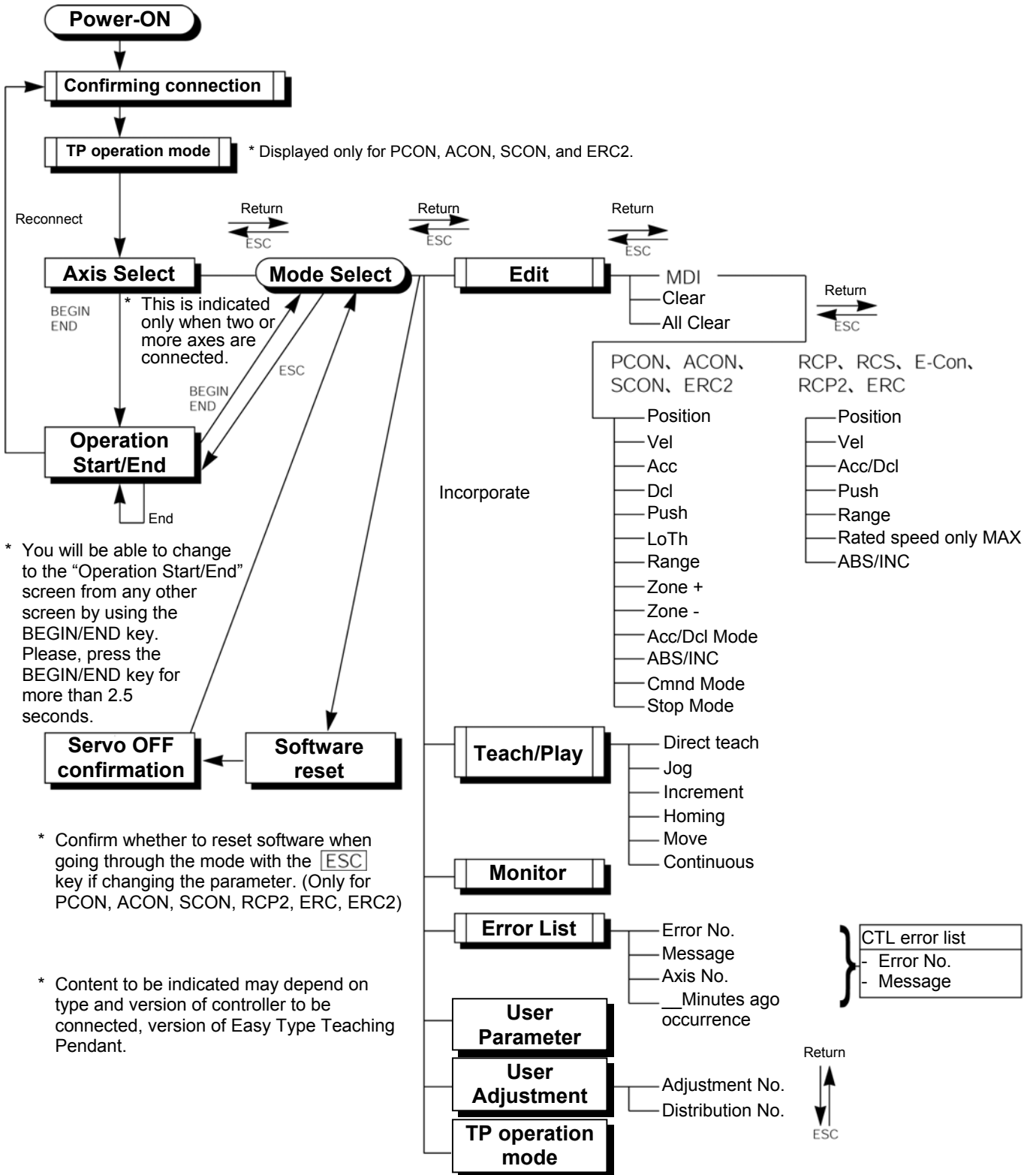
In the case of ERC2 or when controller setting is made by connecting the Teaching Pendant to the gateway unit or SIO converter:

- If the Teaching Pendant is disconnected while the setting of “Teach 1” or “Teach 2” remains, I/O will become invalid and control from PLC will become impossible.
- If the Teaching Pendant is disconnected while the setting of “Monitor 1” remains, the maximum speed will become the safety speed set for the parameter regardless of a command from PLC.

8. Operation

(1) Positioner (PCON-PL/PO, ACON-PL/PO, SCON: Mode other than the Pulse Train Mode)

The total picture of operations performed with the Easy Type Teaching Pendant has the tree structure as shown below. To return to the previous screen, press the ESC key.



* Only PCON, ACON, SCON and ERC2 are allowed.

8-1 Initial Screen During Power - UP

When power is connected to the controller and the controller PORT switch is ON, power is supplied to the Easy Type Teaching Pendant and operation starts.

Once the PORT switch on the controller equipped with the PORT switch is ON, power is supplied to the Easy Type Teaching Pendant and operation will begin.

Upon power-on, the LCD display screen (hereinafter called the “screen”) displays the Easy Type Teaching Pendant software version as follows:

Confirming connection			
IAI	RE	ST	V. 2.00

Once the RCP, RCS, E-Con, RCP2 and ERC controller connections are complete, the screen will automatically move to the TP operation mode selection screen.

If a number of RCP, RCS, E-Con, RCP2, ERC controllers are connected, the screen will automatically move to the controller select screen.

T P	O p M o d e	A . 0 0
S l c t (← , →)	:	T e a c h 1

Fig. 8.2 TP operation mode selection screen

The TP operation mode is selected from the following four menus.

- Teach 1
 - PIO not allowed: It is allowed to write position data and parameters, etc., in the controller and command for actuator operation system.
 - With safety speed: The maximum speed is the safety speed set for the parameter regardless of the position data.
- Teach 2
 - PIO not allowed: It is allowed to write position data and parameters, etc., in the controller and command for actuator operation system.
 - Without safety speed: It is allowed to move at a speed registered on the position data.
- Monitor 1
 - PIO allowed: Only monitoring is allowed. It is not allowed to write position data and parameters, etc., in the controller.
 - With safety speed: The maximum speed is the safety speed set for the parameter regardless of the command from the PLC.
- Monitor 2
 - PIO allowed: Only monitoring is allowed. It is not allowed to write position data and parameters, etc., in the controller.
 - Without safety speed: It is allowed to move at a speed as commanded from the PLC.

8-2 Controller Selection (when using multiple units)

In the case of multiple units connected serially via the communication line, the axis selection screen will be displayed. For a single unit, since there is no need to select the axis, the first screen below will not appear (refer to Section 8.3 entitled Operational Mode Selection of this manual). The content explained here will be based on operation of the selected axis (controller). In addition, the controller can connect up to 16 units. However, it is impossible to link a group of PCON, ACON, SCON, ERC2 controllers with RCP, RCS, E-Con, RCP2 and ERC controllers for use.

Display a controller to be used, and further press the Return key. The selection is confirmed, and "8.3 Operation Mode Selection" will appear on the screen.

Slct Axis
* Axis No. 00 (PCON)



Using the keys, select the data inputting axis (controller), and determine with the Return key. Only the connecting axis will be displayed.

Slct Axis
* Axis No. 01 (PCON)



↑ Axis number 1



Slct Axis
* Axis No. 02 (PCON)



← Type of controller will be displayed.

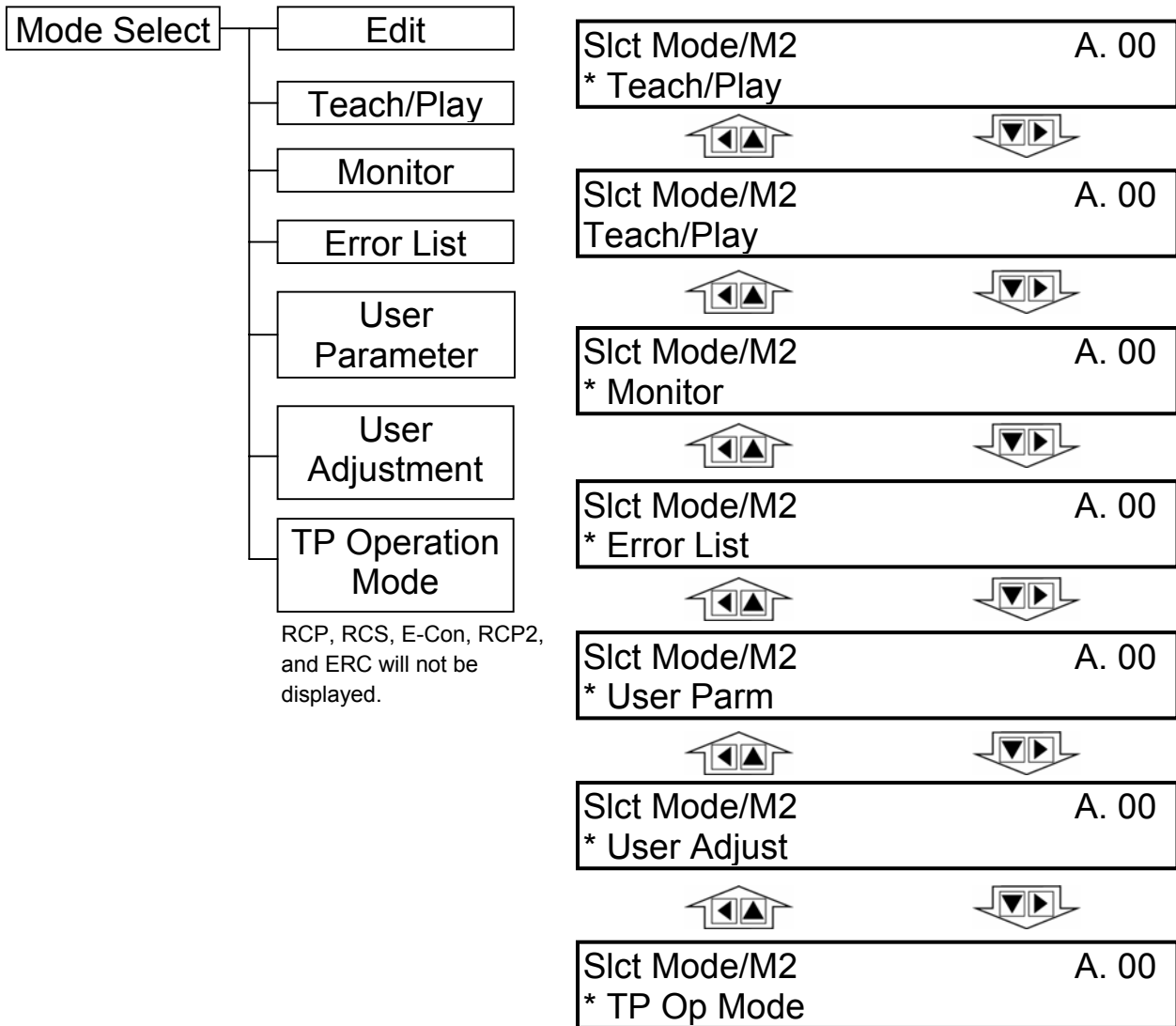
•
•
•

Caution: In the case of a controller with the PORT switch, when power is supplied with the PORT switch ON and power is present on the Easy type teaching pendant, only powered controllers will be detected.

The content explained hereinafter will be based on operation in response to a selected axis (controller).

8-3 Operation Mode Selection

RCP, RCS, E-Con, RCP2 and ERC will be displayed as T2.
PCON, SCON, ACON and ERC2 will be displayed as M2.



RCP, RCS, E-Con, RCP2, and ERC will not be displayed.

Display screen

“* TP Operation Mode” will not be displayed for RCP, RCS, E-Con, RCP2, and ERC.

For the modes, select one of the 7 options as it appears on the above screen.

To select, move the keys to the mode desired and confirm using the Return key.

Category of Modes

1. * Edit Edit and numeric input function for position data table
 Note: Not displayed in the case of the pulse sequence modes of
 PCON-PL/PO, ACON-PL/PO and SCON.
2. * Teach/Play Move and teach an actuator
3. * Monitor RC Controller status display
4. * Error list Alarm content detailed display
5. * User Parameter Setting of axis zone signal output range and axis
6. * User Adjustment Setting for enabling or disabling of temporary stop (hold) input and RC
 controller.
7. * TP Operation Mode Setting the TP operation mode
 Note: Not displayed for RCP, RCS, E-Con, RCP2 and ERC.

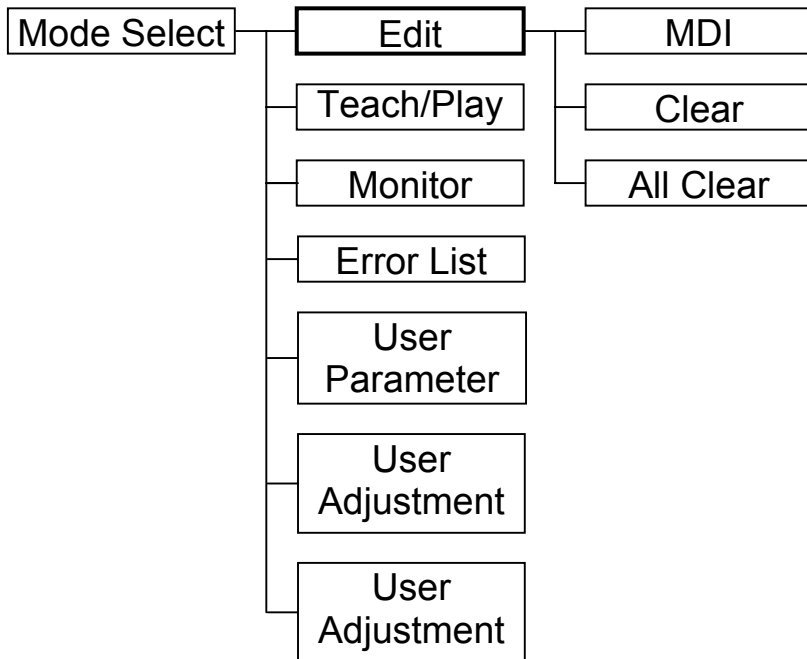
8-4 Edit

8-4-1 Edit Screen

When “*Edit” is selected on the Mode Select screen, the Edit screen is displayed.

The Teach/Play screen has the 6 items as follows:

- * Not displayed in the case of the pulse sequence modes of PCON-PL/PO, ACON-PL/PO and SCON.



RCP, RCS, E-Con, RCP2 and ERC will not be displayed.

Edit * MDI	A. 00
Edit * Clear	A. 00
Edit * All Clear	A. 00

You can change the screens by using the arrow keys (▲▼) and press the return key.

- * MDI: Numerically inputs the position data directly from the ten keys (input example: Page 28 in this manual).
- * Clear: Resets the position data (input example: Page 33 in this manual).
- * All Clear: Resets all of the 16 position data (input example: Page 34 in this manual).

The position data table will be displayed by selecting and determining MDI.

(1) PCON, ACON, SCON, ERC2

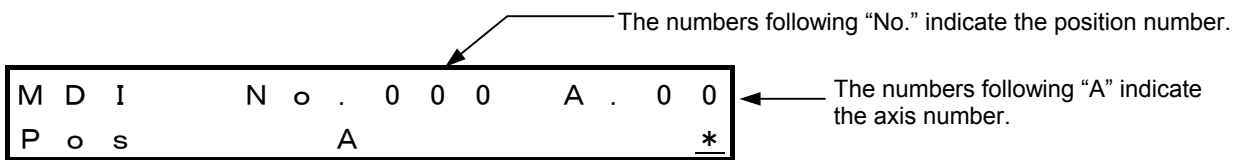
As the table below shows, in the position table, there are 13 setting contents (Position, Vel, Acc, Dcl, Push, LoTh, Range, Zone +, Zone -, Acc/Dcl Mode, ABS/INC, Cmnd Mode, Stop Mode) per each position data number.

* The pulse sequence modes of PCON-PL/PO, ACON-PL/PO and SCON will not be displayed.

No.	Position	Vel	Acc	Dcl	Push	LoTh	Range	Zone +	Zone -	Acc/Dcl Mode	ABS/INC	Cmnd Mode	Stop Mode
0	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
1	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
2	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
3	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
4	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
5	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
6	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
7	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
8	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
9	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
10	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
11	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
12	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
13	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
14	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
15	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*

Position Data Table

Use either the key or the key to execute the transfer of the contents. Use either of the keys for position number changes. In the display screen, only the single content of one position number will be displayed.



Indicates the following:





- A: ABS (Absolute Coordinate Assign)
- I: INC (Relative Coordinate Assign)

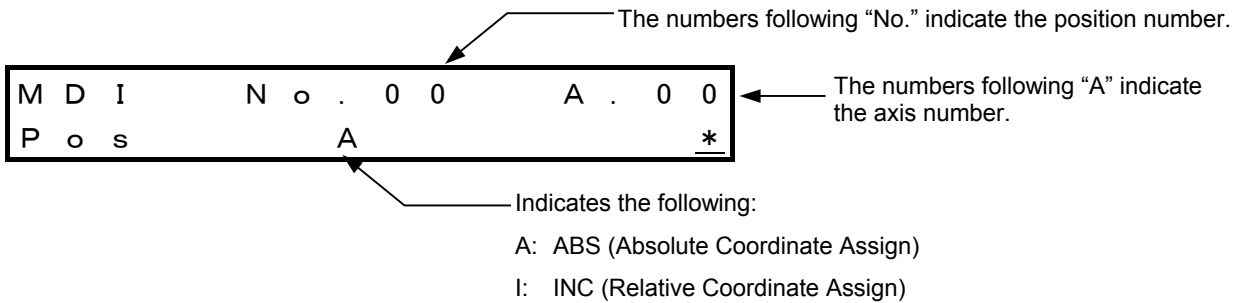
(2) RCP, RCS, E-Con, RCP2, ERC

As the table below shows, in the position table, there are 7 setting contents (Position, Vel, Acc/Dcl, Push, Range, Acc only MAX, and ABS/INC) per each position data number.

No.	Position	Vel	Acc/Dcl	Push	Range	Acc only MAX	ABS/INC
0	*	* mm/s	* G	* %	* mm	*	0
1	*	* mm/s	* G	* %	* mm	*	0
2	*	* mm/s	* G	* %	* mm	*	0
3	*	* mm/s	* G	* %	* mm	*	0
4	*	* mm/s	* G	* %	* mm	*	0
5	*	* mm/s	* G	* %	* mm	*	0
6	*	* mm/s	* G	* %	* mm	*	0
7	*	* mm/s	* G	* %	* mm	*	0
8	*	* mm/s	* G	* %	* mm	*	0
9	*	* mm/s	* G	* %	* mm	*	0
10	*	* mm/s	* G	* %	* mm	*	0
11	*	* mm/s	* G	* %	* mm	*	0
12	*	* mm/s	* G	* %	* mm	*	0
13	*	* mm/s	* G	* %	* mm	*	0
14	*	* mm/s	* G	* %	* mm	*	0
15	*	* mm/s	* G	* %	* mm	*	0

Position Data Table

Use either the  key or the  key to execute the transfer of the contents. Use either of the   keys for position number changes. In the display screen, only the single content of one position number will be displayed.



8.4.2 Position Data Table Contents for PCON, ACON, SCON, and ERC2

The setting items of the position data table are No., Position, Vel, Acc/Dcl, Push, Range, LoTh, Zone+, Zone-, AccDcl Mode, Cmnd Mode, and Stop Mode. They are displayed in 10 screens.

The items of Zone+, Zone-, AccDcl Mode, and Stop Mode are enabled (ON) or disabled (OFF) according to the controller type.

List of ON/OFF of Position Table According to Model

Position Table	Zone +/-		AccDcl Mode			Stop Mode	
			Trapezoid	S-shape	First-order Delay	Full Servo	Auto Servo OFF
ERC2	<input type="radio"/>	PIO pattern: 3	<input type="radio"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	<input type="radio"/>
ERC2-SE	<input type="radio"/>	-	<input type="radio"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	<input checked="" type="checkbox"/>
PCON-C/CG/CF	<input type="radio"/>	PIO pattern: 0, 1, 2, 4, 5	<input type="radio"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	<input type="radio"/>
-CY	<input type="radio"/>	PIO pattern: 1	<input type="radio"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	<input type="radio"/>
-SE	<input type="radio"/>	-	<input type="radio"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	<input checked="" type="checkbox"/>
ACON-C/CG	<input type="radio"/>	PIO pattern: 0, 1, 2, 4, 5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-CY	<input type="radio"/>	PIO pattern: 1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-SE	<input type="radio"/>	-	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>
SCON positioner	<input type="radio"/>	PIO pattern: 0, 1, 2, 4, 5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

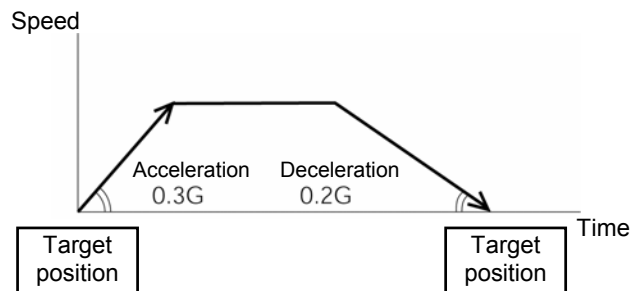
- (1) No. Indicates the position data number.
 To specify relative coordinates, move the cursor here and press the minus key. The “=” sign will appear between No. and Position.
 By pressing the minus key again, “=” disappears and the screen returns to absolute coordinates.

Warning: Always specify absolute coordinates for the 3-point type of PCON-C/CG, ACON-C/CG, and SCON-C and the proximity switch type of PCON-CY and ACON-CY.
 If you specify relative coordinates, a position data error will occur.

- (2) Position: Input the target position to move the actuator to, in [mm].
- Absolute Coordinates:
 Input the target location by determining the distance between the original point and target position. No negative value can be input.
 - Relative Coordinates:
 Input the target location by determining the distance between the current position and target position. Any negative value can be input (if coordinates are in the negative direction). In this case (during negative direction of the display coordinate), first select Relative Positioning using (10) ABS/INC.

Caution: In the case of PCON, ACON, SCON, or ERC2, there are cases where the input value to “Push” may be rounded off to a multiple of the minimum resolution of the controller (during data acquisition from the controller).

- (3) Vel: Input the speed at which the actuator will be moved, in [mm/sec].
The initial value will depend on the actuator type.
- (4) Acc/Dcl: Input the acceleration/deceleration at which the actuator will be moved, in [G].
Basically, use acceleration/deceleration within the catalog rated value range.
The input range allows larger value input than the catalog rated values, on the assumption that the tact time will be reduced if the transfer mass is significantly smaller than the rated value.
Make the numeric value smaller if transfer work vibrates and causes trouble during acceleration/deceleration.



The acceleration will become sudden if the numeric value is made larger, and it will become gradual if the numeric value is made smaller.

Caution: Enter appropriate values for Vel and Acc/Dcl in such a way as to prevent excessive impact or vibration from being applied to the actuator in consideration of the installation conditions and the shape of transferred work by referring to the “List of Actuator Specifications” in the Appendix.
Increasing such values largely relates to the transfer mass and the actuator characteristics vary depending on the model, consult IAI regarding the input-limiting values.

- (5) Push:
- Select the positioning operation or push operation.
The default value is “0.”
0: Normal positioning operation
Other than 0: Indicates the current-limiting value and indicates the push operation.
- (6) LoTh:
- This field is invalid.
The default value is 0.

(7) Range:

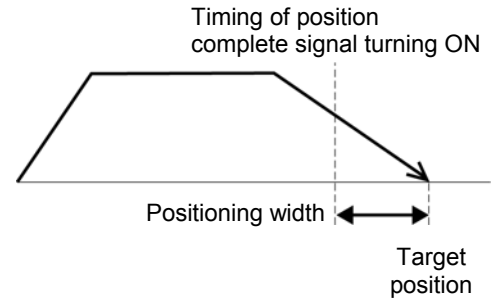
- The “positioning operation” and “push operation” have different meanings.

Positioning operation:

It defines the distance to the target position from a position at which the position complete signal turns ON.

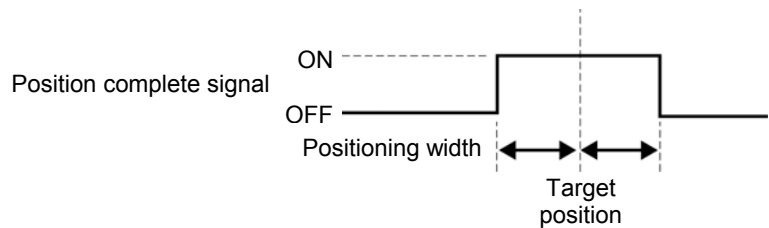
The default value is 0.1 mm.

Since increasing the positioning width value hastens the next sequence operation, it becomes a factor for tact time reduction. Set the optimum value by considering the balance of the entire equipment.



However, it defines the width of the position complete signal for the 3-point type of PCON-C/CG, ACON-C/CG, and SCON and the proximity switch type of PCON-CY and ACON-CY.

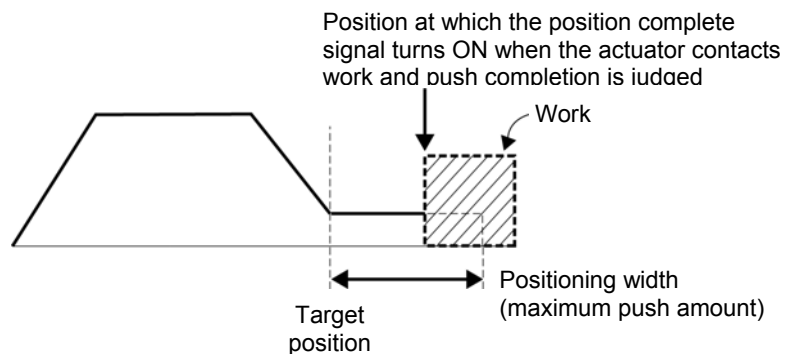
3-point type and proximity switch type



Push operation:

It defines the maximum push amount from the target position in the push operation.

Set the positioning width in such a way as to prevent positioning completion before the actuator contacts work by considering mechanical variations of work.



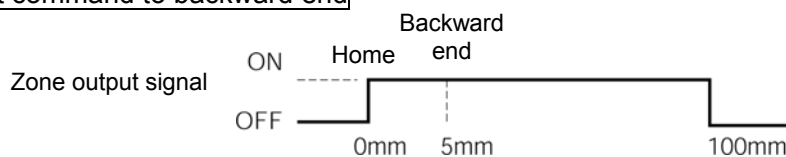
(8) Zone +/-:

- It defines the zone where the zone output signal of the standard type turns ON. Individual setting is available for each target position to give flexibility.

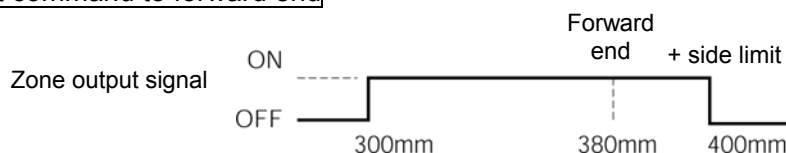
[Setting example]

No.	Position [mm]	Zone+ [mm]	Zone- [mm]	Comment
0	5.00	100.00	0.00	Backward end
1	380.00	400.00	300.00	Forward end
2	200.00	250.00	150.00	Midpoint

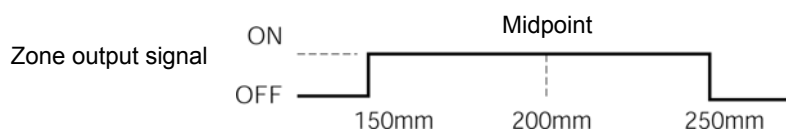
Movement command to backward end



Movement command to forward end



Movement command to midpoint



(9) Acc/Dcl Mode:

- It defines the acceleration/deceleration characteristics.

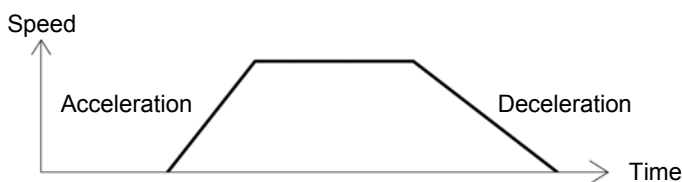
The default value is 0.

0: Trapezoid pattern

1: S-shaped motion

2: First-order delay filter

Trapezoid pattern

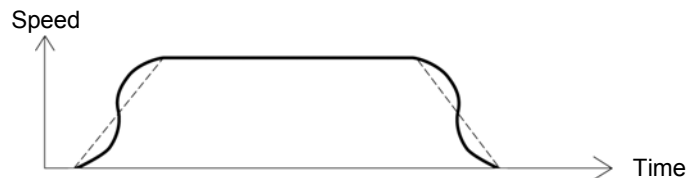


* Set the acceleration and deceleration in the "Acc" and "Dcl" fields of the position table.

S-shaped motion

A curve, which is gradual at the beginning of acceleration but rises sharply halfway, is drawn.

Use it in the applications for which you want to set the acceleration/deceleration high due to tact time requirement but desire a gradual curve at the beginning of movement or immediately before stop.



* Set the degree of the S-shaped motion with the parameter No. 56 [S-shaped motion ratio setting]. The setting unit is % and the setting range is between 0 and 100.

(The above is the image graph when 100% setting is made.)

If "0" is set, the S-shaped motion becomes invalid.

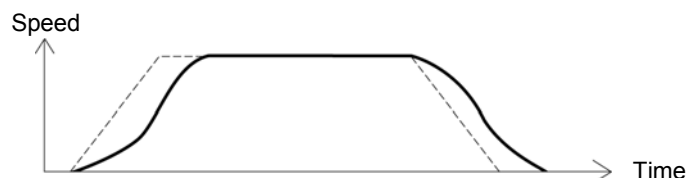
However, it will not be reflected in jogging/increment movement by PC or Teaching Pendant operation.

(Note) It cannot be set for the ERC2 or PCON controller. The parameter No. 56 is reserved.

First-order delay filter

More gradual acceleration/deceleration curves are drawn than the linear acceleration/deceleration (trapezoid pattern).

Use this in the applications by giving micro vibrations to work during acceleration/deceleration not desired.



* Set the degree of the first-order lag with the parameter No. 55 (constant for the position command first-order filtering). The setting unit is 0.1 msec and the setting range is between 0.0 and 100.0.

If "0" is set, the first-lag filter will become invalid.

However, it will not be reflected in jogging/increment movement by PC or Teaching Pendant operation.

(Note) It cannot be set for the ERC2 or PCON controller. The parameter No. 55 is reserved.

- (10) ABS/INC - Select either the absolute or incremental positioning.
- 0: Absolute positioning (ABS)
 - 1: Incremental positioning (INC)
- The default value is absolute positioning (ABS).

Warning: Always specify absolute coordinates for the 3-point type of PCON-C/CG, ACON-C/CG, and SCON-C and the proximity switch type of PCON-CY and ACON-CY.
If you specify relative coordinates, a position data error will occur.

(11) Cmnd Mode:

- This field is invalid.
The factory setting is 0.

(12) Stop Mode:

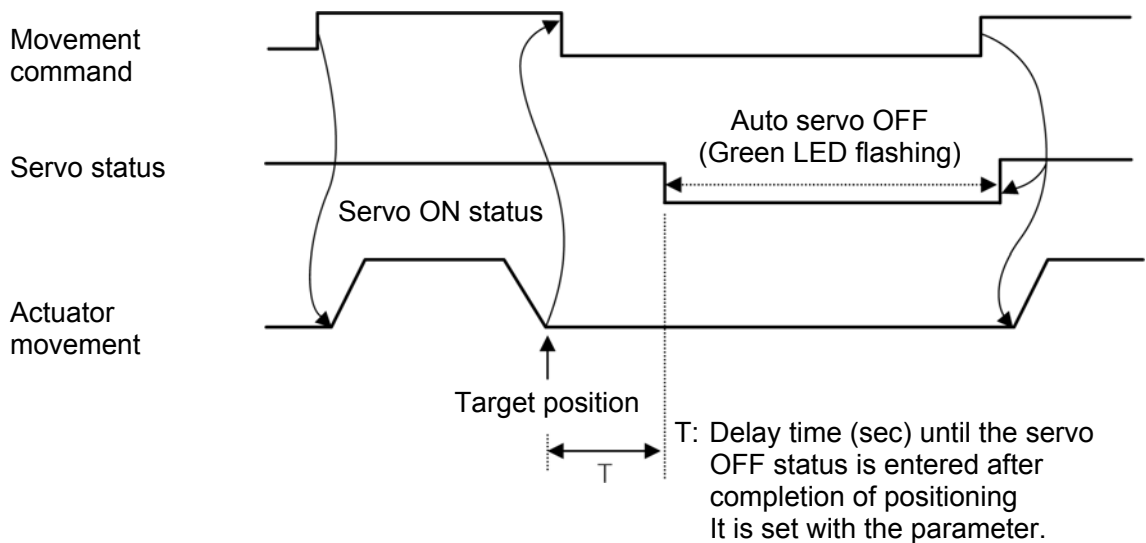
- It defines the power saving method on standby after completion of positioning to the target position set in the "Position" field of the position number.
 - 0: Invalid power saving method * The default setting is 0 (invalid).
 - 1: Auto servo OFF method. Delay time defined with the parameter No. 36
 - 2: Auto servo OFF method. Delay time defined with the parameter No. 37
 - 3: Auto servo OFF method. Delay time defined with the parameter No. 38
 - 4: Full servo control method

Full servo control method

The holding current can be reduced by servo-controlling the pulse motor.
 The degree of reduction varies depending on the actuator model, load condition, etc., but the holding current decreases approximately by a factor of 2 to 4.
 No displacement occurs since this method maintains the servo ON status.
 The actual holding current can be checked on the monitoring screen of PC-compatible software.


Auto servo OFF method

When a given length of time has elapsed after completion of positioning, the servo OFF status is automatically entered.
 (Since the holding current does not flow, the power consumption can be saved by the same amount.)
 When a movement command is subsequently given from PLC, the status returns to the servo ON and the actuator starts to move.



8-4-3 Position Data Table Contents for RCP, RCS, E-Con, and ERC

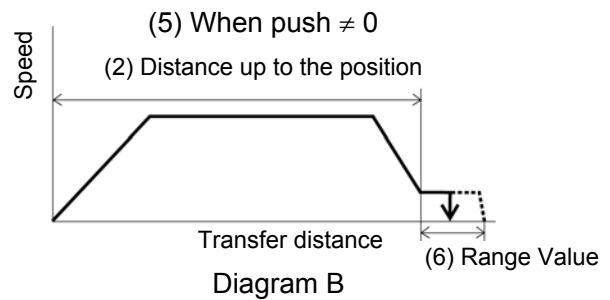
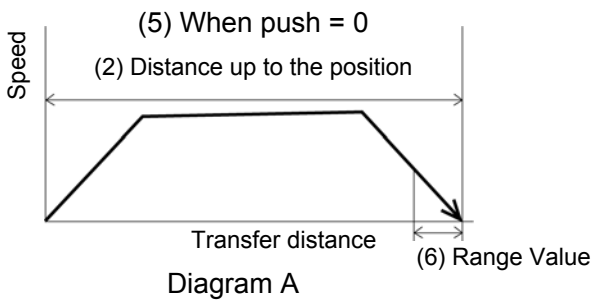
The columns for the position data table are Position, Vel, Acc/Dcl, Push, Range, Acc only MAX, and ABS/INS.

- (1) No. Shows position data No.
- (2) Position: The desired move location from home in millimeters.
 - Absolute Positioning:
Moves the actuator to the desired location in reference to the home location. Inputting negative values is not possible.
 - Relative Positioning:
Moves the actuator to the desired position in reference to the current position. Inputting negatives values is possible. In this case (during negative direction of the display coordinate), first select Relative Positioning using (7) ABS/INC.
 - * By pressing the  key once from the Position Input Screen will move the screen to ABS/INC Input Screen.

Caution: There are cases when the input value may be rounded off to the least common denominator multiple of the controller.

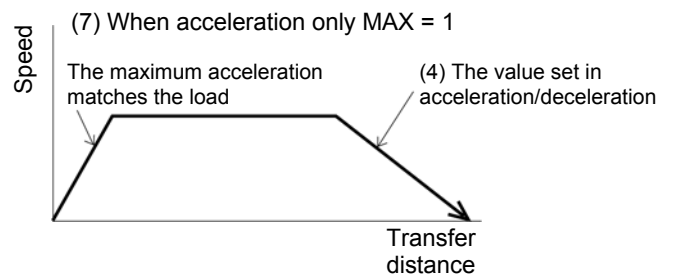
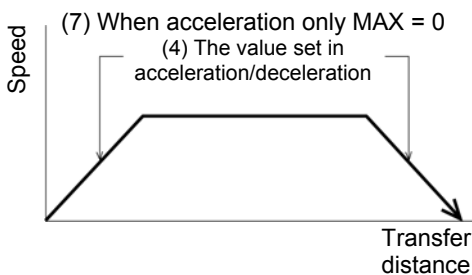
- (3) Vel
 - The speed when moving the actuator (mm/sec).
The default value will depend on the actuator type.
- (4) Acc/Dcl
 - The acceleration/deceleration setting for the move to the corresponding position (in G's).
The default value will depend on the actuator type.
- (5) Push
 - Selects the positioning mode or push mode.
The default value is set as 0.
0: Positioning Mode (normal movement)
Besides 0: Push Mode (%)
 - In the case of push mode, data number is the servo motor current control value during push.
Uses a value that matches the actuator type with a maximum value of 100%.

- (6) Range - As for the range, depending on the setting in the push as either 0 or other than 0, this function will vary. [mm]
- (A) Push = 0 (Positioning Mode)
 - The positioning mode uses range value as a location to turn ON the position complete output prior to reaching the actual data.
 - The default value will depend on the actuator type. (see diagram A).
 - (B) Push \neq besides 0 (Push Mode)
 - The push mode uses the range value as the distance of the push. [mm]
 - When the push direction is towards home, a “minus” sign should be placed in the range column.



(7) MAX Acceleration

- Selects either the assigned acceleration or the maximum acceleration. Inputs are either 1 or 0. The default value is set as 0.
- 0: Assigned acceleration
 - The value placed in (4) will be used as the actual acceleration value and deceleration value.
- 1: Maximum acceleration
 - This will automatically utilize the maximum acceleration matched to the load.
 - Deceleration remains as the assigned value in (4).



- (8) ABS/INC - Select either the absolute or incremental positioning.
- 0: Absolute positioning (ABS)
 - 1: Incremental positioning (INC)
- The default value is absolute positioning (ABS).

8-4-4 MDI Numeric Input

Method of numerically inputting the position data directly from the ten keys of the Easy Type Teaching Pendant.

In this section, we will explain an example of the input procedure according to MDI (numeric input) for PCON, ACON, SCON and ERC2.

Input the following content in Position Nos. 0 to 3.

Position No. 0	Absolute positioning mode Position 0mm
Position No. 1	Absolute positioning mode Position 50mm, Vel 100mm/s, Acc/Dcl 0.1G Range 0.2mm, Acc MAX 1
Position No. 2	Absolute push mode Position 80mm, Vel 100mm/s, Acc/Dcl 0.1G Push 40%, Range 5mm
Position No. 3	Incremental positioning mode Position 10mm, speed 20mm/s

Data not assigned utilizes default value. The example here is based on initial status during shipment (when data is all clear).

You may input data from position data table similar to the table below.

Position Data Table

No.	Position	Vel	Acc	Dcl	Push	LoTh	Range	Zone +	Zone -	Acc/Dcl Mode	ABS/INC	Cmd Mode	Stop Mode
0	0.00	125 mm/s	0.20 G	0.20 G	0 %	0 %	0.10 mm	0.00 mm	0.00 mm	0	0	0	0
1	50.00	100 mm/s	0.10 G	0.10 G	0 %	0 %	0.20 mm	0.00 mm	0.00 mm	0	0	0	0
2	80.00	100 mm/s	0.10 G	0.10 G	40 %	0 %	5.00 mm	0.00 mm	0.00 mm	0	0	0	0
3	10.00	20 mm/s	0.20 G	0.20 G	0 %	0 %	0.10 mm	0.00 mm	0.00 mm	0	1	0	0

Input the data inside the thick lined frames (see above table). The default values will be used for the data outside the thick-lined frame. By inputting the position data, the default value will be automatically input. The default values (Vel, Acc/Dcl and LoTh) will vary according to actuator machine type (in this example: RA4C Low speed type).

Slct Mode/M2 * Edit	A. 00	Using the ▲▼ keys in the Mode Select Screen, select Edit/Teach and choose using the Return key.
------------------------	-------	---

Edit * MDI	A. 00	Using the ▲▼ keys in the Edit/Teach Screen, select MDI and choose using the Return key.
---------------	-------	---

Input using position number 0.

MDI Position A	No. 000	A. 00 * _	The screen will turn into the Input Screen for Position.
-------------------	---------	-----------------	--

MDI Position A	No. 000	A. 00 0. _	Using the Numeric keys, press 0 and the Return key.
-------------------	---------	---------------	---


MDI	No. 000	A. 00
Vel	1 <u>2</u> 5	mm/s

The screen will turn into the Input Screen for Speed. The default value will be utilized as is. Since other data will use the default value, input for position number 0 will end here.
Next, position number 1 input will be executed.

Input using position number 1

MDI	No. 001	A. 00
Position A	<u>1</u>	*

↑
Position number 1

Press the  key to advance the position number to 1.

MDI	No. 001	A. 00
Position A	<u>5</u> 0	

The screen will turn into the Input Screen for Position. Use the Numeric keys to input 50 and then, press the Return key.

MDI	No. 001	A. 00
Vel	10 <u>0</u>	mm/s

The screen will turn into the Input Screen for Speed. Use the Numeric keys to input 100 and then, press the Return key.

MDI	No. 001	A. 00
Acc	0. <u>1</u>	G

The screen will turn into the Input Screen for Acc. Use the Numeric keys to input 0.1 and then, press the Return key.

MDI	No. 001	A. 00
Dcl	0. <u>1</u>	G

The screen will turn into the Input Screen for Dcl. Use the Numeric keys to input 0.1 and then, press the Return key.

MDI	No. 001	A. 00
Push %	<u>0</u>	%

The screen will turn into the Input Screen for Push %. The default value will be utilized as is, so press the Return key.

MDI	No. 001	A. 00
LoTh	<u>0</u>	%

The screen will turn into the Input Screen for Range. The default value will be utilized as is, so press the Return key.

MDI	No. 001	A. 00
Range		0. <u>2</u> mm

The screen will turn into the Input Screen for Range. Use the Numeric keys to input 0.2 and then, press the Return key.

MDI	No. 001	A. 00
Zone +		0.00 <u>0</u> mm

The screen will turn into the Input Screen for Zone +. The default value will be utilized as is, so press the Return key.

MDI	No. 001	A. 00
Zone -		0.00 <u>0</u> mm

The screen will turn into the Input Screen for Zone -. The default value will be utilized as is, so press the Return key.

MDI	No. 001	A. 00
Acc/Dcl		<u>0</u>

The screen will turn into the Input Screen for Acc • Dcl. The default value will be utilized as is, so press the Return key.

MDI	No. 001	A. 00
ABS → 0	INC → 1	<u>0</u>

Input for position number 1 will end here.
Next, position number 2 input will be executed.

Input using position number 2

MDI	No. 002	A. 00	Press the key to advance the position number to 2.
Position A	↑ Position number 2	* _	

MDI	No. 002	A. 00	The screen will turn into the Input Screen for Position. Use the Numeric keys to input 80 and then, press the Return key.
Position A		8 <u>0</u>	

MDI	No. 002	A. 00	The screen will turn into the Input Screen for Speed. Use the Numeric keys to input 100 and then, press the Return key.
Vel	1 <u>00</u>	mm/s	

MDI	No. 002	A. 00	The screen will turn into the Input Screen for Acc. Use the Numeric keys to input 0.1 and then, press the Return key.
Acc	0. <u>1</u>	G	

MDI	No. 002	A. 00	The screen will turn into the Input Screen for Dcl. Use the Numeric keys to input 0.1 and then, press the Return key.
Dcl	0. <u>1</u>	G	

MDI	No. 002	A. 00	The screen will turn into the Input Screen for Push %. Use the Numeric keys to input 40 and then, press the Return key.
Push %	4 <u>0</u>	%	

MDI	No. 002	A. 00	The screen will turn into the Input Screen for Range. Use the Numeric keys to input 5 and then, press the Return key.
LoTh	<u>0</u>	%	

MDI	No. 002	A. 00	The screen will turn into the Input Screen for Positioning Width. Use the Numeric keys to input 5 and then, press the Return key.
Range		<u>5</u> mm	

MDI	No. 002	A. 00	Input for position number 2 will end here. Next, position number 3 input will be executed.
Zone +		0. <u>00</u> mm	

Input using position number 3

MDI	No. 003	A. 00
Position A		*

↑
Position number 3

Press the ▲ key to advance the position number to 3.

Input using MDI

MDI	No. 003	A. 00
Position A		10

The screen will turn into the Input Screen for Position. Use the Numeric keys to input 10 and then, press the Return key.

MDI	No. 003	A. 00
ABS → 0	INC → 1	1

Press the ◀ key to change screen into ABS/INC Display Screen. Use the Numeric keys to input 1 and then, press the Return key.

MDI	No. 003	A. 00
Position I		10.00

↑
INC (Relative positioning)

The screen will turn into the Input Screen for Position. Press the ◀ key, then position "I" is displayed.

MDI	No. 003	A. 00
Vel	20	mm/s

The screen will turn into the Input Screen for Speed. Use the Numeric keys to input 20 and then, press the Return key.

Input for MDI will end here.

8-4-5 Clear • All Clear

In this section, we will give specific examples of how to clear data in the position table.

- (1) Clear: Resets the assigned position data.
- (2) All Clear: Resets all of 16 position data.

(1) Clear:

The Clear operation procedure is explained below. The data of any position number is cleared.

In this example, the data of position number 1 is cleared.

The position data table becomes as shown below.

No.	Position	Vel	Acc	Dcl	Push	LoTh	Range	Zone +	Zone -	Acc/Dcl Mode	ABS/INC	Cmnd Mode	Stop Mode
0	0.00	125 mm/s	0.20 G	0.20 G	0 %	0 %	0.10 mm	0.00 mm	0.00 mm	0	0	0	0
1	50.00	100 mm/s	0.10 G	0.10 G	0 %	0 %	0.20 mm	0.00 mm	0.00 mm	0	0	0	0
2	80.00	100 mm/s	0.10 G	0.10 G	40 %	0 %	5.00 mm	0.00 mm	0.00 mm	0	0	0	0
3	10.00	20 mm/s	0.20 G	0.20 G	0 %	0 %	0.10 mm	0.00 mm	0.00 mm	0	1	0	0



No.	Position	Vel	Acc	Dcl	Push	LoTh	Range	Zone +	Zone -	Acc/Dcl Mode	ABS/INC	Cmnd Mode	Stop Mode
0	0.00	125 mm/s	0.20 G	0.20 G	0 %	0 %	0.10 mm	0.00 mm	0.00 mm	0	0	0	0
1	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
2	80.00	100 mm/s	0.10 G	0.10 G	40 %	0 %	5.00 mm	0.00 mm	0.00 mm	0	0	0	0
3	10.00	20 mm/s	0.20 G	0.20 G	0 %	0 %	0.10 mm	0.00 mm	0.00 mm	0	1	0	0

Slect Mode/M2 A. 00
* Edit

In the Mode Select Screen, using the keys, select Edit and then, press the Return key.

Edit A. 00
* Clear

In the Teach/Play screen, using the keys, select Clear and then, press the Return key.

Position number 1 →

Clear? No. 001 A. 00
50.00 Y → 1 N → 0

← Position data for position number 1

Using the keys, change the position number into 1. Pressing 1 on the Numeric keys will clear position number 1 and then, the screen will return to the Edit Screen. To cancel, press 0.

In either case, the screen will return to the previous screen.

Edit A. 00
* Clear

Slect Mode/M2 A. 00
* Edit

Press the key once to return the screen to the Mode Select Screen.

(2) All Clear:

The data of all the position numbers is cleared.

The position data table becomes as shown below.

No.	Position	Vel	Acc	Dcl	Push	LoTh	Range	Zone +	Zone -	Acc/Dcl Mode	ABS/INC	Cmnd Mode	Stop Mode
0	0.00	125 mm/s	0.20 G	0.20 G	0 %	0 %	0.10 mm	0.00 mm	0.00 mm	0	0	0	0
1	50.00	100 mm/s	0.10 G	0.10 G	0 %	0 %	0.20 mm	0.00 mm	0.00 mm	0	0	0	0
2	80.00	100 mm/s	0.10 G	0.10 G	40 %	0 %	5.00 mm	0.00 mm	0.00 mm	0	0	0	0
3	10.00	20 mm/s	0.20 G	0.20 G	0 %	0 %	0.10 mm	0.00 mm	0.00 mm	0	1	0	0



No.	Position	Vel	Acc	Dcl	Push	LoTh	Range	Zone +	Zone -	Acc/Dcl Mode	ABS/INC	Cmnd Mode	Stop Mode
0	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
1	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
2	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*
3	*	* mm/s	* G	* G	* %	* %	* mm	* mm	* mm	*	*	*	*

Sltc Mode/M2 A. 00
* Edit

In the Mode Select Screen, using the keys, select Edit and then, press the Return key.

Edit A. 00
* All Clear

In the Teach/Play Screen, using the keys, select All Clear and then, press the Return key.

All Clear? A. 00
Y → 1 N → 0

Pressing 1 on the Numeric keys will clear all data and then, the screen will return to the Edit Screen. To cancel, press 0.

In either case, the screen will return to the previous screen.

Edit A. 00
* All Clear

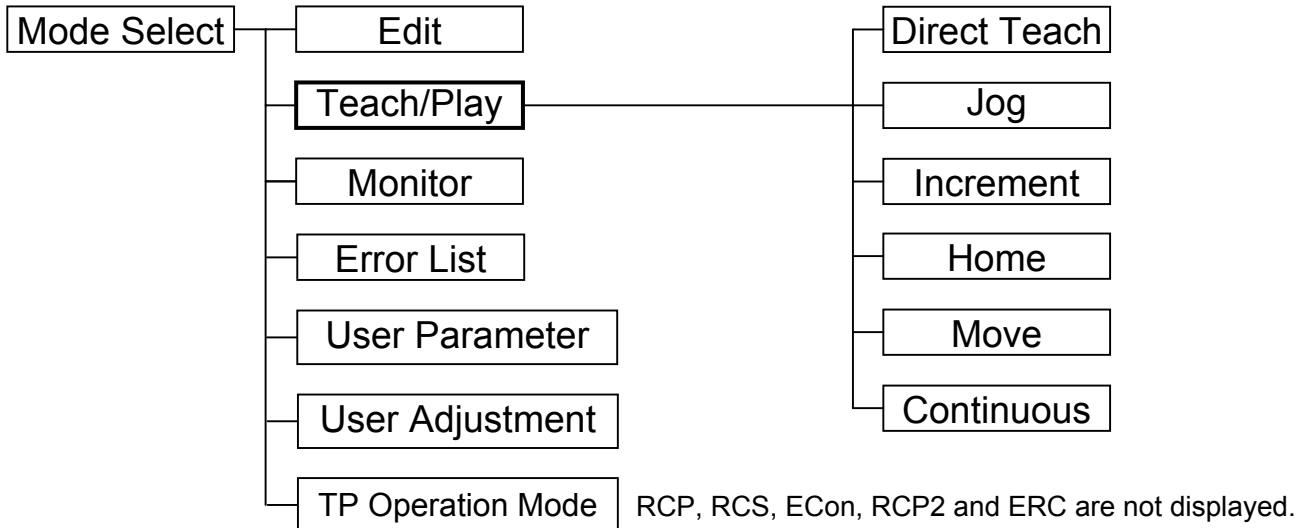
Sltc Mode A. 00
* Edit

Press the **ESC** key once to return the screen to the Mode Select Screen.

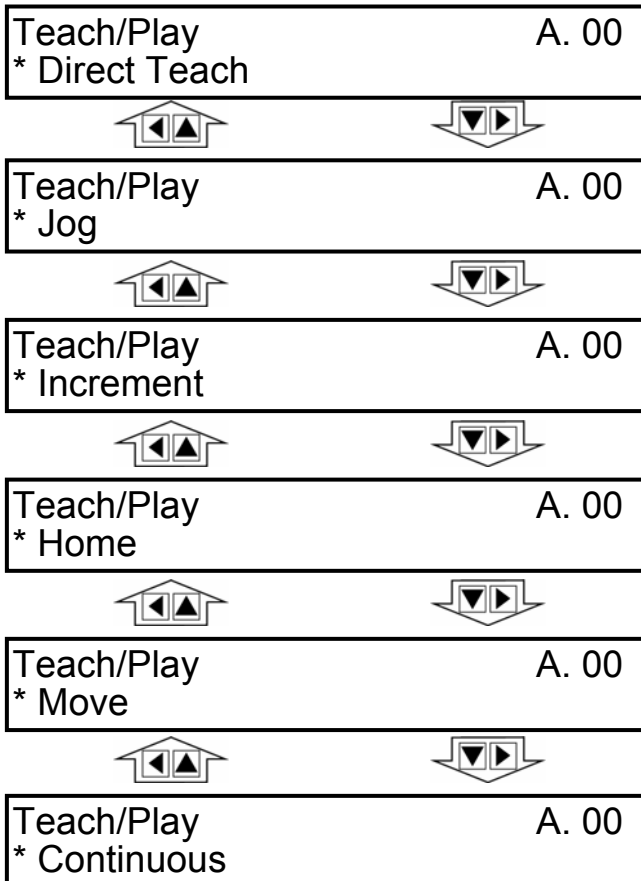
8-5 Teach/Play

8-5-1 Teach/Play Screen

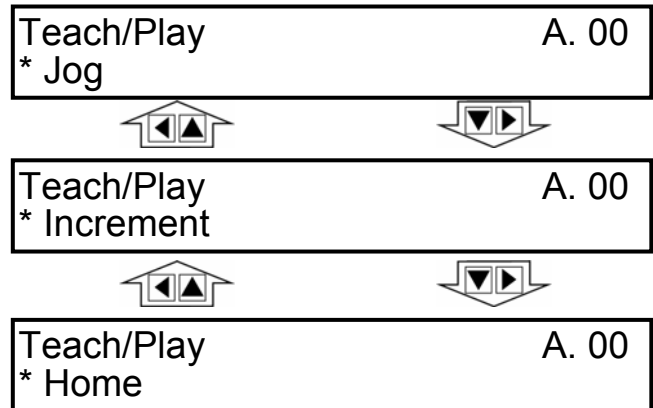
Selecting "Teach/Play" from the Mode Selection will display the Teach/Play Screen. You may execute Teach and Move the actuator using this screen. As the diagram below shows, there are six options available in the Teach/Play Screen.



Other than pulse sequence modes of PCON-PL/PO, ACON-PL/PO and SCON



Pulse sequence modes of PCON-PL/PO, ACON-PL/PO and SCON



8-5-2 Teach

Move the actuator and the current position can be incorporated into the position data table.

- (1) Direct Teach: Turn the servo controller OFF, manually move the slider to match the desired location, and read that location in the position table.
- (2) Jog: Use the arrow keys to jog to the desired location, and read that location into the position table.
- (3) Increment: Uses the arrow keys to incrementally move and read the desired location into the position table.
- (4) Home: Executes home.

Caution: You must home the unit before teaching points.

Jog and Increment before homing will allow you to move up until the end of the mechanism, therefore please do a thorough check prior to operation.

Only position data may be taught. Please use the MDI mode for all other data.

Specific examples will be provided to explain operation procedures.

(1) Direct Teach

Manually move the slider or rod to the desired position and the current position is incorporated into the position data table.

In this example, data is input for position number 4 by Direct Teach.

Slt Mode/M2 * Teach/Play	A. 00
-----------------------------	-------

Using the keys in the Mode Select Screen, select Teach/Play and choose using the Return key.

Teach/Play * Direct Teach	A. 00
------------------------------	-------

Using the keys in the Teach/Play Screen, select Direct Teach and choose using the Return key.

Direct Teach Srv OFF	A. 00 51.23F
-------------------------	-----------------

The servo is turned OFF and the current position is displayed. Under this condition, move the slider or rod by hand and determine a desired position.

Displays the current position.
* Although this is displayed even when homing is incomplete, it is not an accurate value.

(In the case of the actuator with brake, release the brake.)

After determining the desired position, press the Return key.

Position number 4

Incorporate? *	No. 004 Y → 1 N → 0	A. 00
-------------------	------------------------	-------

Change the position number to 4 using the keys.

Displays the old position data.
It is not the desired position determined in the previous screen.

Press 1 on the numeric key.

(If the slider or rod moves before pressing 1, determine a desired position again.)

To cancel the data, press 0.

Direct Teach Srv OFF	A. 00 51.23F
-------------------------	-----------------

In either case, the screen returns to the previous screen.

Slt Mode/M2 * Teach/Play	A. 00
-----------------------------	-------

Press the key twice to return the screen to the Mode Select screen.

Caution: Input any data (speed, acceleration/deceleration, etc.) other than position by MDI. When the position data is first input by the method of Direct Teach after power-on or alarm raising, it is required to have homed the actuator in advance. The Easy Type Teaching Pendant has no function of homing the actuator. Execute Direct Teach after completing homing by PLC in advance.

(2) Jog

Jog the slider or rod using the ◀▶ keys to the desired position, and incorporate the current position into the position table.

In this example, data is input for position number 5 by Jog.

Sltc Mode/M2 * Teach/Play	A. 00
------------------------------	-------

Using the ◀▲▼▶ keys in the Mode Select Screen, select Teach/Play and choose using the Return key.

Teach/Play * Jog	A. 00
---------------------	-------

Using the ◀▲▼▶ keys in the Teach/Play Screen, select Direct Teach and choose using the Return key.

Jog Vel V2	A. 00 18.90N
---------------	-----------------

You may select the jog speed and current location here. Use the ⏏ key to select the Jog speed as follows:

Displays the jog speed.
Displays the current location.
* Although this is displayed even when homing is incomplete, it is not an accurate value.

(Slow) V1 (1 mm/sec) V2 (10 mm/sec) V3 (30 mm/sec) V4 (50 mm/sec) V5 (100 mm/sec) (Fast)
Use the ◀▶ keys to move either the slider or rod to the desired location.

▶: Positive direction
◀: Negative direction

After determining the desired position, press the Return key.

In the case of pulse sequence modes of PCON-PL/PO, ACON-PL/PO and SCON, press the ⏏ key, then the Screen will change to pulse display. Numeric values are displayed in integer numbers.

Position number 5

Incorporate? *	No. 005 Y → 1 N → 0	A. 00
-------------------	------------------------	-------

Change the position number to 5 using the ▲▼ keys.

Displays the old position data. It is not the desired position determined in the previous screen.

Press 1 on the numeric keys to incorporate the current location.

Press 0 to cancel the data.

Jog Vel V2	A. 00 18.90N
---------------	-----------------

In either case, the screen returns to the previous screen. You may use this screen to continue teaching using Jog.

Teach/Play * Jog	A. 00
---------------------	-------

Press the [ESC] key to return the screen to the Teach/Play screen.

Sltc Mode/M2 * Teach/Play	A. 00
------------------------------	-------

Press the [ESC] key to return the screen to the Mode Select screen.

(3) Increment

Increment the slider or rod using the ◀▶ keys to the desired position and the current position is incorporated into the position data table.

In this example, data is input for position number 6 by Jog.

Sltc Mode/M2	A. 00
* Teach/Play	

Using the ◀▲▼▶ keys in the Mode Select Screen, select Teach/Play and choose using the Return key.

Teach/Play	A. 00
* Increment	

Using the ◀▲▼▶ keys in the Teach/Play Screen, select Increment and choose using the Return key.

Jog	A. 00
Distance 0.10	4.00N

You may select the jog speed and current location here. Use the ☒ key to select the Jog speed as follows:

(0.03 → 0.10 → 0.50)

Use the ◀▶ keys to move either the slider or rod to the desired location.

▶: Positive direction

◀: Negative direction

* Jog move is possible by pressing the ◀▶ keys for more than 2 seconds (beyond that, speed will jump up after every second). In the case that the desired location is far, approach closer to that desired location using this function, and then return to increment and do fine adjustment using the keys.

After determining the desired position, press the Return key.

Displays the increment distance.

Displays the current location.
* Although this is displayed even when homing is incomplete, it is not an accurate value.

Position number 6

Incorporate?	No. 006	A. 00
*	Y → 1	N → 0

Change the position number to 5 using the ▲▼ keys.

Press 1 on the numeric keys to incorporate the current location.

Press 0 to cancel the data.

Displays the old position data. It is not the desired position determined in the previous screen.

Increment	A. 00
Distance 0.10	4.00N

In either case, the screen returns to the previous screen. You may use this screen to continue teaching using Jog.

Teach/Play	A. 00
* Increment	

Press the [ESC] key to return the screen to the Teach/Play screen.

Sltc Mode/M2	A. 00
* Teach/Play	

Press the [ESC] key to return the screen to the Mode Select screen.

(4) Home
Executes home.

Slct Mode/M2 * Teach/Play	A. 00
------------------------------	-------

Teach/Play * Home	A. 00
----------------------	-------

Using the ◀▶▲▼ keys in the Teach/Play Screen, select Jog and choose using the Return key.

Home Return key → Execute	A. 00
------------------------------	-------

Press the Return key to execute homing.

Teach/Play * Home	A. 00
----------------------	-------

Press the **ESC** key to return the screen to the Teach/Play screen.

Slct Mode/M2 * Teach/Play	A. 00
------------------------------	-------

Press the **ESC** key to return the screen to the Mode Select screen.

8-5-3 Move

You may move towards a position registered in the position data table (1 step move) and consecutively move through the consecutive position data. In this section, the move will differ from jog and increment move used with the arrow keys. This will be a move towards a position that was registered in the position data table within the controller.

* In pulse sequence modes of PCON-PL/PO, ACON-PL/PO and SCON, move cannot be executed.

(1) Move

1 step move from the current location to the assigned position number registered in the position table.

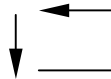
(2) Consecutive Move

Consecutive operation from the assigned position data number to the consecutive position data number until an empty location is reached.

* What is consecutive move?

In the case of the position data similar to the table below, when a consecutive move command is executed from the position No., the place where data exists consecutively will operate as one group (Example: Position No.2 → No. 3 → No. 1 → No.2 and so on).

No.	Position (mm)	Vel (mm/s)	Acc/Dcl (G)
0	*	*	*
1	10.00	20.00	0.05
2	50.00	33.00	0.11
3	100.00	100.00	0.22
4	*	*	*
5	555.55	333.00	0.22
6	666.66	444.00	0.11
7	777.77	777.00	0.07



Specific examples will be provided to explain operation procedures.

Caution: For RCP, RCS, E-con, RCP2 and ERC, complete position output is not updated at speed of 10% and 50% for both positioning mode and push mode.

The positioning complete output will not turn ON when push mode does not encounter a force.

Upon installing power or after an alarm, if you try to move before homing, the RC will home and then move to the assigned position number.

(1) Move

Consecutive operation from the assigned position data number in the position table to the consecutive position data number.

In this example, move to the position number 2.

Slt Mode/M2 * Teach/Play	A. 00
-----------------------------	-------

Using the keys in the Mode Select Screen, select Teach/Play and choose using the Return key.

Teach/Play * Move	A. 00
----------------------	-------

Using the keys in the Teach/Play Screen, select Move and choose using the Return key.

Move No. 002	A. 00 Vel 10%
-----------------	------------------

Position number →
Move speed ratio →

Position number and move speed ratio will be displayed. Changes can be made in the move speed ratio using the key (10% 50% 100%).

Use the keys to turn the moving position number into 2.

Move No. 002	No. 006 A. 00 10.25N
-----------------	----------------------------

Current position will display for numeric values that have N at the end. N indicates servo ON.

The numeric value indicated inside the dotted box can be changed by pressing 0 on the Numeric keys.

Press the Return key from either screen to move to the position number 2. In the case of homing incomplete status, after first homing, the actuator will move to position number 2.

Move No. 002	A. 00 50.00
-----------------	----------------

The old position data of the position No. 2 will display for numeric values that do not have N at the end. N indicates servo ON.

Note: When PCON, ACON, SCON and ERC2 are connected, the maximum speed becomes a safe speed lower than the speed set by the parameters if the MANU operation mode is set to the teach mode 1 (safety speed enable).

Move No. 003	A. 00 Vel 10%
-----------------	------------------

Position number →

Upon move, the position number will automatically turn into 3.

Here, press the Return key to move to position number 3.

Move No. 001	A. 00 Vel 10%
-----------------	------------------

Upon move, the position number will automatically turn into 1.

(if the position table is the one indicated on Page 41 in this manual).

Teach/Play * Move	A. 00
----------------------	-------

Press the key to return the screen to the Teach/Play screen.

Slt Mode/M2 * Teach/Play	A. 00
-----------------------------	-------

Press the key to return the screen to the Mode Select screen.

(2) Consecutive Move

1 step move from the current location to the assigned position number set in the position table.

In this example, move to the position number 2.

Slt Mode/M2 * Teach/Play	A. 00
-----------------------------	-------

Using the keys in the Mode Select Screen, select Teach/Play and choose using the Return key.

Teach/Play * Continuous	A. 00
----------------------------	-------

Using the keys in the Teach/Play Screen, select Continuous and choose using the Return key.

Continuous No. 002	A. 00 Vel 10%
-----------------------	------------------

Position number →
Move speed ratio →

Position number and move speed ratio will be displayed.

Use the keys to turn the moving position number into 2.

Changes can be made in the move speed ratio using the key (10% 50% 100%).

Continuous No. 002	No. 006 A. 00 10.25N
-----------------------	----------------------------

Current position will display for numeric values that have N at the end. N indicates servo ON.

The numeric value indicated inside the dotted box can be changed by pressing 0 on the Numeric keys. Press the Return key from either screen to move to the position number 2. In the case of homing incomplete status, after first homing, the actuator will move to position number 2.

Continuous No. 002	A. 00 50.00
-----------------------	----------------

The old position data of the position No. 2 will display for numeric values that do not have N at the end. N indicates servo ON.

Note: When PCON, ACON, SCON and ERC2 are connected, the maximum speed becomes a safe speed lower than the speed set by the parameters if the MANU operation mode is set to the teach mode 1 (safety speed enable).

Continuous No. 003	A. 00 Vel 10%
-----------------------	------------------

Position number →

During Consecutive Move, the position number will display the position number it is currently moving towards.

Press either the key or emergency stop button to stop Consecutive Move.

Press the Return key to resume Consecutive Move (the emergency stop button is in a released status). Consecutive Move will be resumed towards the position number currently displayed.

Teach/Play * Continuous	A. 00
----------------------------	-------

Press the key to return the screen to the Teach/Play screen.

Slt Mode/M2 * Teach/Play	A. 00
-----------------------------	-------

Press the key to return the screen to the Mode Select screen.

8-6 Data Modification

You may write over all of the position data. Similar to new input, the following 4 cases exist:









- (1) Manual Input: Manually enter the position data directly from the teaching pendant key pad.
- (2) Direct Teach: Turn the servo OFF, manually move the slider to the desired location, and read that location into the position table.
- (3) Jog: Use the arrow keys to jog to the desired location, and read that location into the position table.
- (4) Increment: Use the arrow keys to incrementally move and read that location into the position table.

Caution during data modification:



- * As for manual input, the data entered will erase the old data.
 - * The position will be updated only when the return key is pressed to read in the current location (direct teach, jog, increment). It does not influence speed and others.
 - * Once the position data is cleared, the previous data will not remain anywhere, therefore, when the next position data is set, the position move is selected as a default.
- When clearing to re-set the push assign position data, be sure to confirm all items of the position data to input required data.

8-7 Monitor

The I/O status and current position of all controllers connected on the communications line will be displayed.

Slct Mode/M2 * Monitor	A. 00	In the Mode Select Screen, using the     keys, select Monitor and then, press the Return key. Select the displayed item using the Return key or the   keys. Use the   keys to change the axis number.
---------------------------	-------	---

The following is a display example of controller PCON-CY. Some of the screen may not be displayed depending on the type of controller. Items displayed depend on the I/O pattern setting.

Monitor Pos	A. 00 0.00N mm	Displays the current position.
Monitor Error No. 000	A. 00	Displays the error code number.
Monitor Servo ON	A. 00	Displays the ON/OFF status of servo.
Monitor Vel	A. 00 00 mm/s	Displays the speed. For the pulse modes of PCON-PL/PO, ACON-PL/PO and SCON, the Screen can be changed to the pulse (pls) display by pressing the  key.
Monitor Vel	A. 00 00 mm/s	Displays the current. The Screen is changed to current ratio (%) display by pressing the  key.
Monitor in 00 ST0	A. 00 OFF	Displays the ST0 (retract move command) status.
Monitor in 01 ST1	A. 00 OFF	Displays the ST1 (advance move command) status.
Monitor in 02 ST2	A. 00 OFF	Displays the ST1 (intermediate point move command) status.
Monitor in 03 SON	A. 00 OFF	Displays the SON (servo ON command) status.
Monitor out 00 LS0	A. 00 OFF	Displays the LS0 (retract end position detection) status.
Monitor out 01 LS1	A. 00 ON	Displays the LS1 (advance end position detection) status.

Monitor out 02 LS2	A. 00 OFF	Displays the LS3 (intermediate point end position detection) status.
Monitor out 03 SV	A. 00 OFF	Displays the SV (operating preparation completion) status.
Monitor out 04 HEND	A. 00 ON	Displays the HEND (homing completion) status. Displays ON if homing is completed, and displays OFF if not.
Monitor out 05 * ALM	A. 00 ON	* Displays the ALM (alarm output) status. Displays ON when it is normal.


Displays special input port hereinafter.

The display depends on the axis (controller) to be connected.

Monitor in HMSW	A. 00 OFF	Displays the HMSW (homing check sensor) status.
Monitor PORT SW	A. 00 ON	Displays the PORT switch status.
Monitor Enable SW	A. 00 ON	Displays the Enable SW status.
Monitor CTL Ver	A. 00 ae 030000	Displays the software version of the controller.
Slct Mode/M2 * Monitor	A. 00	The Screen returns to the mode select screen by pressing the ESC key.


8-8 Error List


As long as the Teaching Pendant is connected, this display will show the content of the controller error.

Slct Mode/M2 * Err List	A. 00	In the Mode Select Screen, using the  keys, select Error List and then, press the Return key.
----------------------------	-------	--

(1) Teaching pendant error list

Displays the error having occurred after the Easy Type Teaching Pendant connection (PORT ON).

Select the displayed item using the Return key or  keys.

Change the list number using the  keys.

Error list totaled 30 (List No. 0 – 29).


Teaching Pendant Error List

Err List	List	Page 0	Displays the error code number.
Err No.	0E8		


Err List	List	Page 0	Displays the error name.
A, B disconnect			

Err List	List	Page 0	Displays axis number in which the error occurred.
Axis No.	00		

Err List	List	Page 0	Displays how many minutes ago the error occurred.
	1 Min		

Slct Mode/M2 * Err List	A. 00	Press the  key once to return to the Mode Select Screen.
----------------------------	-------	---

(2) Controller error list

Press any one of the ten keys 0–8 from the screen of the teaching pendant error list, then the error that has occurred is displayed after power for the controller is turned ON. For a number of 10 or more, press the  key and the ten keys of 0-5.







Note) The teaching pendant FLASH Ver. 1.63 and later make available the display function of the controller error list.

For PCON, ACON, SCON and ERC2, the content of the alarm list will be kept even if the power is turned OFF.

Displays the past 8 alarm level errors including the final (most recent) error that has occurred, and one final detected warning level error.

The relationship between the ten keys and error to be displayed are as follows.


Display of PCON, ACON, SCON and ERC2

Ten key	
0	Last detected alarm level error
1	Previously first detected alarm level error
2	Previously second detected alarm level error
3	Previously third detected alarm level error
4	Previously fourth detected alarm level error
5	Previously fifth detected alarm level error
6	Previously sixth detected alarm level error
7	Previously seventh detected alarm level error
8	Previously eighth detected alarm level error
9	Previously ninth detected alarm level error
 0	Previously tenth detected alarm level error
 1	Previously eleventh detected alarm level error
 2	Previously twelfth detected alarm level error
 3	Previously thirteenth detected alarm level error
 4	Previously fourteenth detected alarm level error
 5	Previously fifteenth detected alarm level error

Display of RCP, RCS, E-Con, RCP2 and ERC

Ten key	
0	Last detected alarm level error
1	Previously first detected alarm level error
2	Previously second detected alarm level error
3	Previously third detected alarm level error
4	Previously fourth detected alarm level error
5	Previously fifth detected alarm level error
6	Previously sixth detected alarm level error
7	Previously seventh detected alarm level error
8	Last detected warning level error

The displayed content can be selected with the   keys or return key.

The list No. can be changed with the   keys.


Controller error list

CTL Err List 0	A. 00
Err No. 0B1	

Displays the error No.

CTL Err List 0	A. 00
Bank 31 Err (Point)	

Displays the error name.


The screen returns to the teaching pendant error list screen by pressing the  key.


8-9 User Parameter

The User parameter assigns zone and soft limit ranges, actuator attributes and home direction.

Zone and soft limit are set within ± 9999.99 (input unit: mm).

Home and servo parameters are determined by the actuator. Each setting for initial setting value parameters is the registered default value for position data during teaching.

Slt Mode/M2 * User Parm	A. 00	In the Mode Select Screen, using the  keys, select User Parameter and then, press the Return key.
----------------------------	-------	--

Select the displayed item using the Return key or  keys. To change the value, use the Numeric keys for input and then, press the Return key. Turn on the power again or reset the software (only for applicable models) after changing the parameters.

Parameter display screens for PCON-CY are shown below. The display depends on the type of controller. For content to be displayed, refer to the Operating Manual of each controller.

User Parm 01 + Zone	A. 00 150.3 <u>0</u> mm	Sets the zone limit +side.
User Parm 02 - Zone	A. 00 -0.3 <u>0</u> mm	Sets the zone limit -side.
User Parm 03 + Lmt	A. 00 150.3 <u>0</u> mm	Sets the soft limit + side.
User Parm 04 - Lmt	A. 00 -0.3 <u>0</u> mm	Sets the soft limit - side.
User Parm 05 Home (CWO CCW1)	A. 00 <u>1</u>	Sets the homing direction
User Parm 06 Push Comp	A. 00 25 <u>5</u> mm/s	Sets the push stop determination time.
User Parm 07 Srv Gain No.	A. 00 <u>8</u>	Sets servo gain number.
User Parm 08 Init. Vel	A. 00 10 <u>0</u> mm/s	Sets the initial velocity value.
User Parm 09 Init. Acc	A. 00 0.3 <u>0</u> G	Sets the initial Acc·Dcl initial value.
User Parm 10 LoTh	A. 00 0.1 <u>0</u> mm	Sets the initial positioning width value.

User Parm 12 Hold Cur	A. 00 <u>5</u> %	Sets the current limit value when positioning stops.
User Parm 13 Home Cur	A. 00 <u>10</u> %	Sets the current limit value when homing is carried out.
User Parm 16 Baud	A. 00 3840 <u>0</u> bps	Selects and sets the SIO communication speed.
User Parm 17 RTIM	A. 00 <u>5</u> msec	Sets the slave station transmitter activation minimum delay time.
User Parm 21 SON Disable	A. 00 <u>1</u>	Sets the servo ON input [0: enable/1: disable].
User Parm 22 OFST	A. 00 0. <u>20</u> mm	Sets the homing offset amount.
User Parm 23 + Zone 2	A. 00 9999. <u>99</u> mm	Sets the zone limit 2 + side.
User Parm 24 - Zone 2	A. 00 9999. <u>99</u> mm	Sets the zone limit 2 – side.
User Parm 25 PIO Ptn	A. 00 <u>0</u>	Sets the PIO pattern.
User Parm 28 Pole Sense Dir	A. 00 <u>0</u>	Sets the excitation phase signal detection operation initial move direction [0: reverse/1: normal].
User Parm 29 Pole Sense	A. 00 <u>10</u> msec	Sets the excitation phase signal detection time.
User Parm 31 Prop Gain	A. 00 <u>103</u>	Sets the speed loop proportional gain.
User Parm 32 Int Gain	A. 00 <u>3146</u>	Sets the speed loop integral gain.
User Parm 33 Trq Filter	A. 00 <u>0</u>	Sets the torque filter time constant.
User Parm 34 Push Vel	A. 00 <u>2</u> mm/s	Sets the push speed.

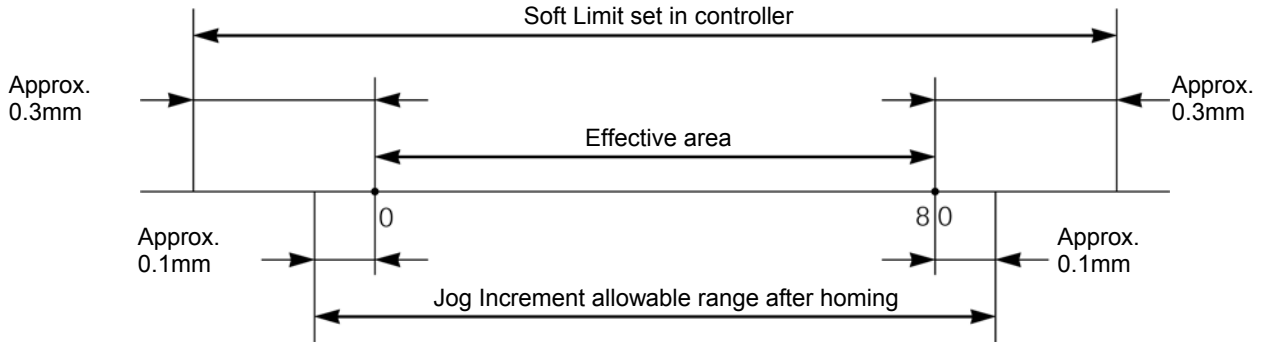
User Parm 35 Safty Vel	A. 00 250 <u>mm/s</u>	Sets the safety speed.
User Parm 36 Auto Srv Off	A. 00 <u>0</u> s	Sets the auto servo OFF delay time 1.
User Parm 37 Auto Srv Off 2	A. 00 <u>0</u> s	Sets the auto servo OFF delay time 2.
User Parm 38 Auto Srv Off 3	A. 00 <u>0</u> s	Sets the auto servo OFF delay time 3.
User Parm 39 PEND Output Typ	A. 00 <u>0</u>	Sets the positioning complete signal output method [0: PEND/1: INP].
User Parm 42 Enable Fnc Dis	A. 00 <u>1</u>	Sets the enable function [0: enable/1: disable].
User Parm 43 Home Sensor Dis	A. 00 <u>0</u>	Sets the home check sensor input character.
User Parm 45 silent Interval	A. 00 <u>0</u>	Sets the silent interval scaling factor.
User Parm 46 Vel Override	A. 00 <u>100</u>	Sets the speed override.
User Parm 53 Stop Mode Def	A. 00 <u>0</u>	Sets the stop mode initial value.

- When soft limit is modified at the customer site, please set a value which extends 0.3mm outside of the effective area.

Example: When setting the effective area between 0mm~80mm

Soft limit + side: 80.3

Soft limit - side: -0.3



- For RCP, RCS, E-Con, RCP2 and ERC, if the homing direction is changed, all of the inputted position data will be cleared. As needed, please re-enter the data.
- Reversed homing direction may not be done on the Rod Type Actuator.
- Homing direction setting is reversed on the In-Line Type (SSR • SMR) Actuator (0: Correct, 1: Reversed).

Caution: Please cycle the controller power after making parameter changes.
Although pressing the emergency switch or port switch ON/OFF will rewrite the parameter, there may be ones that will not be changed.

* Regarding parameter, please refer to the Controller Operating Manual.

8.10 Software reset after user parameters are changed

For software reset (re-start) function support model (PCON, ACON, ERC2, RCP2, ERC), the screen moves to the software reset screen when the **ESC** key is pressed after the user parameter is changed or the user adjustment is set.

Soft Reset	A. 00
* Reset?	Y → 1 N → 0

Press 1 when resetting the software.
(Press 0 when interrupting to reset the software. The screen returns to the mode select screen.)

Soft Reset	A. 00
* Srv OFF?	Y → 1 N → 0

The screen moves to the check screen of servo OFF while servo is ON.

Press 1 when restarting. Since servo OFF is automatically carried out, it is not necessary to turn OFF the SON input.

(Press 0 when interrupting to reset the software.)

The screen returns to the mode select screen even if either one of 1 or 2 is pressed.

8-11 User Adjustment

8.11.1 Pause, servo ON input enable and disable setting, homing operation, axis number setting

Sets enable or disable of homing and pause.

Sets the axis number of controllers (PCON, ACON, ERC2, RCP-RSI, RCP-RMI, ERC, etc.)

Slct Mode/M2 * User Adjust	A. 00	In the Mode Select Screen, using the ◀▶▶▶ keys, select User Adjustment and then, press the Return key.
-------------------------------	-------	--

Homing

User Adjust Adjust	A. 00 <u>1</u>	Input 1 into the adjustment number and then, press the Return key to execute homing.
-----------------------	-------------------	--

Disable hold input:

User Adjust Adjust	A. 00 <u>91</u>	Input 91 into the adjustment number and then, press the Return key. Afterwards, the controller must be turned OFF.
-----------------------	--------------------	--

↑ Input 91

Enable hold input:

User Adjust Adjust	A. 00 <u>90</u>	Input 90 into the adjustment number and then, press the Return key. Afterwards, the controller must be turned OFF.
-----------------------	--------------------	--

↑ Input 90

Disable the servo ON input (only for E-Con, RCS Series)

User Adjust Adjust	A. 00 <u>93</u>	Input 93 into the adjustment number and then, press the Return key. Afterwards, the controller must be turned OFF.
-----------------------	--------------------	--

↑ Input 93

Enable the servo ON input (only for E-Con, RCS Series)

User Adjust Adjust	A. 00 <u>92</u>	Input 92 into the adjustment number and then, press the Return key. Afterwards, the controller must be turned OFF.
-----------------------	--------------------	--

↑ Input 92

Setting the controller axis number

Sets the axis numbers of controllers (RCP, ERC, ERC2) and compact types (PCON-CY, SE, PL/PO, ACON-CY, SE, PL/PO).

User Adjust alloc.	0	A. 00
-----------------------	---	-------

↑
Input axis number.



User Adjust Adjust	2	A. 00
-----------------------	---	-------

↑
Input 2

The adjustment No. and allocation No. are changed by pressing the Return key or ◀▶▲▼ keys. Input the axis number into the allocation number and then, press the Return key.

Input 2 into the adjustment number and then, press the Return key.

If axis No. is set to the controller with axis No. setting switch, an error No. 061 occurs and the setting is rejected.

Afterwards, the controller must be turned OFF.

Caution: Do not input any numeric values other than 1, 2, 3, 4, 90 and 91, 92, 93 and 5119 into the adjustment number.
Additionally, when setting the parameter No.25 (PIO pattern)= 0, 2 in the RCP controller and RCP2 controller (when there is no servo ON input), also do not input 92 into the adjustment number. Since there is no servo ON input, operation cannot be made.

8.11.2 Software Reset

Resets the software (re-start up the controller).

* Version V2.00 or later make available the software reset function.

It is ready for models of PCON, ACON, SCON, RCP2, ERC and ERC2.




Slct Mode/M2 * User Adjust	A. 00	In the mode select screen, using the <input type="button" value="◀"/> <input type="button" value="▲"/> <input type="button" value="▼"/> <input type="button" value="▶"/> keys, select User Adjustment, and then press the Return key.
User Adjust Adjust	A. 00 4	Input 4 into the adjustment number, and press the Return key.
Soft Reset * Reset?	A. 00 Y → 1 N → 0	When performing the software reset, press the <input type="checkbox"/> key. (When interrupting the software reset, press the <input type="checkbox"/> key. The screen returns to the mode select screen.)
Soft Reset * Srv OFF?	A. 00 Y → 1 N → 0	During servo on, if pressing the <input type="checkbox"/> key, a message "Srv OFF?" appears on the full screen. (When interrupting the software reset, press the <input type="checkbox"/> key. The screen returns to the mode select screen.)
Soft Reset Please Wait.	A. 00 Y → 1 N → 0	A message "Please wait." appears, and the software reset is carried out. After carrying out, the screen returns to the mode select screen.



8.11.3 Error List Clear

Clears all of the contents of error lists in the controller.

* Version V2.00 and later make available the error list clear function.

This is available for models of PCON, ACON, SCON, and RCP2.

Slct Mode/M2 * User Adjust	A. 00	In the mode select screen, using the  keys, select User Adjustment, and then press the Return key.
User Adjust Adjust	A. 00 3	Input 3 into the adjustment number, and press the Return key.
Soft Reset * Reset?	A. 00 Y → 1 N → 0	Press the  key. The error list is cleared. (When interrupting error list clear, press the  key.)

The Screen returns to the mode select screen even by pressing either the  key or  key.

8.12 TP Operation Mode

Sets operation mode in the manual mode (MANU).

Models of PCON, ACON, SCON, ERC2 are available for this mode.

Slct Mode/M2	A. 00
* TP Op Mode	

In the mode select screen, using the ◀▲▼▶ keys, select User Adjustment, and then press the Return key.

TP Op Mode	A. 00
Slct (←, →):	Teach 1

The TP operation mode is selected from the following four menus using the ◀▲▼▶ keys.

- Teach 1
 - PIO not allowed: It is allowed to write position data and parameters, etc., in the controller and commands for actuator operation system.
 - With safety speed: The maximum speed is the safety speed set on the parameter regardless of the position data.
- Teach 2
 - PIO not allowed: It is allowed to write position data and parameters, etc., in the controller and commands for actuator operation system.
 - Without safety speed: It is allowed to move at a speed registered on the position data.
- Monitor 1
 - PIO allowed: Only monitoring is allowed. It is not allowed to write position data and parameters, etc., in the controller.
 - With safety speed: The maximum speed is the safety speed set on the parameter regardless of the command from the PLC.
- Monitor 2
 - PIO allowed: Only monitoring is allowed. It is not allowed to write position data and parameters, etc., in the controller.
 - Without safety speed: It is allowed to move at a speed as commanded from the PLC.

8-13 End

End is executed to save each setting or registration content of the Easy Type Teaching Pendant. Before removing the Easy Type Teaching Pendant from the RC controller, be sure to execute End.

Operation:

Press the **BEGIN/END** key for more than 2.5 seconds.

In a case that data input ends, and the Easy Type Teaching Pendant needs to be removed

Op. Start / End
* End ST = Efct



Op. Start / End
* End ST = Non

Turn the RC Controller PORT Switch to OFF. Then, remove the connector.

In a case that you reopen the connection from the initial screen

Op. Start / End
* Reconnection



Confirming Connection
IAI RC ST V. 2.00



Select Axis
* Axis No. 00

(in a case of multiple axes connection)

Or

OP Op Mode A. 00
* Select (←, →): Teach 1

(in a case of single axis connection)

Caution: When multiple axes are connected with a controller link cable, after recycling power of a controller that is not directly connected to the Easy Type Teaching Pendant, please execute a reconnect.

Caution: Disconnect the PCON, ACON, ERC2 controllers which are not equipped with the AUTO/MANU switch after setting the TP operation mode to the "Monitor 2." (Refer to 8.12 TP Operation Mode.)

In the case of ERC2, and when the controller is set with the teaching pendant connected with the gateway unit, SIO converter

- I/O is disabled and control cannot be carried out from the PLC if they are disconnected while the "Teach 1" and "Teach 2" are being set.
- The maximum speed becomes a safe speed set on the parameter regardless of command from the PLC if they are disconnected while the "Monitor 1" are being set.

9. Message Area

In the message screen, content during error and warning will be displayed.

Code No.	Error Label	Error Reset	Reference
000~07F	Controller Warning	Yes	Controller rejects command
080~0FF	Controller Error	Yes	Error inside the controller
100~1FF	DIP* Message	Yes	Input error, guide message, etc.
200~2FF	DIP* Movement Release	Yes	Movement continuation impossible
300~3FF	DIP Cold Start Error	No	DIP Power install or reconnect are necessary.

* TB in the table mean Easy Type teaching pendant.

* Refer to the “9.3 Controller Error.”

* For an error which can be reset, the error is reset by pressing the BEGIN/END key on the key sheet. And all of the error lists in the controller are cleared by the error list clear on the user adjustment. (Refer to 8.11.3.)

9-1 Warning Label Error (Code No. 000h – 07Fh)

Warning message is cleared by recovery procedure as follows:

Release operation:

1. First, confirm the cause of the warning and resolve the problem.
2. Press down BEGIN/END key.

Warning is probably due to the following possibilities:

- RS485 communication abnormality
- Easy Type Teaching Pendant operational mistake

a) RS 485 communication related abnormality

Indicates occurrence of any abnormality on the RS485 communication line.

Code No: 05Ah, 05Bh, 05Dh, 05Eh, 05Fh (Communication error detected by the controller)

Cause: (1) RS 485 communication related abnormality

For example, when move command is delivered by PIO signal from teaching while communicating to other devices (PLC), “075h” will occur.

(2) Influence by foreign noise or connections is not properly installed.

The Easy Type Teaching Pendant and RC controller execute packet communication (move instruction, data transfer, etc.) at all times. At this time, when data changes due to noise, the RC controller will determine that it is incorrect data and will reject the data.

Solution: (1) Confirm the above causes. In the case of frequent warning occurrences, please separately set the signal cable and power line.

(2) Be sure to use one unit to operate the RC controller.

See to it that the Easy Type Teaching Pendant will not conflict with the PIO signal.

9-2 Easy Type Teaching Pendant Message Level Error

Easy Type Teaching Pendant Operational Mistake:

When you attempt to input an incorrect value, the message label error will occur.

Code No: 112h, 113h, 114h, 118h, 11Eh, 11Fh, etc. (Keypad input value is incorrect.)

9-3 Controller Error

An alarm detected from the controller side can be displayed. This is a serious error due to an abnormality related to servo control and electricity. Please read through the RC Controller operating manual carefully for error compliance.

Code No: 0B0h, 0B1h, 0B8h, 0B9h, 0BBh, 0BCh, 0BDh, 0BEh

0C0h, 0C1h, 0D0h, 0D1h, 0D8h, 0E0h, 0E8h, 0E9h, 0EAh, 0F8h, etc.

For details of error code, refer to the Operating Manuals of the controller which you use.
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* Appendix

Parameter (factory-installed) initializing method

Parameter is changed to the factory-installed parameter. (Initialization)

Models of PCON, ACON, SCON, ERC2 are available for this method.

Caution: Note that the parameter set by the user is changed to the factory-installed parameter if the parameter (factory-installed) is initialized.

Slct Mode/M2 * User Adjust	A. 00	In the mode select screen, using the <input type="button" value="◀"/> <input type="button" value="▲"/> <input type="button" value="▼"/> <input type="button" value="▶"/> keys, set the user adjustment, and then press the Return key.
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User Adjust Adjust	A. 00 5119	Input 5119 into the adjustment number, and press the Return key.
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Ship Para * Reset?	A. 00 Y → 1 N → 0	When initializing the parameter (factory-installed), press the <input type="checkbox"/> key. When initialization of the parameter (factory-installed) is completed, the screen moves to the software reset screen. (When interrupting, press the <input type="checkbox"/> key. The screen returns to the mode select screen.)
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Soft Reset * Reset?	A. 00 Y → 1 N → 0	When executing software reset, press the <input type="checkbox"/> key. (When interrupting the software reset, press the <input type="checkbox"/> key. The screen returns to the mode select screen.)
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(Note) Unless the software was reset, the parameters were rewritten to factory-installed parameters, however, operation is not performed with factory-installed parameters. The parameters are enabled after the next reset or after power is turned on.

Soft Reset	A. 00
* Srv OFF?	Y → 1 N → 0

When servo is turned ON, you are asked whether servo off is carried out or not on all screens by pressing the  key.
(When interrupting the software reset, press the  key. The screen returns to the mode select screen.)

Soft Reset	A. 00
* Please Wait.	

A message “data being obtained” appears, the software is reset, and operation is performed with parameters set at shipment from factory.
After executing, the screen returns to the mode select screen.

(Note)	Unless the software was reset, the parameters were rewritten to factory-installed parameters, however, operation is not performed with factory-installed parameters. The parameters are enabled after the next reset or after power is turned on.
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Teaching pendant error table

Listed on the table are teaching pendant specific error.

For error of controller, refer to the Operating Manual of each controller.

Code	Message name	Description
112	Input Incorrect Error	An incorrect value was entered in a parameter. (Example) 9601 was entered as the serial communication speed by mistake. Reenter an correct value.
113	Input Under Error	The entered value is smaller than the setting range.
114	Input Over Error	The entered value is larger than the setting range. Refer to the actuator specifications or parameter table and reenter a correct value.
115	Homing Incomplete	The current position was written when home return was not yet completed. Execute home return again.
117	No Move Data	Target position is not set under the selected position number. Enter the target position first.
11E	Pair Data Mismatch	The values indicating the magnitude relationship of a pair of data are incorrect. (Example) The same value was entered in both the parameters for + and – soft limits. Reenter correct values.
11F	Absolute Value Error	The minimum movement toward the target position is determined by the lead length of the drive system and resolution of the encoder. This message indicates that the entered target value is smaller than the minimum movement. (Example) If the lead length is 20mm, the encoder's resolution is 800 pulses and accordingly the minimum movement becomes $20 \div 800 = 0.025$ mm/pulse. In this case, this message will be displayed if 0.02mm is entered as the target position.
121	Push search end over	The final position in push & hold operation exceeds the soft limit. This has no negative effect if the actuator contacts the work. If the actuator misses the work, however, the soft limit will be reached and this message is displayed as a warning. Change either the target position or positioning band.
122	Allocate, multi-axes connect	Address was assigned when multiple axes were connected. Assign each address only when one axis is connected.
133	Jig No. change not allowed	For PCON-C/CG, ACON-C/CG, SCON controllers, the axis number is set with the rotary switch on the front panel. The axis number cannot be set on the teaching pendant.
180	Change to axis number OK	These messages are displayed to confirm operation. (They do not indicate an operation error or other abnormality.)
181	Controller initialize OK	
182	Home Change All Clear	
183	IO function has been changed	
201	Emergency Stop	An emergency stop condition was detected. (This is not an error.) This is displayed on RCP, RCS, E-Con, RCP2, and ERC.
202	Emergency Stop	An emergency stop condition was detected. (This is not an error.) This is displayed on PCON, ACON, SCON, and ERC2.
203	Motor voltage drop	In controller of "shut-off relay external type," motor drive power is shut off due to opening between MPI terminal and MPO terminal. (Note) If this error occurs while closing between MPI terminal and MPO terminal, the controller is considered to be in failure.
204	ABS battery voltage drop	Battery voltage drops when power is turned on.
20A	During movement, Servo OFF	This message indicates that the servo ON signal (SON) was turned OFF by the PLC while the actuator was moving, and that the servo turned OFF and the movement was disabled as a result.
20C	During movement, CSTR-ON	This message indicates that the start signal (CSTR) became "1" by the PLC while the actuator was moving, and that duplicate movement commands occurred as a result.

Code	Message name	Description
20D	During movement, STP-OFF	This message indicates that the temporary stop signal (*STP) was turned OFF by the PLC while the actuator was moving, and the movement was disabled as a result.
20E	Soft limit over	Soft limit is reached.
210	During movement, HOME-ON	During movement operation, homing signal (HOME) from PLC side is turned ON, and movement command is duplicated.
211	During movement, JOG-ON	During movement operation, jog movement signal (JOG) from PLC side is turned ON, and movement command is duplicated.
220	During AUTO, write not allowed	Parameter writing operation was performed in AUTO mode of PCON-C/CG, ACON-C/CG, SCON controllers.
221	During monitor mode, write not allowed	Position data, parameter write operation was performed in monitor mode.
222	During AUTO, movement not allowed	Actuator movement operation was performed in AUTO mode of PCON-C/CG, ACON-C/CG, SCON controllers.
223	During monitor mode, movement not allowed	Actuator movement operation was performed in monitor mode.
301 302 304 305 306 308 30A 30B	Over Run Error (M) Framing Error (M) SCI R-QUE OV (M) SCI S-QUE OV (M) Termi R-BF OV (M) Response Time Out (M) Packet R-QUE Packet S-QUE OV	<p>These messages indicate an error in the serial communication with the controller.</p> <p>Cause: [1] Garbage data due to the effect of noise [2] Duplicate slave numbers when multiple controllers are controlled by serial communication.</p> <p>Action: [1] Adjust the wiring in a manner eliminating the effect of noise and review the installation of equipment, etc. [2] Change the slave numbers to avoid duplication.</p> <p>If the message is still displayed after taking the above actions, please contact IAI.</p>
307 309	Memory Command Reject Termi Light Address Error	<p>This message indicates that the command was refused in the serial communication with the controller.</p> <p>This message indicates that an indeterminate WRITE address error occurred in the serial communication with the controller.</p> <p>These conditions do not occur in normal operation. Should they occur, record the entire error list before cutting off the power for use in the cause investigation. Also, contact IAI.</p>
30C	No Connect Error	<p>This message indicates that no controller axis number is recognized.</p> <p>Cause: [1] The controller is not operating properly. [2] Only the supplied communication cable (SGA/SGB) is disconnected. [3] If a SIO converter is used, 24V is supplied to the converter but the link cable is not connected. [4] The ASDRS switch settings are duplicated by mistake when multiple connectors are linked.</p> <p>Action: [1] Check if the RDY lamp on the controller is lit. If the lamp is not lit, the controller is faulty. [2] If a spare teaching pendant is available, replace the current pendant with the spare unit, or with a PC, and see if the message disappears. [3] Supply power after connecting the link cable between the converter and controller. [4] Make sure the ADRS switch settings are not duplicated.</p> <p>If the message is still displayed after taking the above actions, please contact IAI.</p>



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