

KOGANEI

**ELEWAVE SERIES
TEACHING BOX
EWHTB**

OWNER'S MANUAL Ver.3.0

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1. Overview

Thank you for purchasing Koganei's Elewave Series Teaching Box.

This manual describes the unit's features and usage. Please read it carefully before using the unit.

This unit is a dedicated operation box for Elewave Series units (for all models).

It enables the setting and initialization of parameters/points as well as point movement/teaching movement.

2. Appearance and Functions

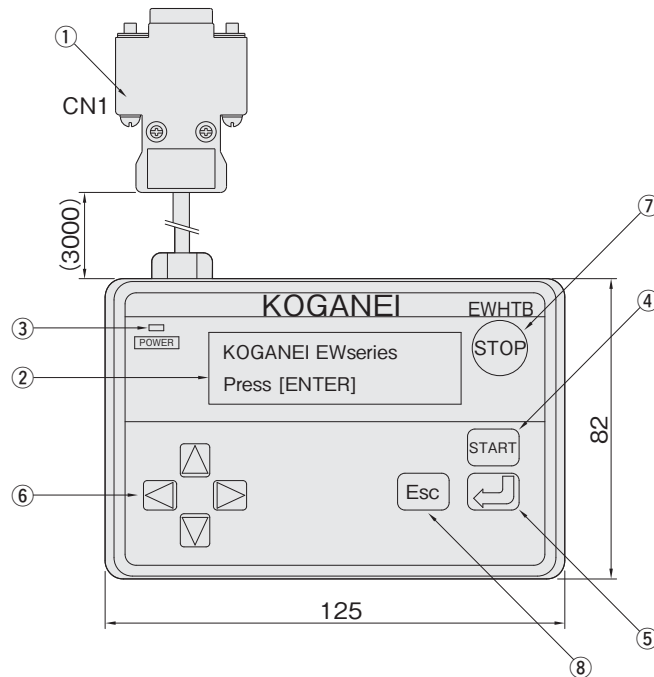


Figure 1 Appearance and functions

① RS232C cable (CN1)

Connect to the COM port of an Elewave Series controller.

② LCD (liquid crystal display): 16 characters × 2 lines

Data is displayed on this screen.

③ LED power indicator (5V)

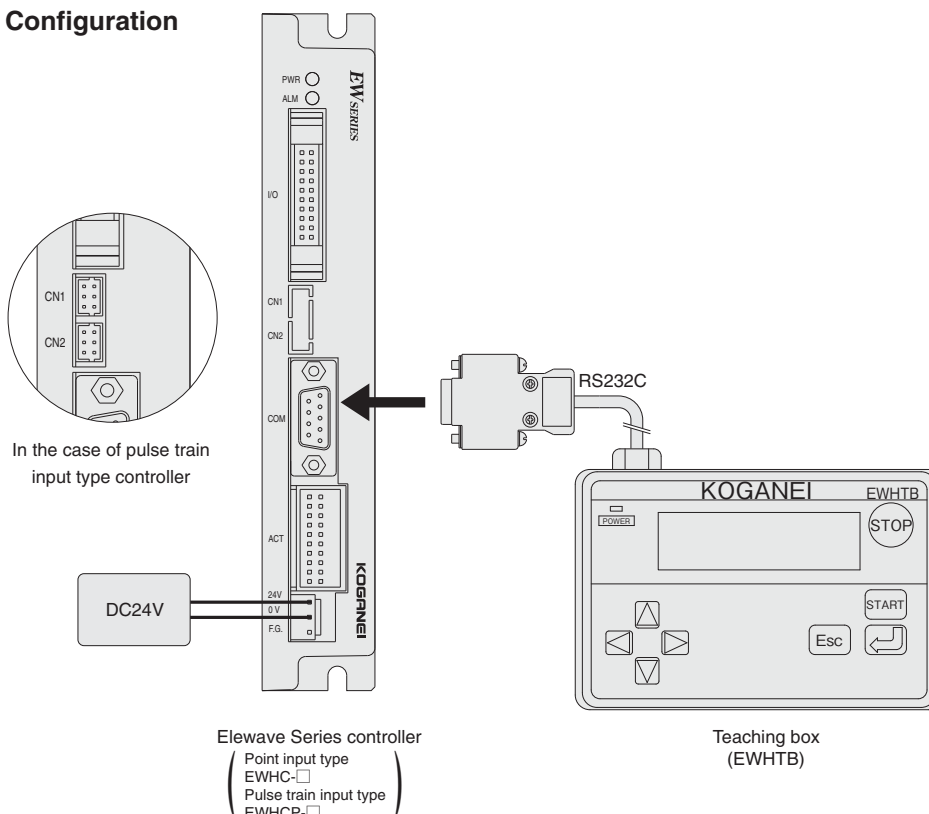
LED (rating 12VDC) lights up when power is on.

④: START key, ⑤: Enter key, ⑥: Move key, ⑦: STOP key, ⑧: Esc key

The above-mentioned keys are respectively used for start, confirmation, cursor movement/number change, stop, and return of data displayed on the LCD.

3. System Configuration and Wiring Specifications

3-1. System Configuration



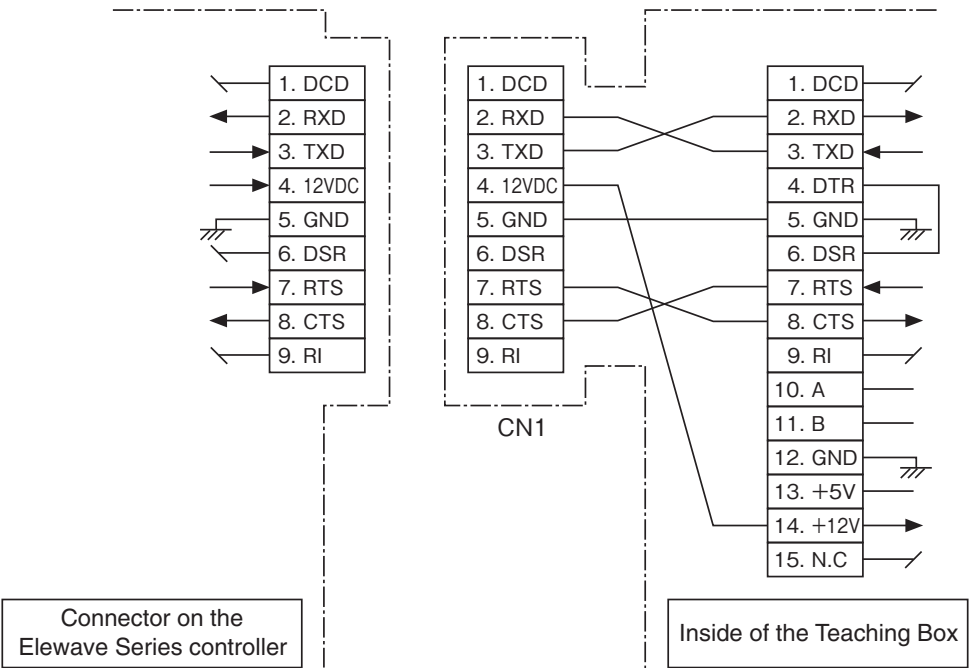
3-2. Specifications

Item		Model	EWHTB
Power supply	Voltage		12VDC supplied from the Elewave Series controller
	Consumption current		50mA max.
Display	Setting display		16-character × 2-line LCD
	Power display		LED lights up when power (internal 5V) is on.
Setting method			Key control :UP :DOWN :LEFT :RIGHT :ENTER :ESCAPE :START :STOP
Communication method			Conforms to RS232C
General specifications	Operating temperature		0 to 40°C
	Operating humidity		35 to 80%RH (no condensation)
	Storage temperature		− 10 to 65°C
	Noise resistance		IEC61000-4-4 Power line and communication line 1KV (level 2)
	Mass		200g (teaching box)
Applicable controller ^{Note}			For Electric Rotary Actuators: EWHC-RA, EWHCP-RS (EWHC-R), EWHCP-RA, EWHCP-RS (EWHCP-R) For Electric Hands: EWHC-NH (EWHC-H), EWHCP-NH For NS Sliders: EWHC-NH, EWHCP-NH

Figure 2 System configuration and specifications

Note: EWHTB Ver.1.0* and EWHTB Ver.2.00 cannot be used in the pulse train input type controller. Additionally, EWHTB Ver.1.0*, EWHTB Ver.2.00, and EWHTB Ver.2.01 cannot be used in EWHRT1A, EWHRT40A, and EWHRT60A. With a version upgrade, however, they can become compatible with the pulse train input type controllers EWHRT1A, EWHRT40A, and EWHRT60A. For information on updating versions, please consult our Overseas Department. For the version confirmation method, see p.13 and 22.

3-3. Wiring Specifications



3-4. Communication Parameter

Transmission rate:	9600bps
Data bit length:	8 bits
Stop bit length:	1 bit
Parity check:	On
Parity setting:	Odd parity (ODD)
Control method:	XON/XOFF software control method
(parameter)	(effective)
Communication method:	Full duplex
Synchronous method:	Asynchronous method
Return key transmission:	CR code
CR code reception:	For CR/LF reception: Return + line feed
CR reception:	Return


Figure 3 Wiring specifications

4. Using the Unit

4-1. Connecting to the Elewave Series Controller

- Connect the RS232C cable (CN1) on the teaching box to the RS232C connector (COM) on the Elewave Series controller. (In addition to the RS232C cable, you must also connect a power cable, motor cable, and I/O cable to the Elewave Series controller.)

4-2. Connecting the Power Supply



- Next, supply power (24VDC) to the Elewave Series controller.
(12VDC is supplied to the teaching box from the Elewave Series controller.)
- Power is being supplied normally if the Power LED (number ③ in Figure 1) on the teaching box lights up and stays on.
- As soon as the teaching box is powered on and the enter key  is pressed in the language selection screen, the teaching box automatically identifies the type of the Elewave Series controller (Electric Hands, Electric Rotary Actuators, or NS Sliders).

4-3. Control by the Teaching Box


① Basic Information on Key Control


- The second line of the screen will show the modes you can select at the moment.

In example A [Select mode], the modes you can select are [1:SET], [2:RUN], and [3:HE].



Select a mode using the   keys.



The selected digit will start blinking.

- Pressing the enter key  in the screen A goes deeper into the screen hierarchy.

To return one level higher, press the escape key .

- Enter a number in screen D.

Select a digit with the   keys. The selected digit will start blinking.

Use the   keys to increase/decrease the number.

② Menu hierarchy

See Figures 5-1 and 5-2 on p. 25-26.

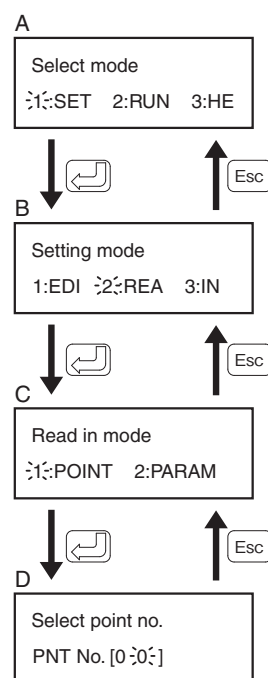





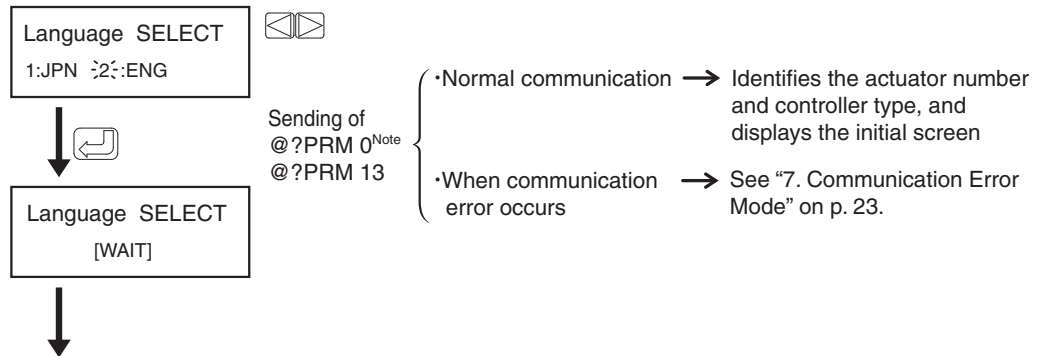
Figure 4 Example of display flow

- Notes: 1. When performing teaching box operations, do not use the controller I/O dedicated input-output commands. If the I/O dedicated input-output command is sent from the controller while the teaching box is in operation, the teaching box could show incorrect displays. Note that there is no problem with using the controller I/O dedicated input-output commands while the teaching box is connected.
2. Do not operate the teaching box when the controller I/O dedicated input-output command STOP is active. If the teaching box will be operated while the STOP command is active, the controller will send "63: Stop command." Then, you can not correctly perform settings.


5. Operations for Point Input Type Controller (For the pulse train input type controller, see p.14, “6. Operations for Pulse Train Input Type Controller.”)

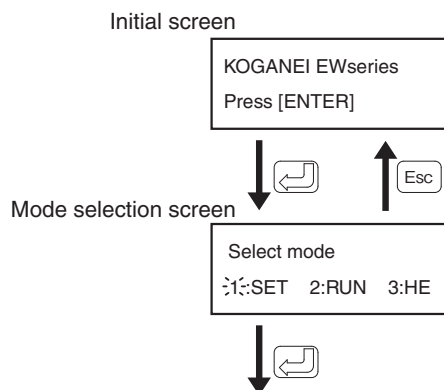
5-1. Language Selection Screen


- After powering the unit on, select the language to be displayed on the teaching box screen before performing basic operations.
[1: JPN] (Japanese) [2: ENG] (English)
- Use the   keys to make a selection and then press the enter key .



5-2. Initial Screen

- Next, the initial screen will appear.
- Pressing the enter key  in this screen moves to the mode selection screen.








Note: As soon as the teaching box is powered on, the language selection screen appears, and when the enter key  is pressed, the teaching box automatically identifies the type of the controller (NS Sliders, Electric Rotary Actuators, and Electric Hands) and input type (point or pulse train).

As a result, if it becomes necessary to change the actuator size or type, after changing the actuator always perform initialization of the parameters and points (see p.7 and 11). After initialization, always return to the language selection screen once.

5-3. SET (settings) Mode

Edit (points/parameters/origin), read, or initialize.

- In the mode selection screen, select [1:SET] using the   keys. Make [1:SET] start blinking and then confirm by pressing the enter key . (Figure A)
- Next, in the setting mode screen, use the   keys to select [1:EDI], [2:REA], or [3:IN]. (Figure B)
- Finally, perform editing/reading/initialization in accordance with the flowcharts in Figures 6, 7, and 8.

- [1:EDI] Edit mode flow

[2:PRM] Parameter write-in
Writes the parameters.

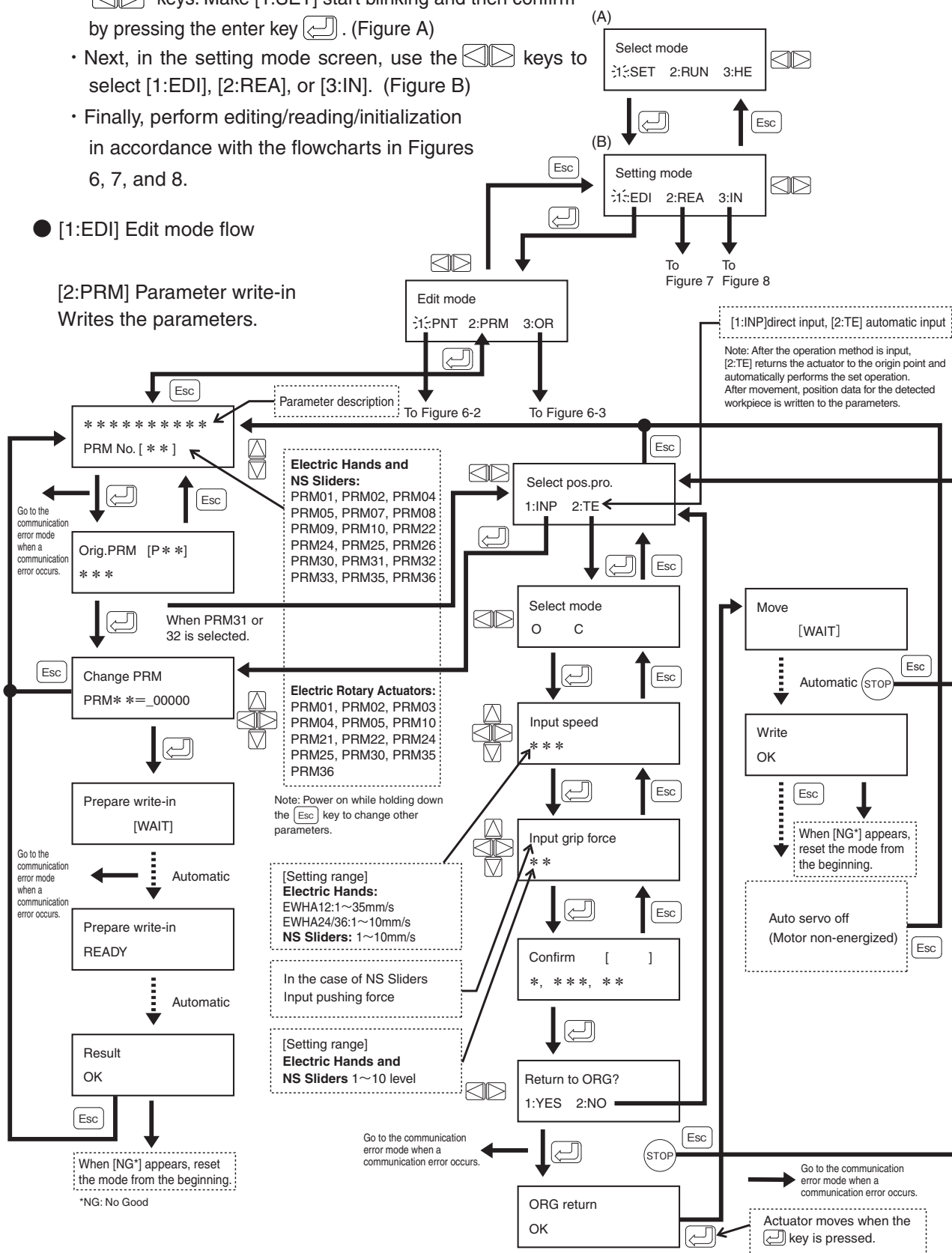


Figure 6-1 Editing mode flowchart (PRM)

Writes the points.

Point setting methods include [1:INP] for direct input of position, [2:DIR] for input of position data by manually moving the actuator, and [3:TE] for input of position data by moving the actuator using the teaching box button.

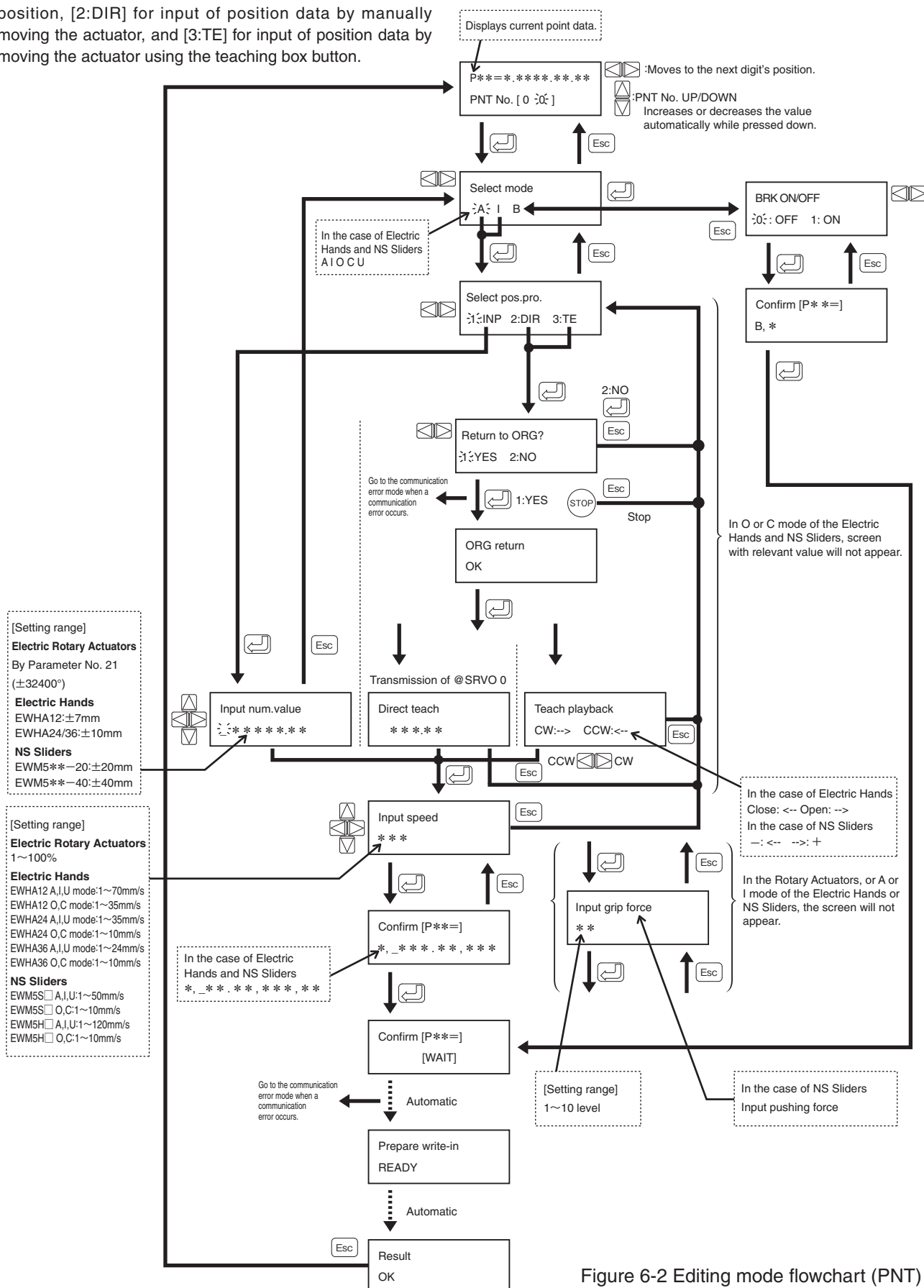


Figure 6-2 Editing mode flowchart (PNT)

[3:OR] Write origin shift/origin change

[1:SHI]

Writes the origin shift.

The return to origin position is shifted by the value set here.

Origin shift setting methods include [1:INP] for direct input of position, [2:DIR] for input of position data by manually moving the actuator, and [3:TE] for input of position data by moving the actuator using the teaching box button.

[2:ORGC]

Changes the origin position data.

Perform this operation when the controller is changed during use, or when initializing the origin position data and the return to origin position has shifted.

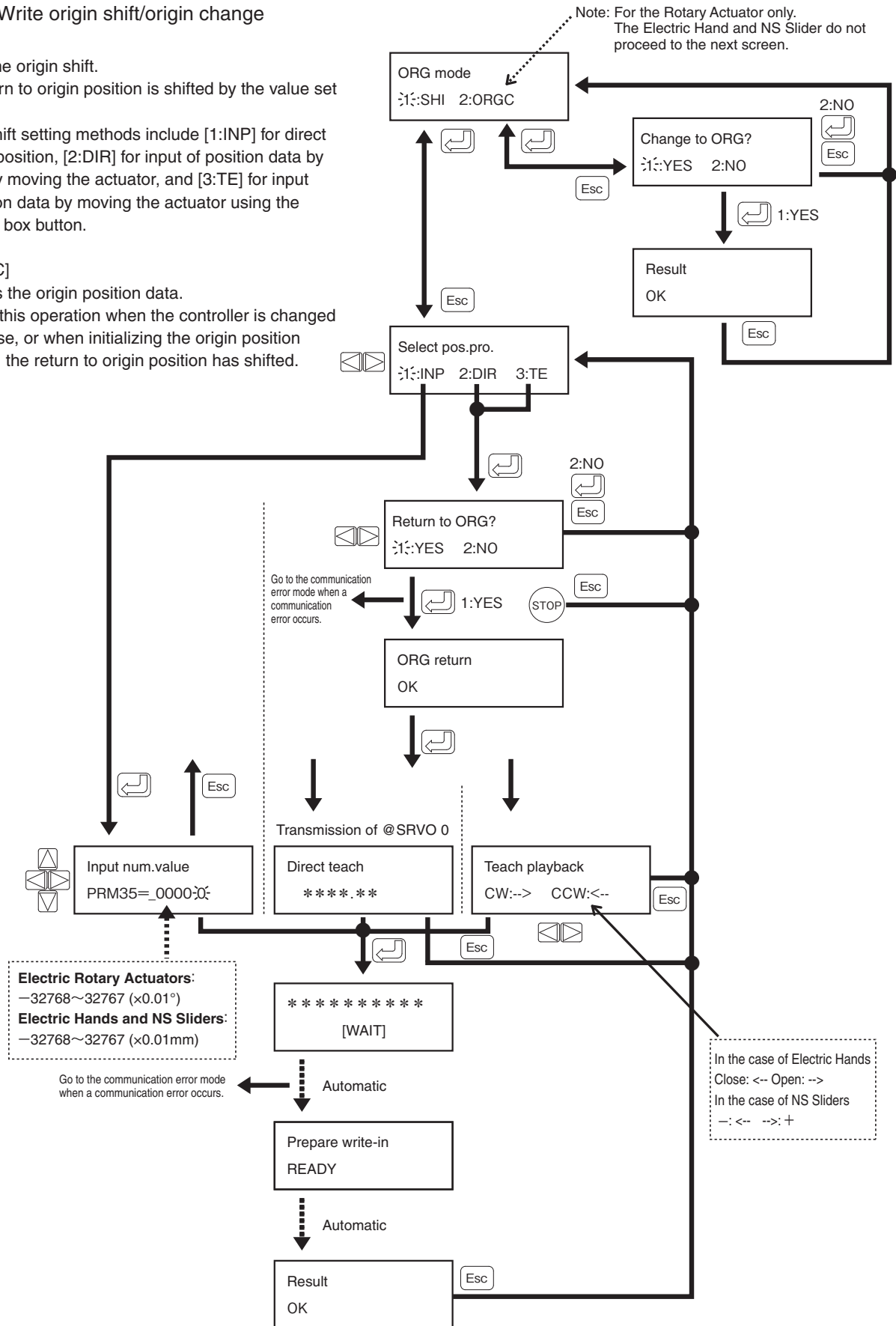


Figure 6-3 Editing mode flowchart (OR)

● [2:REA] Read (READ) point/parameter mode flow

Reads the [1:POINT] point and [2:PARAM] parameter currently set in the controller.

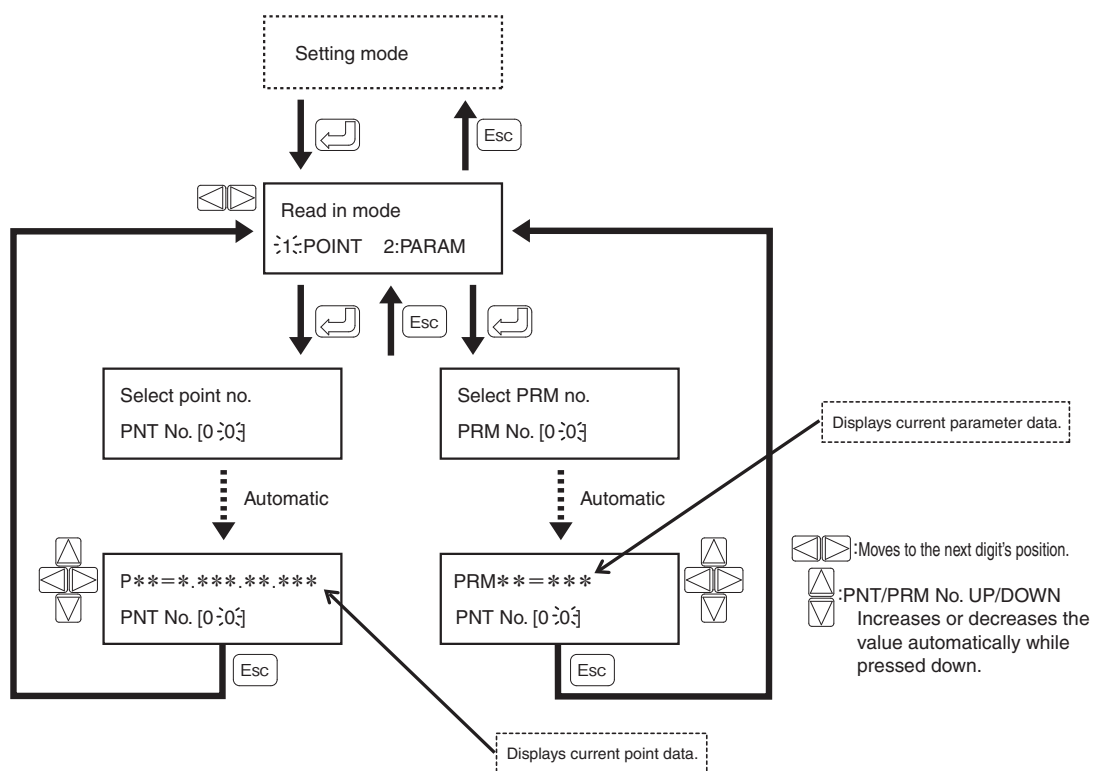


Figure 7 Read-in mode flowchart

● [3:IN] Initialization (INIT) mode flow for point/parameter/origin point position (ORG)

Initializes the [1:PNT] point, the [2:PRM] parameter, and the [3:ORG] origin point position.

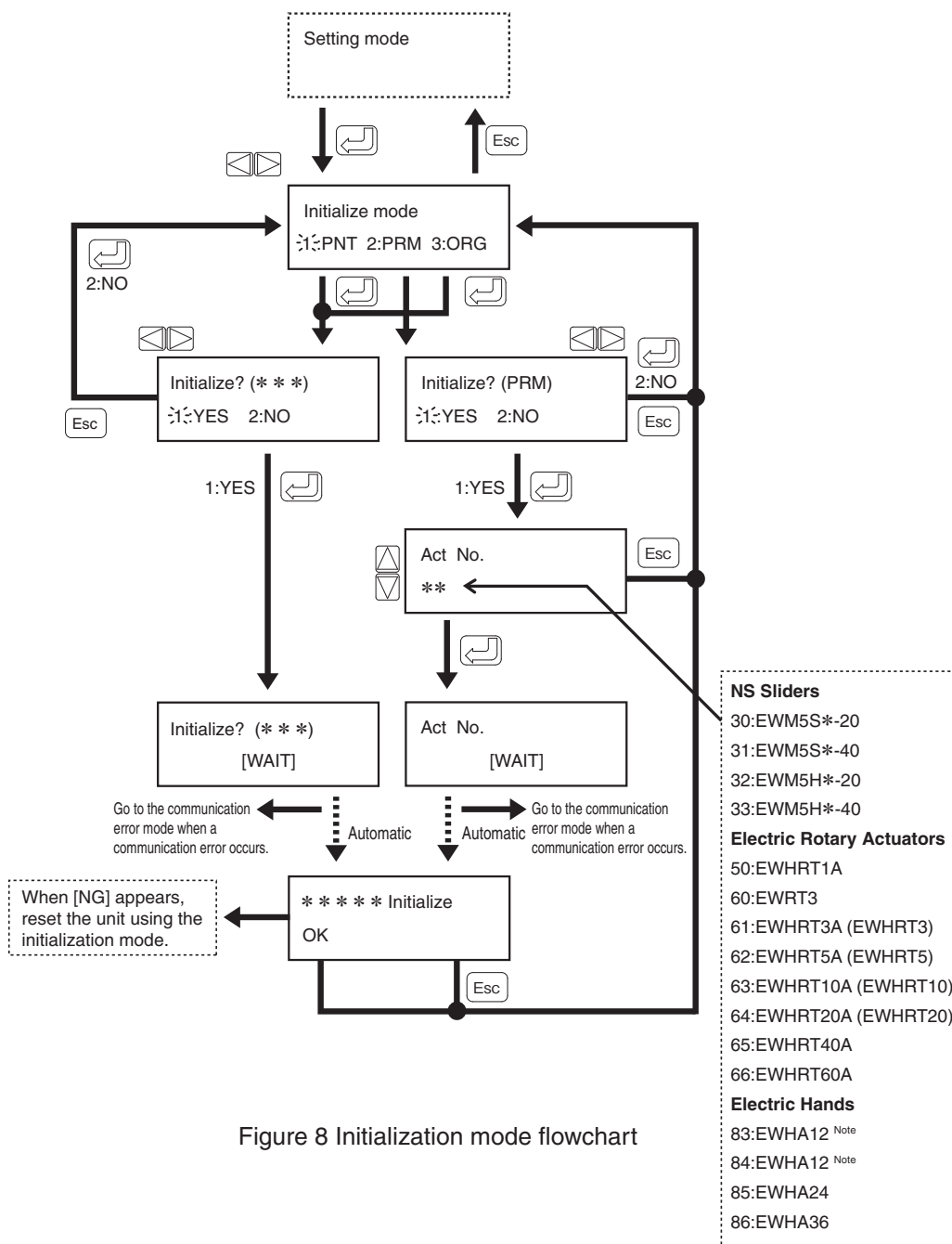


Figure 8 Initialization mode flowchart

Note: In the case of Electric Hands, there are some with the same model but different actuator numbers. The first 2 digits of the serial number on the main unit's label is the actuator number, and enter the number to initialize. In addition, actuator numbers are sometimes added or changed, so always check before entering them.

5-4. RUN (operation) Mode

Executes return to origin/move point/error display.

- In the mode selection screen, select [2:RUN] using the keys. Make [2:RUN] start blinking and then confirm by pressing the enter key . (Figure A)
- Next, in the RUN mode screen, use the keys to select [1:ORG], [2:MOV], or [3:DS]. (Figure B)
- Perform return to origin/move point/error display in accordance with the flowcharts in Figures 9, 10, and 11.

● [1: ORG] Return to origin flow

Executes return to origin.

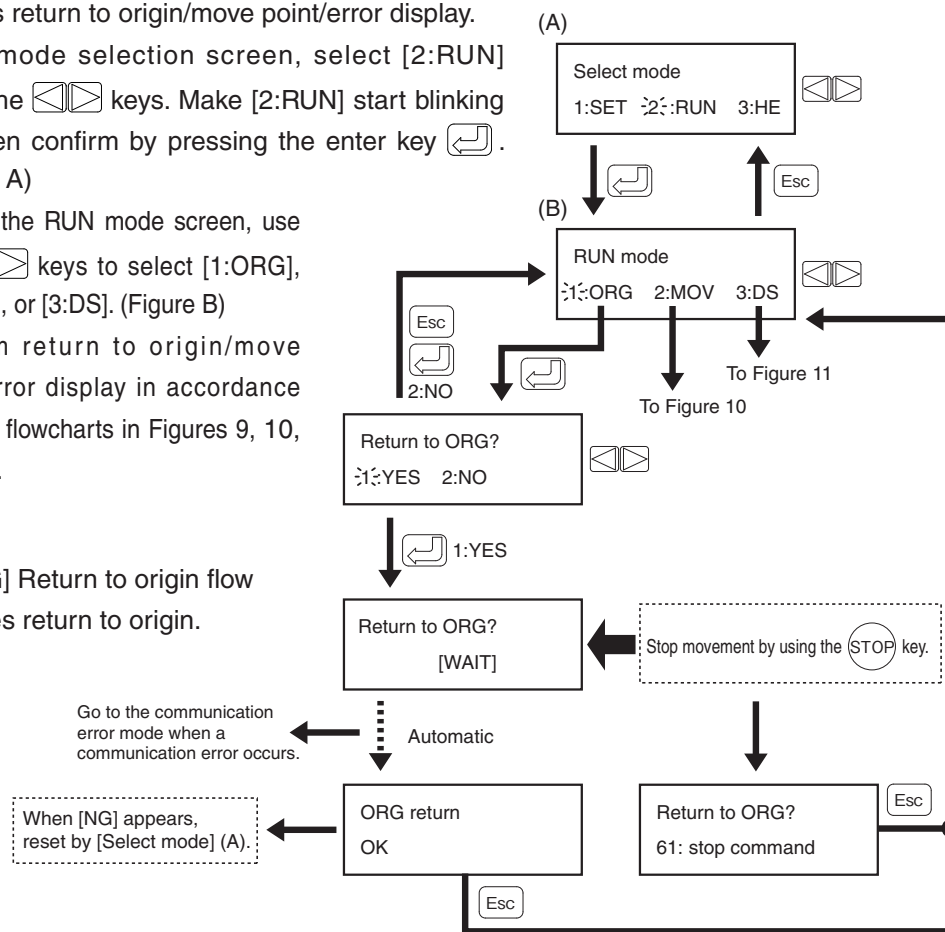


Figure 9 Return to origin flowchart

● [2:MOV] Move point flow

Performs or stops actuator's point movement.

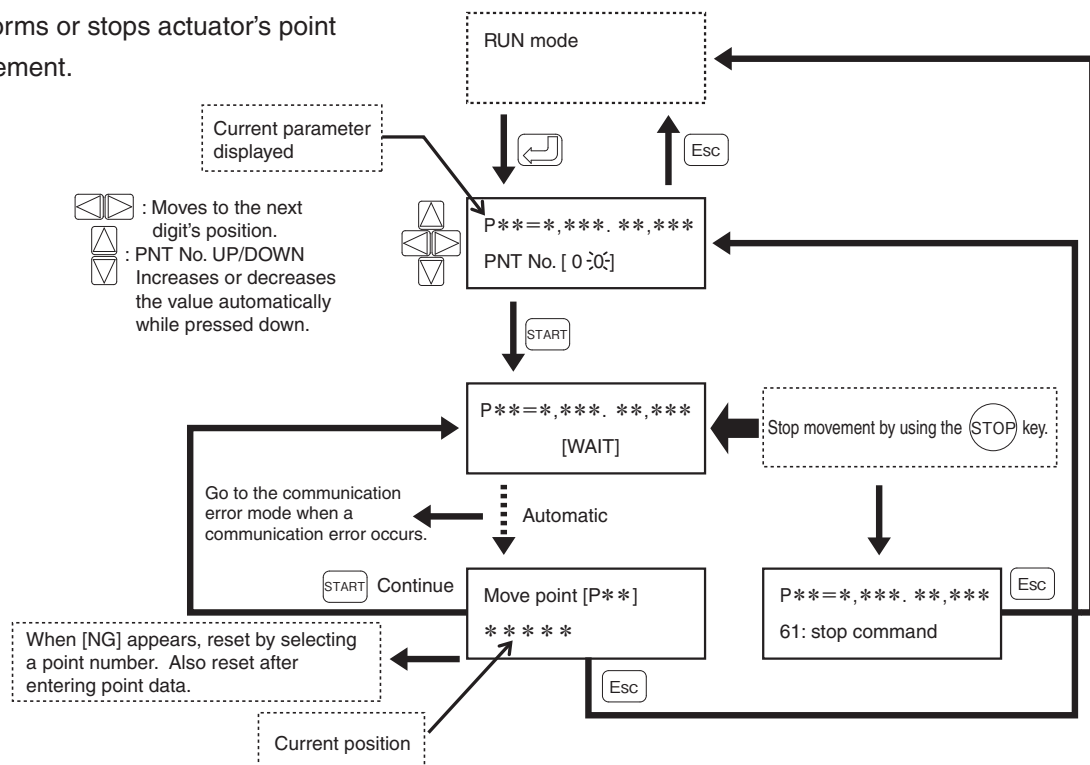


Figure 10 Move point flowchart

● [3:DS] Error Monitor (DS) mode flow

If an error in the controller occurs while set to this screen, the error is displayed.

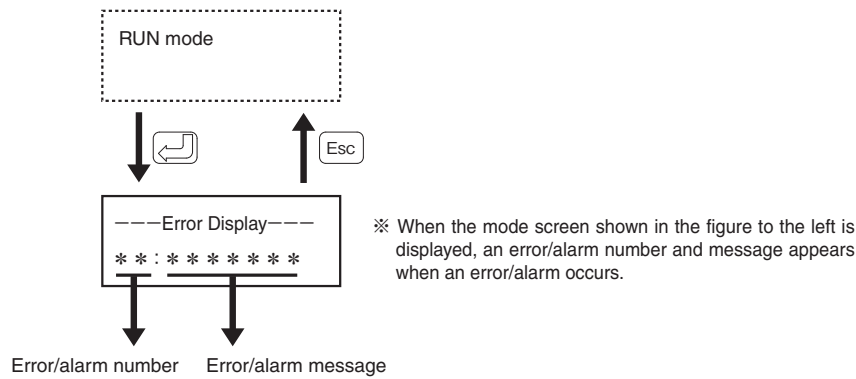


Figure 11 Error monitor flowchart

5-5. HE (help) Mode

Displays version information/error history.

● [1:VER] Version information

- In the mode selection screen, select [3:HE] using the keys.
Make [3:HE] start blinking and then confirm by pressing the enter key . (Figure A)
- In the screen shown in (B) below, select [1:VER] using the keys.
Make [1: VER] start blinking and then confirm by pressing the enter key .
- Version information is displayed.

● [2:ERR] Error history

- In the mode selection screen, select [3:HE] using the keys.
Make [3:HE] start blinking and then confirm by pressing the enter key . (Figure C)
- In the screen shown in (D) below, select [2:ERR] using the keys.
Make [2: ERR] start blinking and then confirm by pressing the enter key .
- The current and latest error history is displayed.

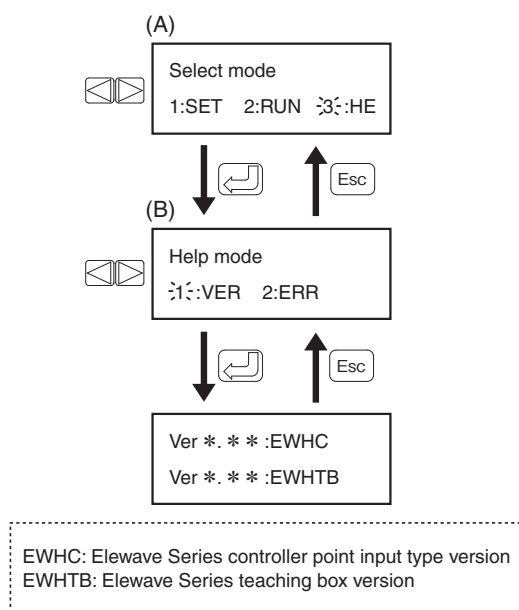


Figure 12 Version display flowchart

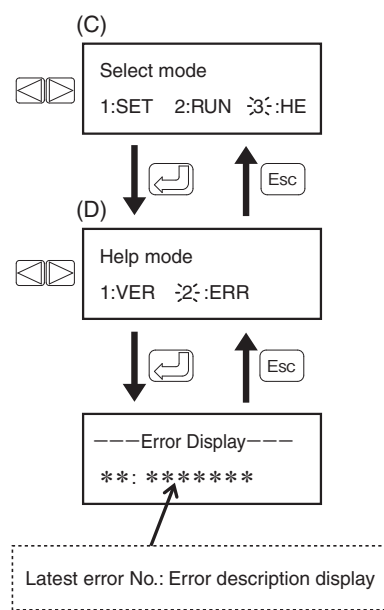



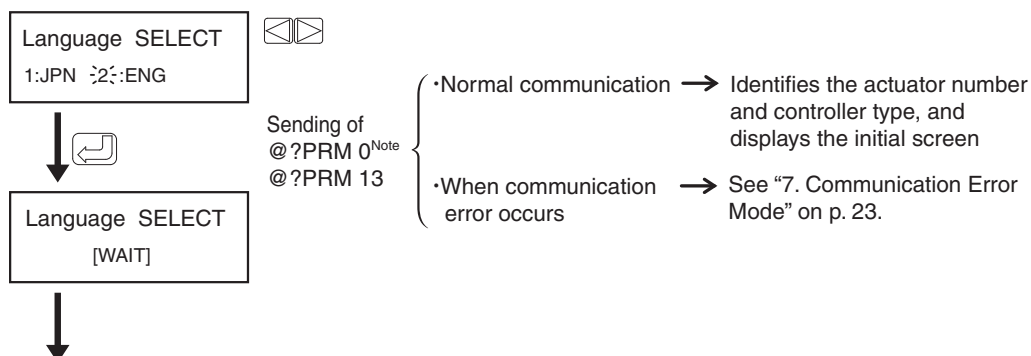


Figure 13 Error history display flowchart


6. Operations for Pulse Train Input Type Controller (For the point input type controller, see p.6, "5. Operations for Point Input Type Controller.")

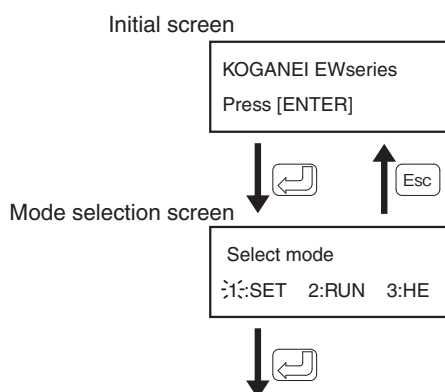
6-1. Language Selection Screen


- After powering the unit on, select the language to be displayed on the teaching box screen before performing basic operations.
[1: JPN] (Japanese) [2: ENG] (English)
- Use the   keys to make a selection and then press the enter key .



6-2. Initial Screen

- Next, the initial screen will appear.
- Pressing the enter key  in this screen moves to the mode selection screen.



Note: As soon as the teaching box is powered on, the language selection screen appears, and when the enter key  is pressed, the teaching box automatically identifies the type of the controller (NS Sliders, Electric Rotary Actuators, and Electric Hands) and input type (point or pulse train). As a result, if it becomes necessary to change the actuator size or type, after changing the actuator always perform initialization of the parameters and zone positions (see p.15 and 19). After initialization, always return to the language selection screen once.

6-3. SET (settings) Mode

Edit (zone positions/parameters/origin shift), read, or initialize.

- In the mode selection screen, select [1:SET] using the keys.
- Make [1:SET] start blinking and then confirm by pressing the enter key . (Figure A)
- Next, in the setting mode screen, use the keys to select [1:EDI], [2:REA], or [3:IN]. (Figure B)
- Follow the flowcharts in Figures.14, 15, and 16 below to perform editing, reading, and initialization.

● [1:EDI] Edit mode flow

[2:PRM] Parameter write-in
Writes the parameters.

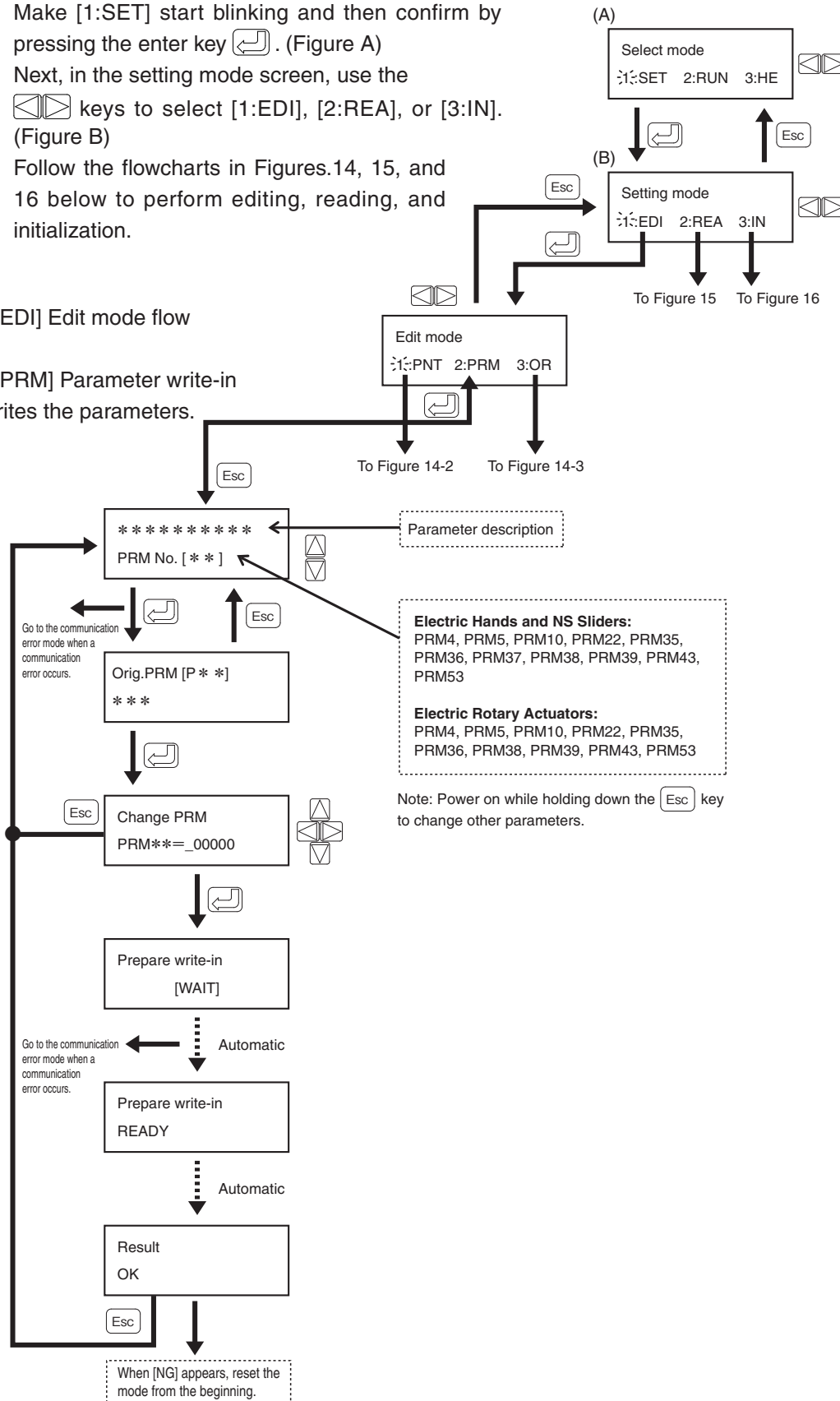


Figure 14-1 Editing mode flowchart (PRM)

Writes and deletes the zone position data to Zone numbers Z0 to Z3.
Zone position data setting methods include [1:INP] for direct input of position, and [2:DIR] for input of position data by manually moving the actuator.



[3:OR] Write origin shift/origin change

[1:SHI]

Writes the origin shift.

The return to origin position is shifted by the value set here.

Origin shift setting methods include [1:INP] for direct input of position, and [2:DIR] for input of position data by manually moving the actuator.

[2:ORGC]

Changes the origin position data.

Perform this operation when the controller is changed during use, or when initializing the origin position data and the return to origin position has shifted.

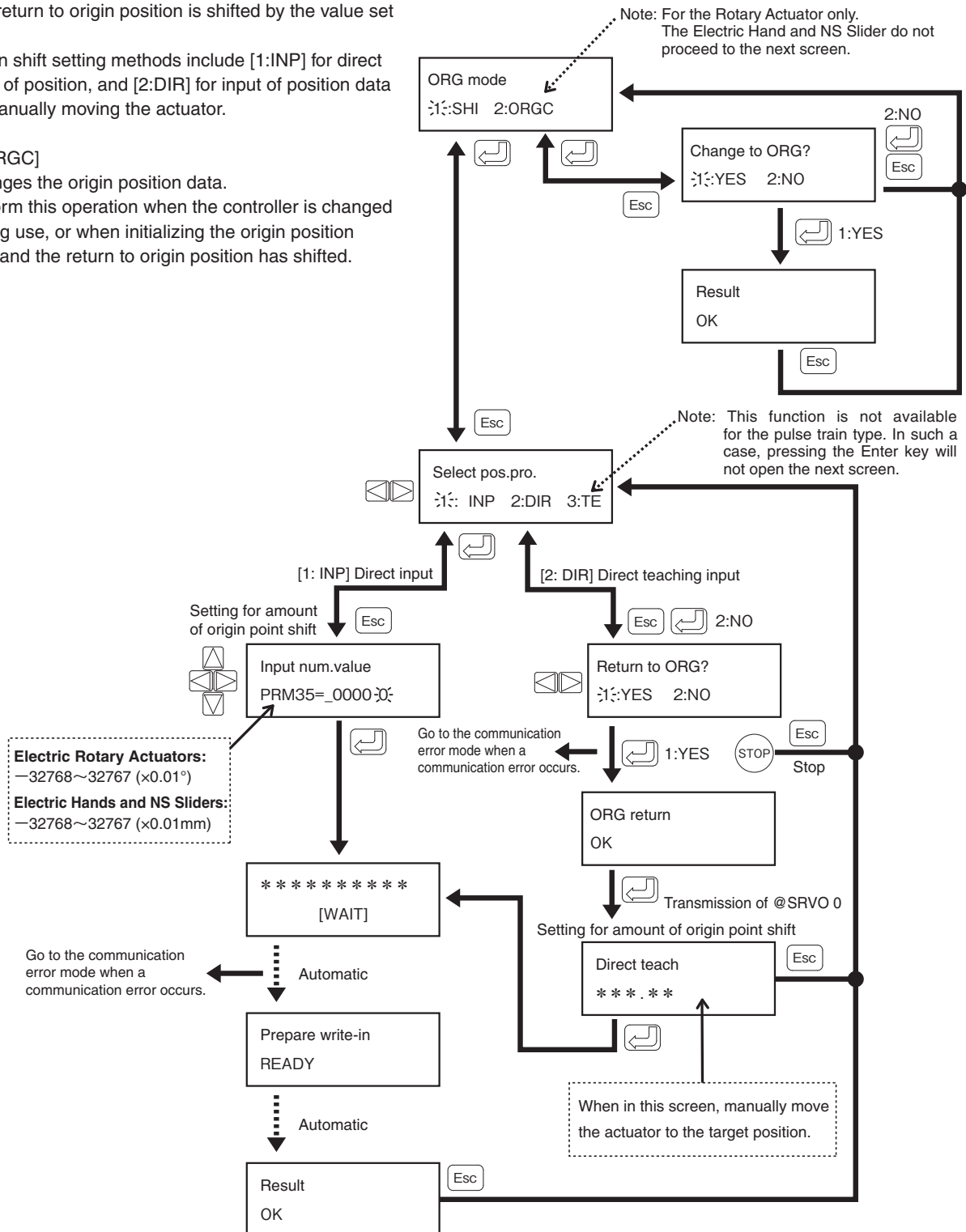


Figure 14-3 Editing mode flowchart (OR)

● [2: REA] Read (READ) zone position data/parameter mode flow

Reads the [1:POINT] zone position data and [2:PARAM] parameters currently set in the controller.

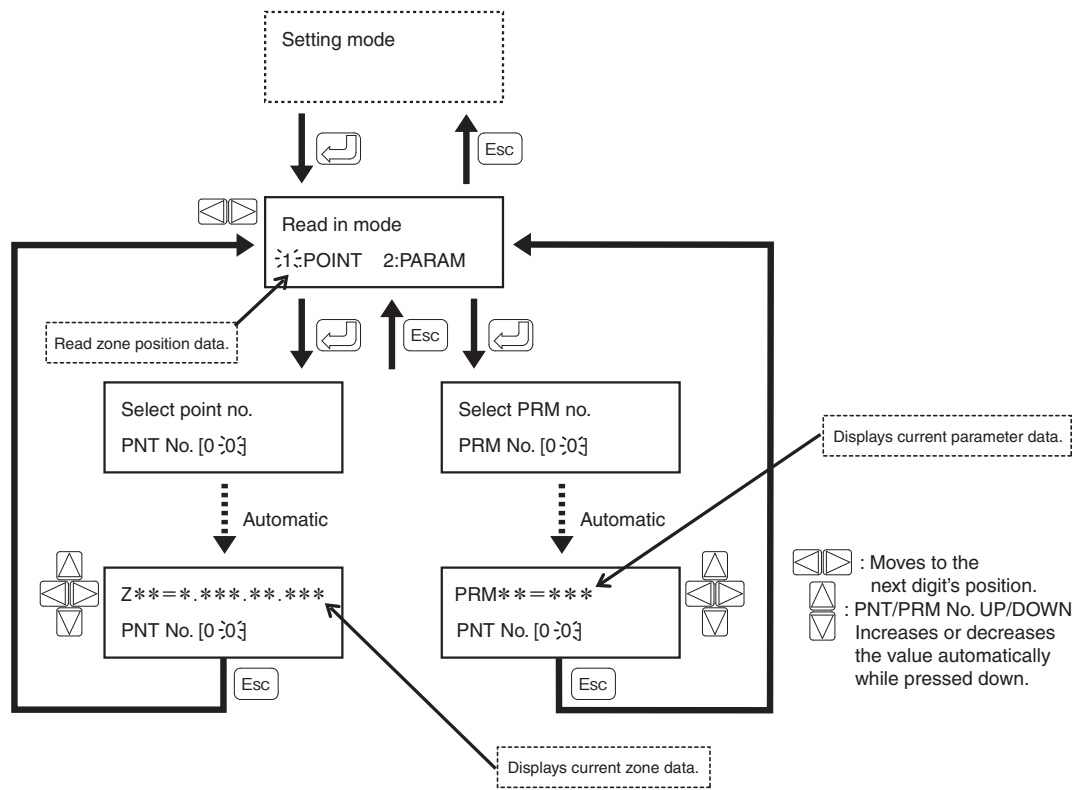


Figure 15 Read-in mode flowchart

● [3: IN] Initialization (INIT) mode flow for zone position/parameter/origin point position (ORG)

Initializes the [1:PNT] zone position, the [2:PRM] parameter, and the [3:ORG] origin point position.

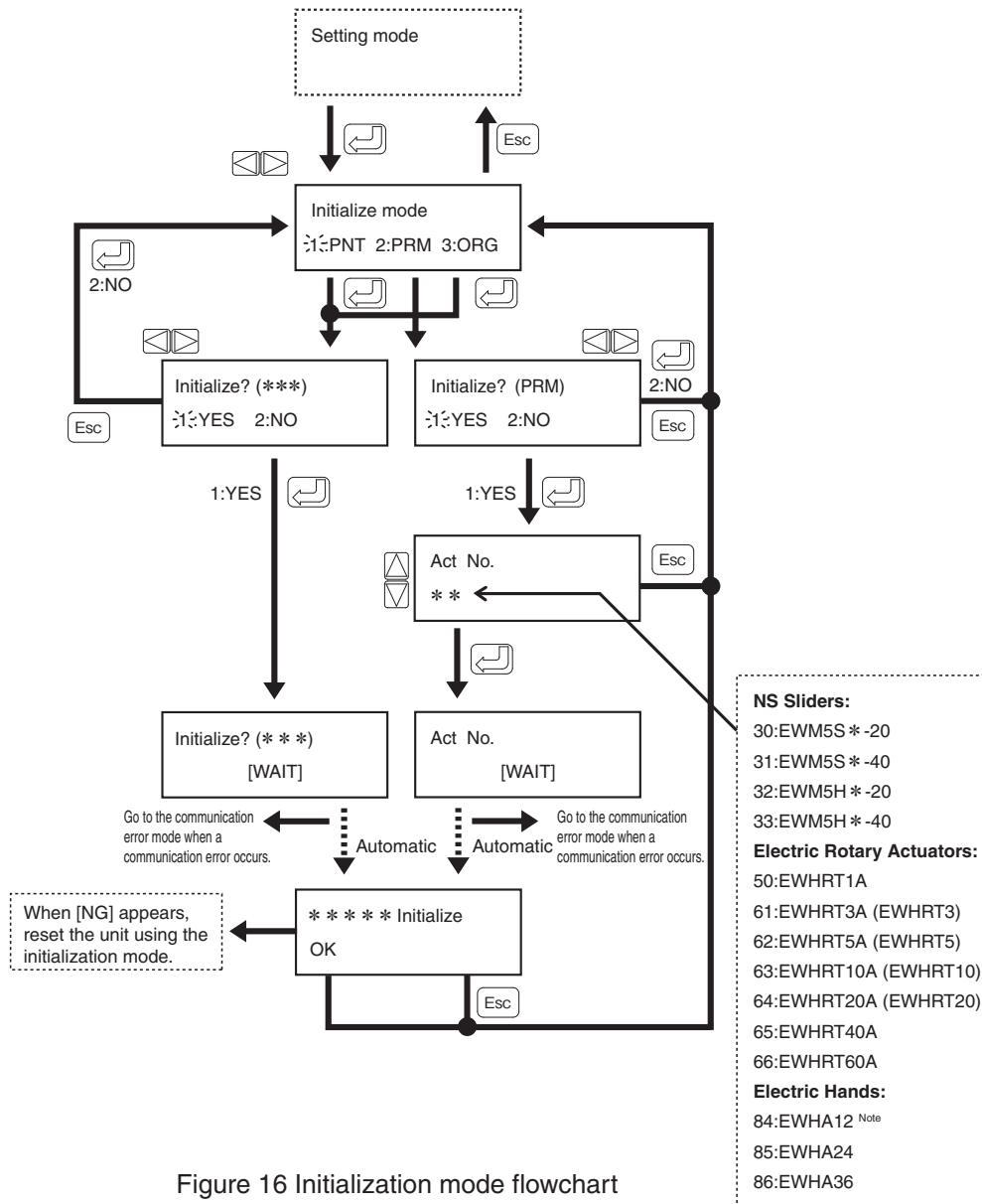







Figure 16 Initialization mode flowchart

Note: In the case of Electric Hands, there are some with the same model but different actuator numbers. The first 2 digits of the serial number on the main unit's label is the actuator number, and enter the number to initialize. In addition, actuator numbers are sometimes added or changed, so always check before entering them.

6-4. RUN (operation) Mode

Executes return to origin/move/error display.

- In the mode selection screen, select [2: RUN] using the   keys. Make [2: RUN] start blinking and then confirm by pressing the enter key . (Figure A)
- Next, in the RUN mode screen, use the   keys to select [1:ORG], [2:MOV], or [3:DS]. (Figure B)
- Perform return to origin/move/error display in accordance with the flowcharts in Figures 17, 18, and 19.

- [1:ORG] Return to origin flow

Executes return to origin.

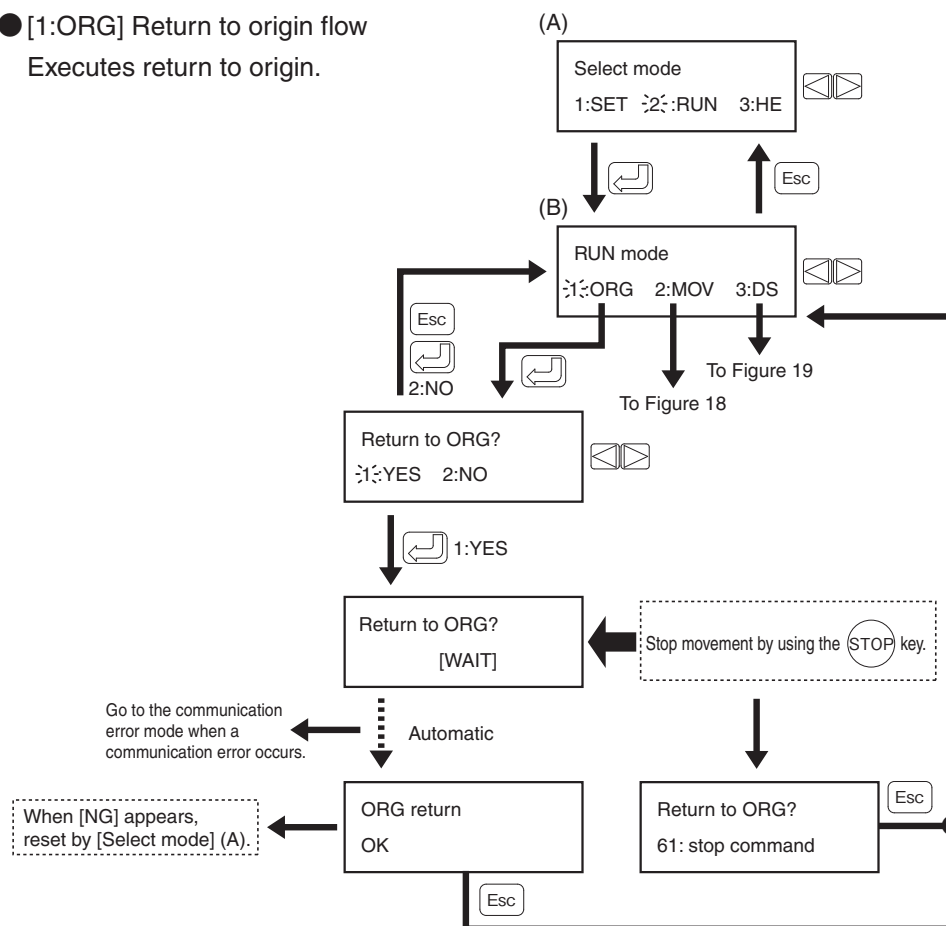
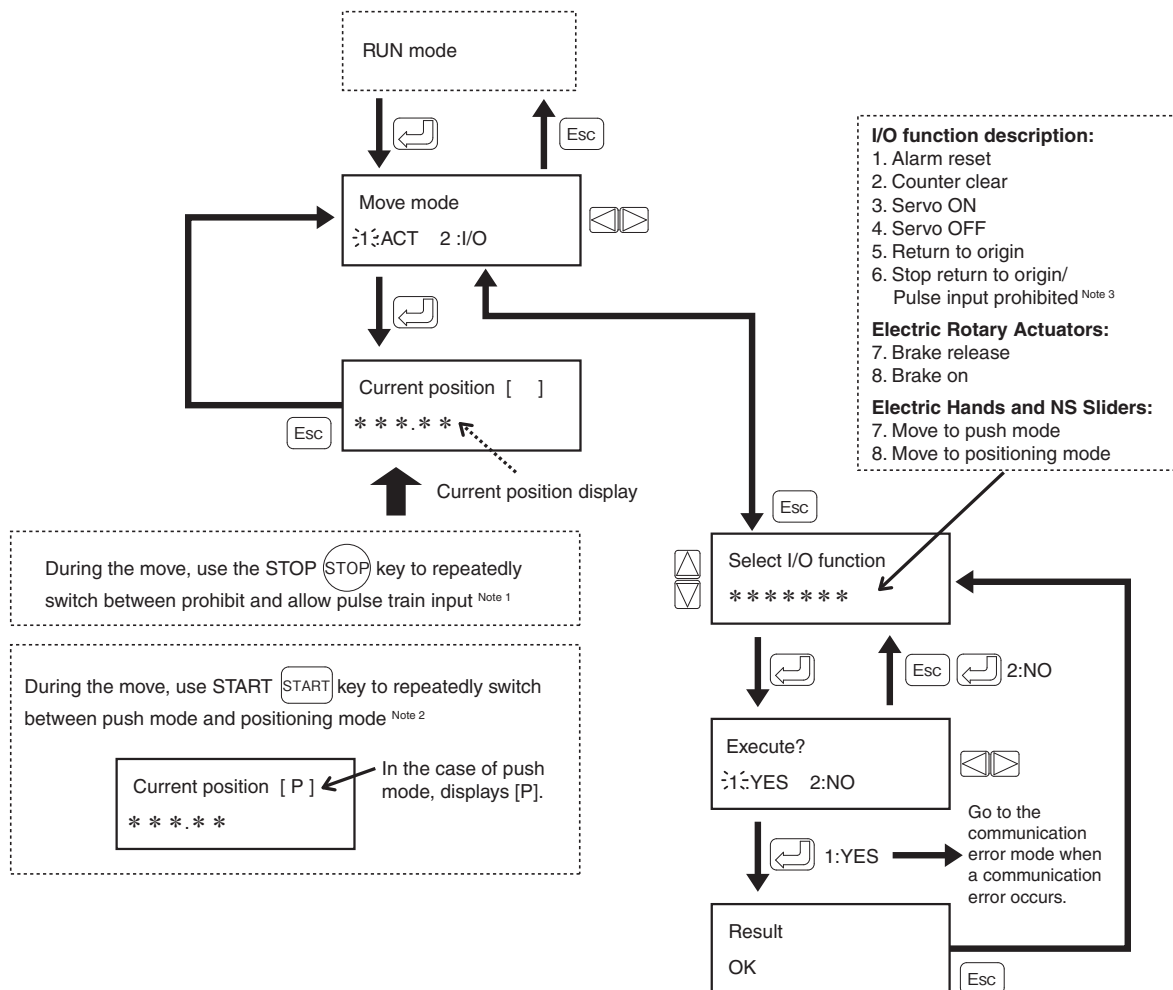


Figure 17 Return to origin flowchart

● [2: MOV] Move mode flow

[1:ACT] Checks the current position during operation. Also stops actuator and moves to push modes.

[2:I/O] Executes the input/output function in the teaching box.



- Notes: 1. Executing prohibition of pulse train input during high-speed operation could cause an overload.
- 2: The push function is not available for the Electric Rotary Actuators. Pressing the Start key will not bring the screen display to [P].
- 3: Pressing pulse train input prohibited switches between pulse disable and pulse enable.

Figure 18 Move mode flowchart

● [3:DS] Error monitor (DS) mode flow

If an error in the controller occurs while set to this screen, the error is displayed.

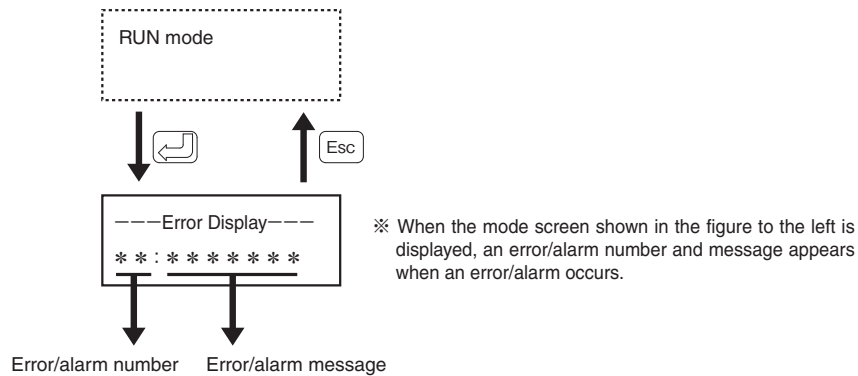


Figure 19 Error monitor flowchart

6-5. HE (help) Mode

Displays version information/error history.

● [1:VER] Version information

- In the mode selection screen, select [3:HE] using the keys.
Make [3:HE] start blinking and then confirm by pressing the enter key . (Figure A)
- In the screen shown in (B) below, select [1:VER] using the keys.
Make [1: VER] start blinking and then confirm by pressing the enter key .
- Version information is displayed.

● [2:ERR] Error history

- In the mode selection screen, select [3:HE] using the keys.
Make [3:HE] start blinking and then confirm by pressing the enter key . (Figure C)
- In the screen shown in (D) below, select [2:ERR] using the keys.
Make [2: ERR] start blinking and then confirm by pressing the enter key .
- The current and latest error history is displayed.

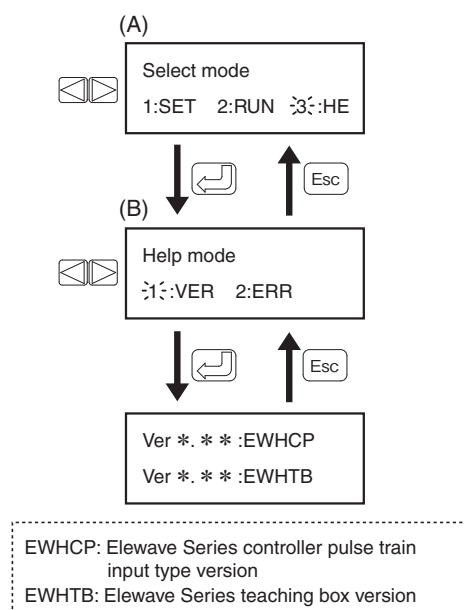


Figure 20 Version display flowchart

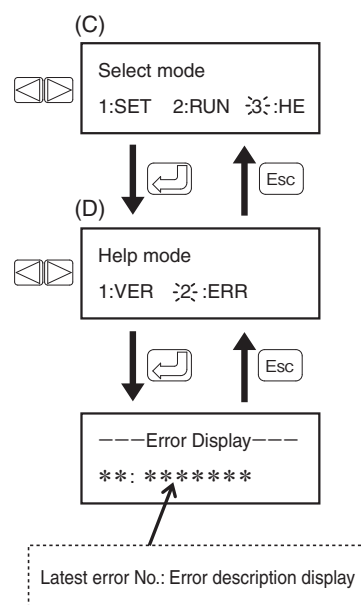


Figure 21 Error history display flowchart

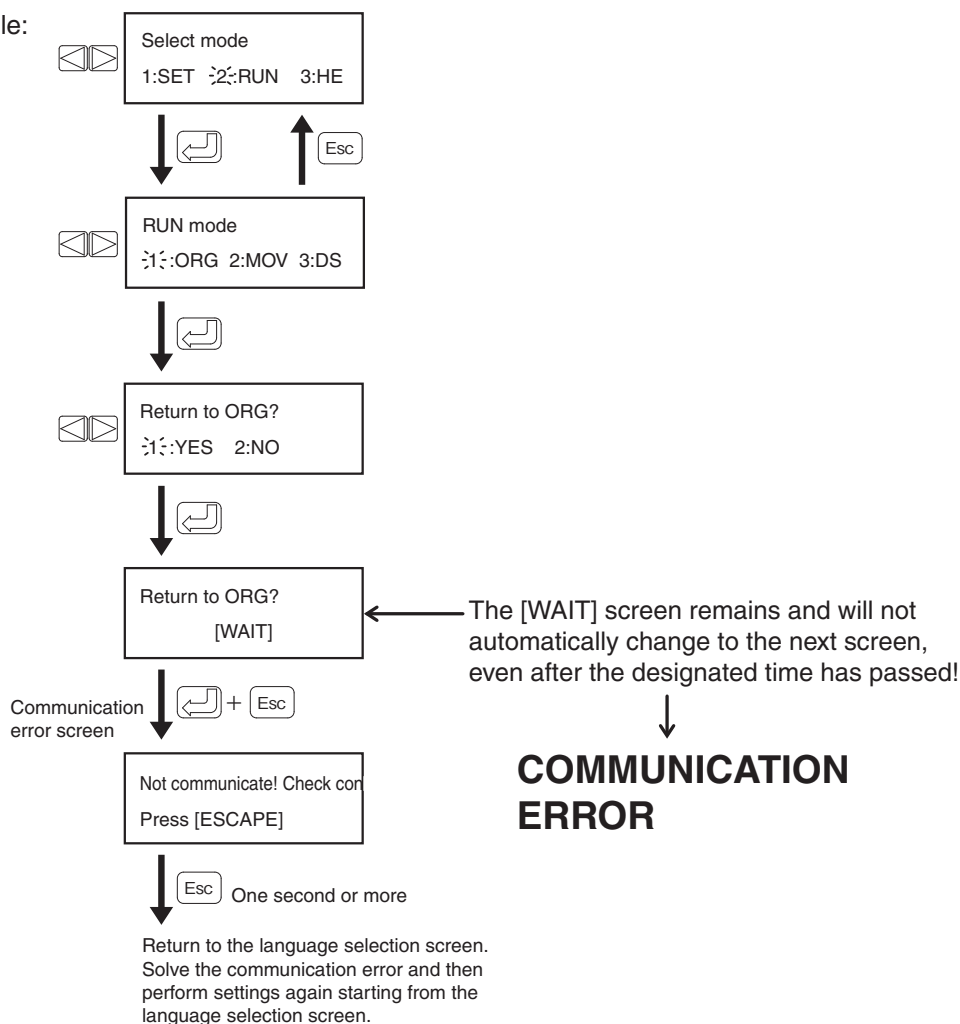
7. Communication Error Mode

When the second line on the LCD screen is [WAIT], the unit is communicating.

If for some reason the [WAIT] screen remains even after the designated time has passed, or if a different message or screen than that shown in the flowchart appears, there has been a communication error. (There was no response from the Elewave Series controller due to a disconnected communication cable or other such reason.)

Return to the language selection screen as shown in the following example and then check the communication cable or the Elewave Series controller.

Example:











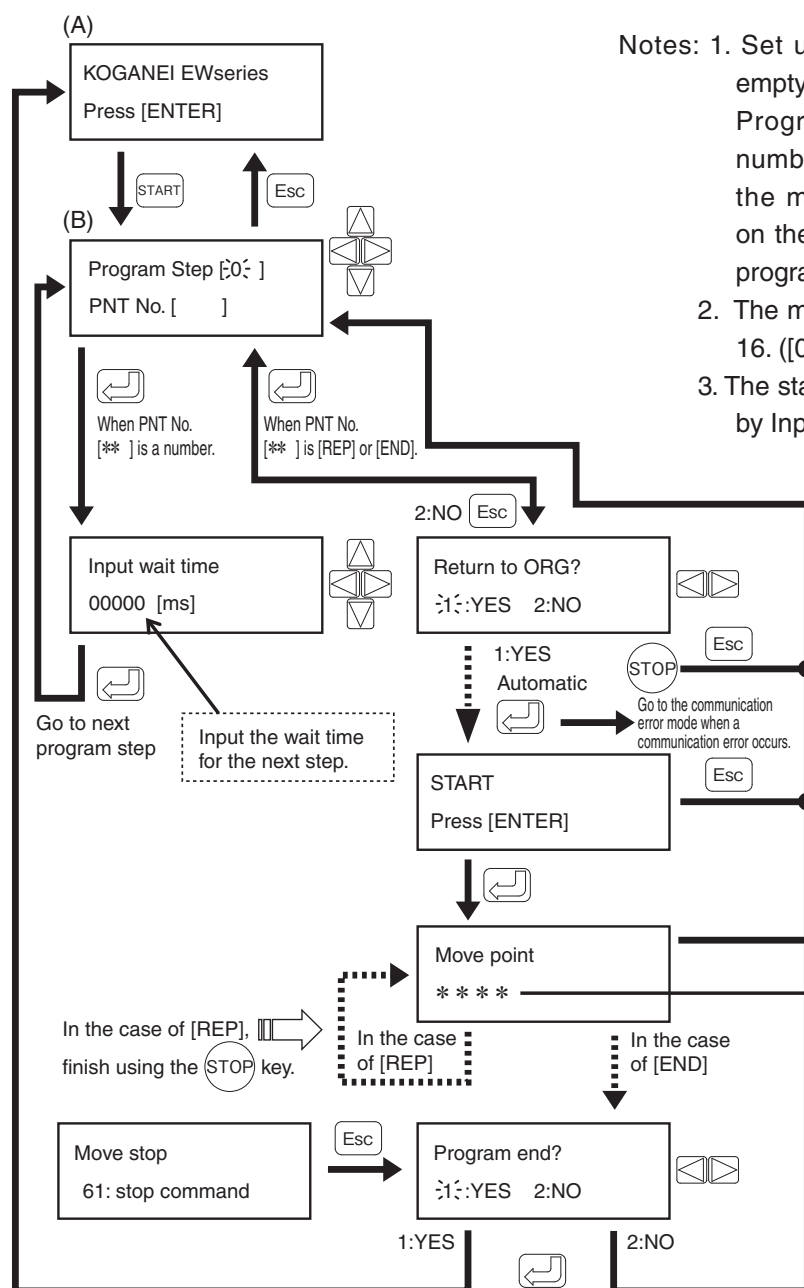
Caution: While movement operations, such as return to origin, are in progress, the display shows [WAIT]. At this time, be aware that pressing the and buttons together will cause the communication error screen to appear, even if the operation is proceeding correctly.

8. Simple Programming Function (Function for Point Input Type Only)

Points set using the point input type controller can be set to continuous operation up to a maximum 16 steps (programming). Use this function for performing trial operations, etc.

Operation method

- 1) In the initial screen (A), press the  key.
- 2) In the screen shown in (B) below, select a program step number using the  keys and then press the enter key . (16 steps are available to use.)
- 3) Next, use the  keys to enter the point number that you want to set in the PNT No.[* *] on the lower row.
(Use the  keys to select [REP] (repeat program) or [END] (end program) for the last step of the program.)
- 4) Pay attention to the following notes when selecting the point number for the program step.
- 5) When pressing the enter key  for [END] or [REP], return to origin is executed and the program starts running.
- 6) To stop the program, press the  key. The actuator stops when the  key is pressed. (The same applies to stop input for I/O.)




Notes: 1. Set up the program so that there is no empty step.

Programs run in the order of their step numbers. When there is an empty step, the message [21: illegal type] appears on the LCD screen. Be sure to set up the program properly again.

2. The maximum number of program steps is 16. ([0] to [15])

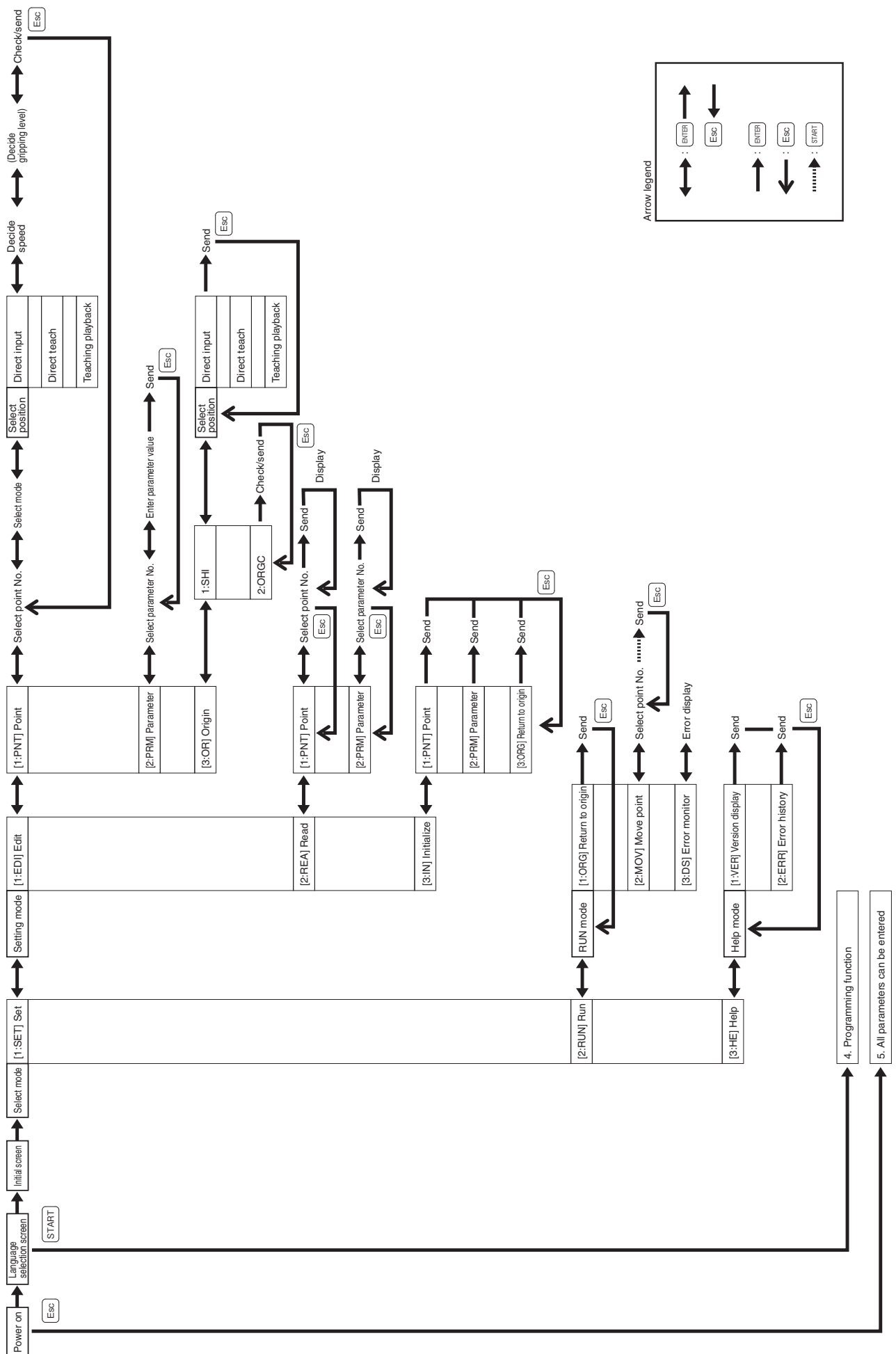
3. The standby time between steps is decided by Input standby time. (Unit: [ms])

Go to the communication error mode when a communication error occurs.

- [OK] is displayed in the case of normal operation.
- An error is displayed when an error occurs. Use the escape key  to set the program again.

- Menu hierarchy for teaching box of Elewave Series controller

Figure 5-1 Point input type



```

graph TD
    PowerOn[Power on] --> Language[Language selection screen]
    Language --> Initial[Initial screen]
    Initial --> SelectMode[Select mode]
    SelectMode --> SetMode[Set mode]
    SetMode --> SettingMode[Setting mode]
    
    SettingMode --> Edit[["[1:EDT] Edit"]]
    Edit --> ZonePos[["[1:PNT] Zone position"]]
    ZonePos --> Param[["[2:PRM] Parameter"]]
    Param --> Origin[["[3:OR] Origin"]]
    Origin --> ZoneData[["[1:POINT] Zone position data"]]
    ZoneData --> Param2[["[2:PARAM] Parameter"]]
    Param2 --> Init[["[3:IN] Initialize"]]
    Init --> ReturnOrg[["[1:ORG] Return to origin"]]
    ReturnOrg --> Move[["[2:MOV] Move"]]
    Move --> ErrorMon[["[3:DS] Error monitor"]]
    ErrorMon --> Version[["[1:VER] Version display"]]
    Version --> ErrHist[["[2:ERR] Error history"]]
    ErrHist --> IOPos[["[1:ACT] Current position display"]]
    IOPos --> IOFunc[["[2:I/O] I/O function execute"]]
    IOFunc --> DirectInput[["[1:DIR] Direct input"]]
    DirectInput --> DirectTeach[["[2:TEACH] Direct teach"]]
    DirectTeach --> CheckSend[["[1:CHK] Check/send"]]
    CheckSend --> Send[["[2:SEN] Send"]]
    
    Send --> Esc[Esc]
    Esc --> AllParams[4. All parameters can be entered]
    
    AllParams --> PowerOn
  
```

4. All parameters can be entered

Revision History

Ver 2.0 (Changes to ver.2.0)

Additions of Pulse Train Input Type Controller, and revisions to contents, on all pages.

Ver.3.0 (Changes to ver.3.0)

Additions of three models, the Electric Rotary Actuators EWHRT1A, 40A, and 60A.

If you have questions about the contents of this manual, or about other technical issues, please consult the OVERSEAS DEPARTMENT at the address and telephone number shown below.

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ELEWAVE SERIES TEACHING BOX EWHTB

OWNER'S MANUAL

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