



# **Data Setter OPX-2A**

## **PKA Series**

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## **OPERATING MANUAL**

Thank you for purchasing an Oriental Motor product.  
This Operating Manual describes product handling procedures and safety precautions.

- Please read it thoroughly to ensure safe operation.
- Always keep the manual where it is readily available.



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# 1 Safety precautions

The precautions described below are intended to prevent danger or injury to the user and other personnel through safe, correct use of the product. Use the product only after carefully reading and fully understanding these instructions.

Also read the "Safety precautions" sections in the operating manuals that came with the product you are combining with the **OPX-2A**.

 <b>Warning</b>	Handling the product without observing the instructions that accompany a "Warning" symbol may result in serious injury or death.
 <b>Caution</b>	Handling the product without observing the instructions that accompany a "Caution" symbol may result in injury or property damage.
<b>Note</b>	The items under this heading contain important handling instructions that the user should observe to ensure safe use of the product.

## **Warning**

### General

- Do not use the product in explosive or corrosive environments, in the presence of flammable gases, locations subjected to splashing water, or near combustibles. Doing so may result in fire, electric shock or injury.
- Assign qualified personnel the task of installing, wiring, operating/controlling, inspecting and troubleshooting the product. Failure to do so may result in fire, electric shock or injury.
- When the protective function is triggered, first stop operation and turn off the power, then turn on the power again after removing the cause. Continuing the operation without removing the cause of the problem may cause malfunction of the motor, leading to injury or damage to equipment.

### Repair, disassembly and modification

- Do not disassemble or modify the data setter. This may cause electric shock or injury. Refer all such internal inspections and repairs to the branch or sales office from which you purchased the product.

## **Caution**

### General

- Do not use the motor beyond the specifications. Doing so may result in electric shock, injury or damage to equipment.

### Operation

- Provide an emergency stop device or emergency stop circuit external to the equipment so that the entire equipment will operate safely in the event of a system failure or malfunction. Failure to do so may result in injury.

### Disposal

- To dispose of the data setter, disassemble it into parts and components as much as possible and dispose of individual parts/components as industrial waste.

## 2 Introduction

Only qualified personnel should work with the product. Use the product correctly after thoroughly reading the section "1 Safety precautions" on p.3.

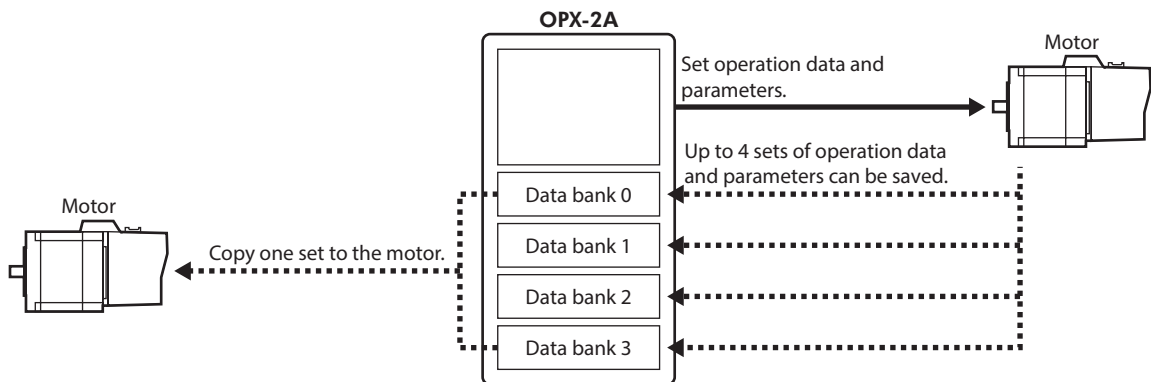
The product described in this manual has been designed and manufactured to be incorporated in general industrial equipment. Do not use for any other purpose. Oriental Motor Co., Ltd. is not responsible for any damage caused through failure to observe this warning.

### ■ Overview of the product

The **OPX-2A** is a data setter that lets you set operating data and parameters, perform monitoring, etc. So that the **OPX-2A** is used correctly and safely, thoroughly read the "**PKA Series USER MANUAL**" and understand the basic operating procedures and other details of the motor.

### ■ Features of OPX-2A

The **OPX-2A** can be used to save data in addition to setting of operation data and parameters. There are four destinations (data banks) to save data.



The **OPX-2A** can be used for the following purposes:

- Operation data and parameters of the motor can be set.
- The operating status of the motor can be monitored.
- The operation data and parameters set in the motor can be saved to the **OPX-2A**.
- The operation data and parameters saved in the **OPX-2A** can be copied to another motor connected to the **OPX-2A**.

### ■ Specifications

Connection	Mini DIN, 8 pins
External dimensions	96(W)× 72(H)× 21.5(D) mm [3.78 (W) × 2.83 (H) × 0.85 (D) in.]
Cable length	5 m (16.4 ft.)
Mass	0.25 kg (8.8 oz)

### ■ Hazardous substances

The products do not contain the substances exceeding the restriction values of RoHS Directive. (2011/65/EU)

## 3 Preparation

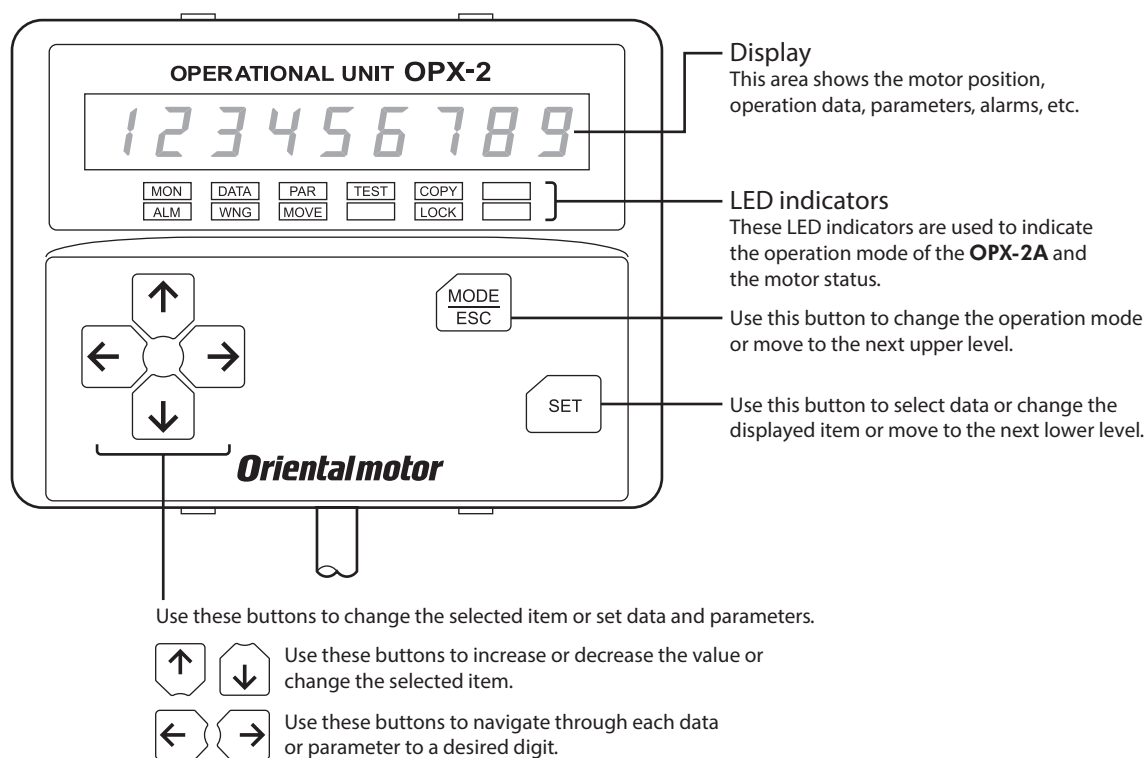
This chapter explains the items you should know before using the **OPX-2A**.

### 3.1 Checking the product

Verify that the items listed below are included. Report any missing or damaged items to the branch or sales office from which you purchased the product.

- Data setter **OPX-2A** ..... 1 unit
- OPERATING MANUAL (CD-ROM) ..... 1 pc.
- Information ..... 1 copy

### 3.2 Names and functions of parts



#### ■ Notation

In this manual, keys are denoted by symbols, such as  $\left[ \frac{\text{MODE}}{\text{ESC}} \right]$   $[\text{SET}]$   $[\uparrow]$   $[\downarrow]$   $[\leftarrow]$   $[\rightarrow]$ . In figures, a simplified illustration of the display and LED indicators is used, as shown below.



### 3.3 How to read the display

The display consists of 7-segment LEDs. (The number "5" and alphabet "S" are the same.)

· Numbers

1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

· Alphabets

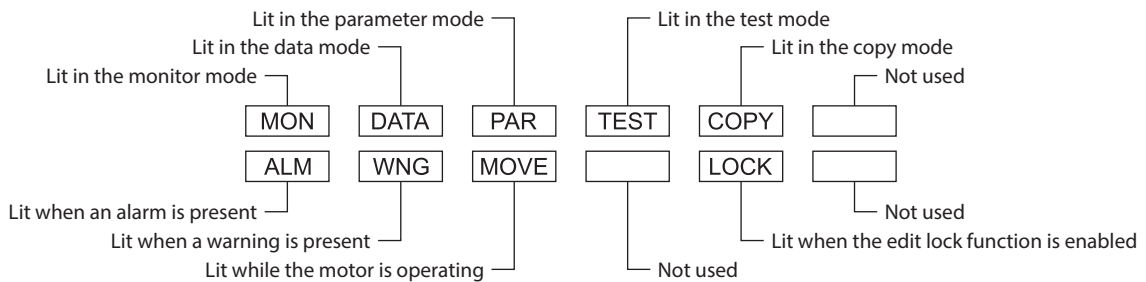
A	A	B	b	C	c	D	d	E	E	F	F	G	G	H	H	I	I	J	J	K	K	L	L
M	m	N	n	O	o	P	P	Q	q	R	r	S	S	T	t	U	U	V	v	W	w	Y	y

· Signs

+	+	-	-
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#### ■ How to read the LED indicators

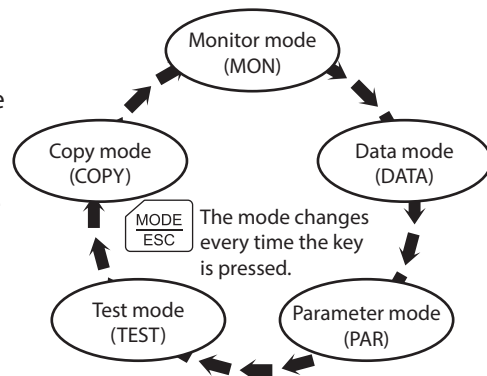
When the operation mode is changed or an alarm or warning generates, a corresponding LED will be lit. While the motor is operating or the edit lock function is enabled, the condition is also indicated by the illumination of a corresponding LED.



### 3.4 Types of operation modes

The OPX-2A has multiple operation modes, and the operation mode will change every time the  $\left[ \begin{smallmatrix} \text{MODE} \\ \text{ESC} \end{smallmatrix} \right]$  key is pressed. The display starts in the monitor mode when the power is turned on.

When the operation mode is changed, the LED indicator corresponding to the previous mode will turn off and the one corresponding to the new mode will be lit. Identify the current operation mode based on the LED indicator currently lit.

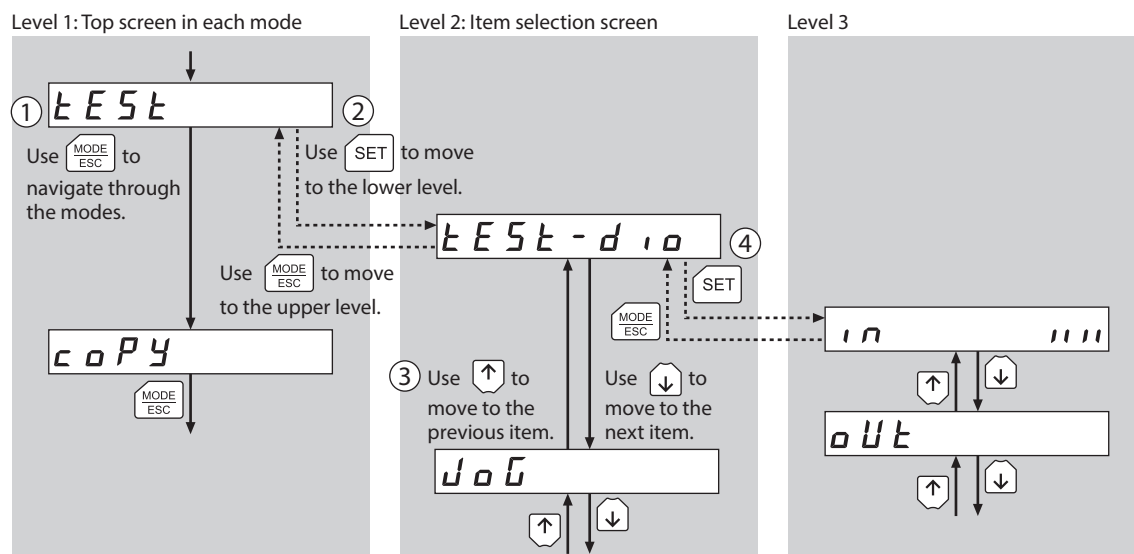


## 3.5 Basic operations of the OPX-2A

Use the six keys  $\left[ \frac{\text{MODE}}{\text{ESC}} \right]$   $\left[ \text{SET} \right]$   $\left[ \uparrow \right]$   $\left[ \downarrow \right]$   $\left[ \leftarrow \right]$   $\left[ \rightarrow \right]$  to set data and operate the motor.

### ■ Operation flow

The **OPX-2A** is operated according to the flow shown below.



1. Use the  $\left[ \frac{\text{MODE}}{\text{ESC}} \right]$  key to select a desired operation mode appropriate for your intended operation.  
Example: If you want to use a function in the test mode, press the  $\left[ \frac{\text{MODE}}{\text{ESC}} \right]$  key to select the test mode (indicated by a lit "TEST" LED). The top screen of the test mode is displayed.
2. Press the  $\left[ \text{SET} \right]$  key to move to the lower level.
3. Use the  $\left[ \uparrow \right]$   $\left[ \downarrow \right]$  keys to select a desired item.
4. To move to the lower level, press the  $\left[ \text{SET} \right]$  key. To return to the previous level, press the  $\left[ \frac{\text{MODE}}{\text{ESC}} \right]$  key.

As explained above, use the  $\left[ \text{SET} \right]$  key to navigate through the levels and use the  $\left[ \uparrow \right]$   $\left[ \downarrow \right]$  keys to select a desired item. This is the basic operation flow.

**Note** If the  $\left[ \text{SET} \right]$  key on the **OPX-2A** is pressed while internal processing is being performed, the top screen will not change to any of its sub-screens and "mEm-bUSy" will be shown on the display. Be sure to wait until all internal processing is completed, before pressing the  $\left[ \text{SET} \right]$  key.

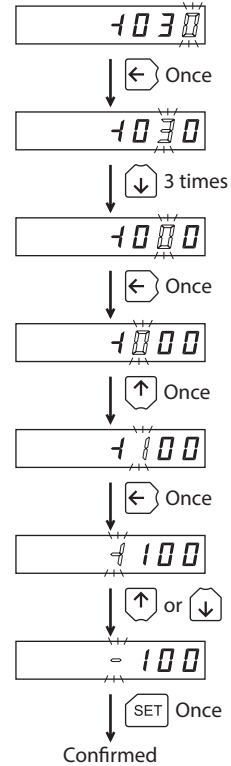
## ■ How to input values

As an example, how to change "+30" to "-100" is explained.

### Basic operations

- Use the [↑][↓] keys to increase/decrease the value or change the sign.  
Use the [←][→] keys to move to the digit you want to edit.
- If positive and negative values are differentiated, each value is preceded by a sign.
- You can edit the digit currently blinking.

1. First, change the 10's place from "3" to "0."  
Press the [←] key once to move to the 10's digit you want to edit.
2. Press the [↓] key three times to change the value to "0."
3. Next, change the 100's place from "0" to "1."  
Press the [←] key once to move to the 100's digit you want to edit.
4. Press the [↑] key once to change the value to "1."
5. Next, change the sign.  
Press the [←] key once to move to the sign digit you want to edit.
6. Press the [↑] or [↓] key once to change the sign to "-."
7. After all digits have been changed, press the [SET] key to confirm the value.  
All digits comprising the value blink for approx. 2 seconds.



**Note** | If the value you have input is outside the setting range, "Error" will be displayed for 1 second. If this error display appears, input a different value that falls within the setting range.

## 3.6 Edit lock function

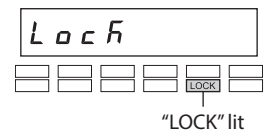
Enable the edit lock function if you want to prevent operation data and parameters from being edited or cleared. Operation data and parameters cannot be changed or deleted while the edit lock function is enabled.

### • Setting the edit lock function

In the top screen of each operation mode, press the [MODE/ESC] key for at least 5 seconds.

The display will show "Lock" and the edit lock function will be enabled.

The "LOCK" LED in the LED indicator area will also be lit.



"LOCK" lit

### • Canceling the edit lock function

Again in the top screen of each operation mode, press the [MODE/ESC] key for at least 5 seconds.

The display will show "UnLock" and the edit lock function will be cancelled.

The "LOCK" LED in the LED indicator area will turn off.





## 3.7 Rewriting the motor's non-volatile memory

Operation data and parameters are saved to the motor's non-volatile memory. The non-volatile memory can be rewritten approximately 100,000 times. The non-volatile memory will be rewritten after one of the following operations is performed:

- Edit any operation data or parameter
- Download data from the **OPX-2A** to the motor
- Initialize motor operation data and parameters

# 4 Installation and connection of the OPX-2A

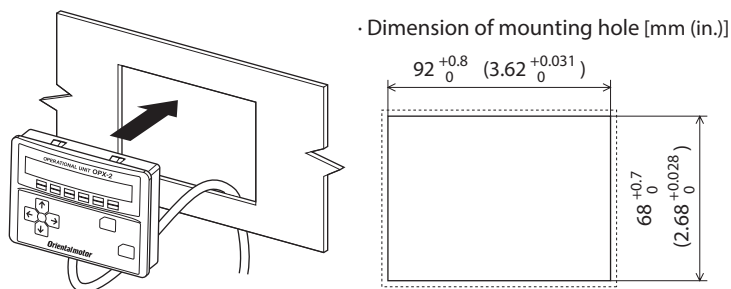
## 4.1 Location for installation

The **OPX-2A** is designed and manufactured to be incorporated in equipment. Install it in a well-ventilated location that provides easy access for inspection. The location must also satisfy the following conditions:

- Inside an enclosure that is installed indoors (provide vent holes)
- Operating ambient temperature 0 to +40 °C (+32 to +104 °F) (non-freezing)
- Operating ambient humidity 85% or less (no condensation)
- Area that is free of explosive atmosphere or toxic gas (such as sulfuric gas) or liquid
- Area not exposed to direct sun
- Area free of excessive amount of dust, iron particles or the like
- Area not subject to splashing water (rain, water droplets), oil (oil droplets) or other liquids
- Area free of excessive salt
- Area not subject to continuous vibration or excessive shocks
- Area free of excessive electromagnetic noise (from welders, power machinery, etc.)
- Area free of radioactive materials, magnetic fields or vacuum
- 1000 m (3300 ft.) or less above sea level

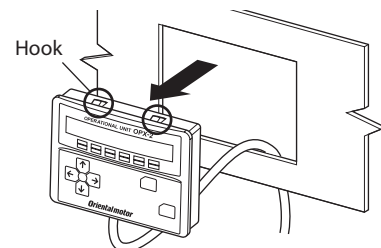
## 4.2 Installation method

Using a metal plate of 1 to 3 mm (0.04 to 0.12 in.) in thickness, insert the **OPX-2A** into the mounting hole from the front side and securely set the **OPX-2A** in place.



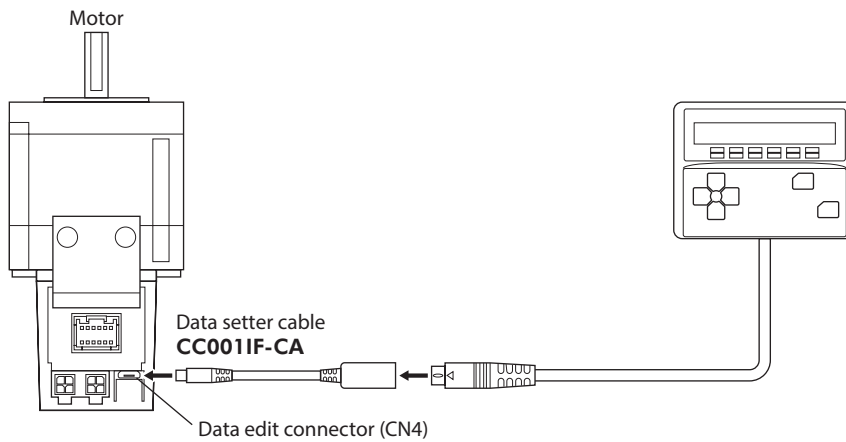
### Removing method

Press all of the four hooks provided on top and bottom of the **OPX-2A**. In this condition, press the **OPX-2A** forward to release.



## 4.3 Connecting to the motor

1. Connect the **OPX-2A** cable and accessory data setter cable **CC001IF-CA** (sold separately).
2. Turn on the motor power after connecting the data setter cable **CC001IF-CA** to the data edit connector (CN4) on the motor.




### Note

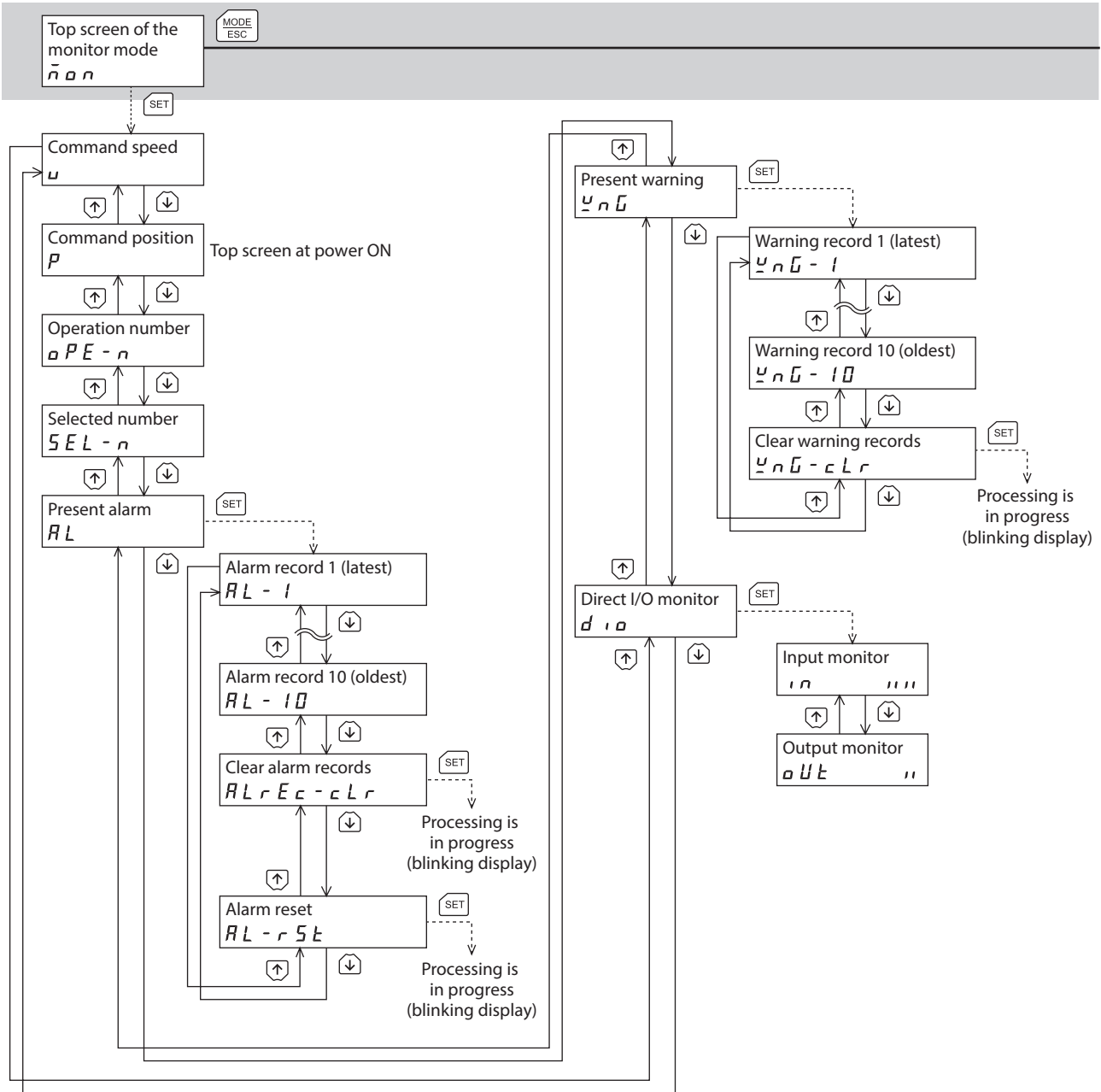
- When operation data and parameters are set on the **OPX-2A**, they will be stored in the motor. Once stored in the motor, the data will not be cleared even after the **OPX-2A** is disconnected from the motor.
- Turning on the power to the motor will also turn on the power to the **OPX-2A**. Turning off the motor power will turn off the **OPX-2A** power.
- Turn off the motor power before connecting or disconnecting the **OPX-2A** cable.

## 4.4 Error display on OPX-2A screen

The following error message is displayed on the **OPX-2A** screen.

Error display	Description	Remedial action
	A communication error occurred between the <b>OPX-2A</b> and motor.	<ul style="list-style-type: none"> <li>• Check if the <b>OPX-2A</b> is connected securely.</li> <li>• Check if the cables connecting the <b>OPX-2A</b> are disconnected or damaged.</li> <li>• The <b>OPX-2A</b> or the communication part of the motor may have damaged. Contact your nearest Oriental Motor sales office.</li> </ul>

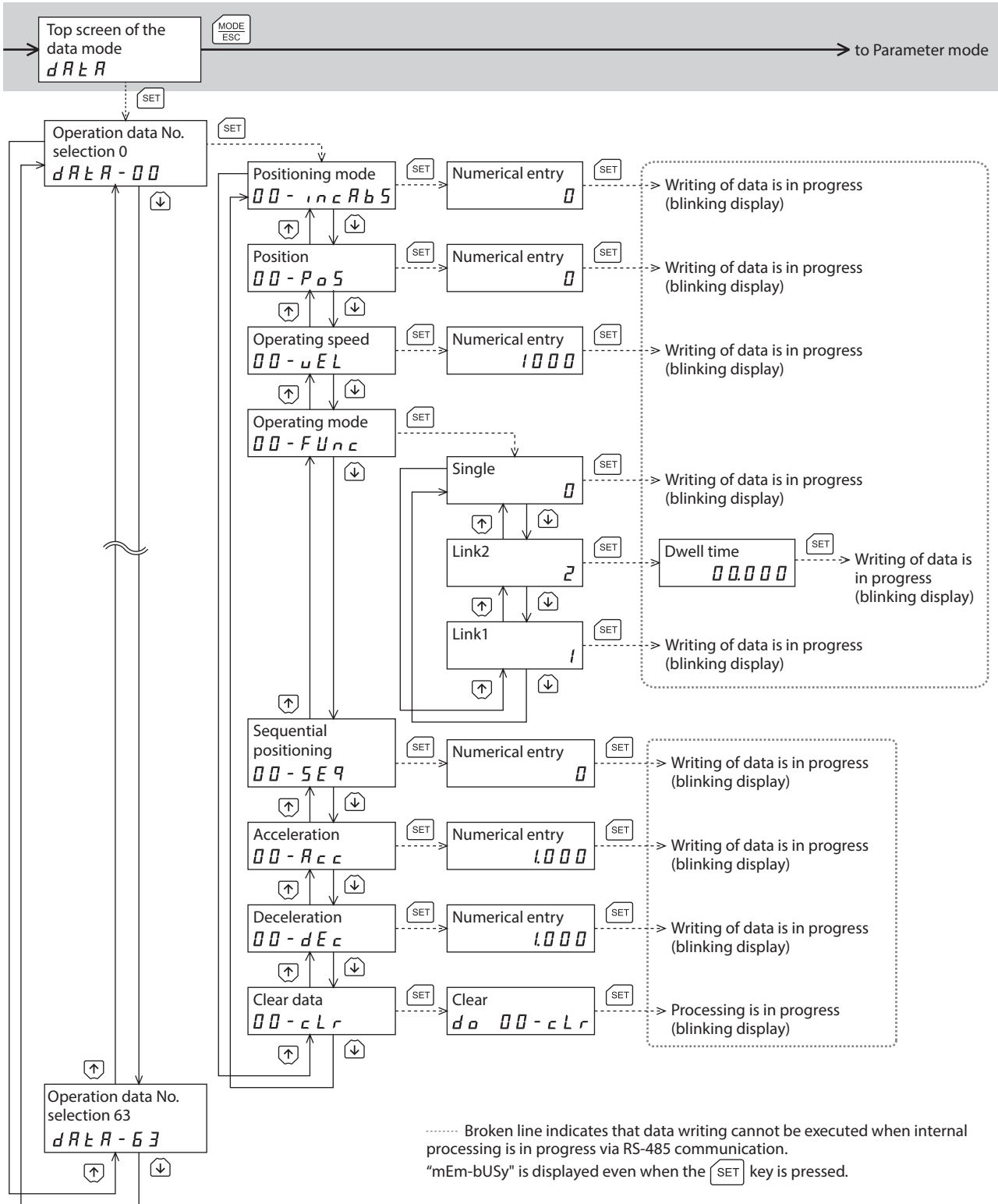
# 5 Screen transitions

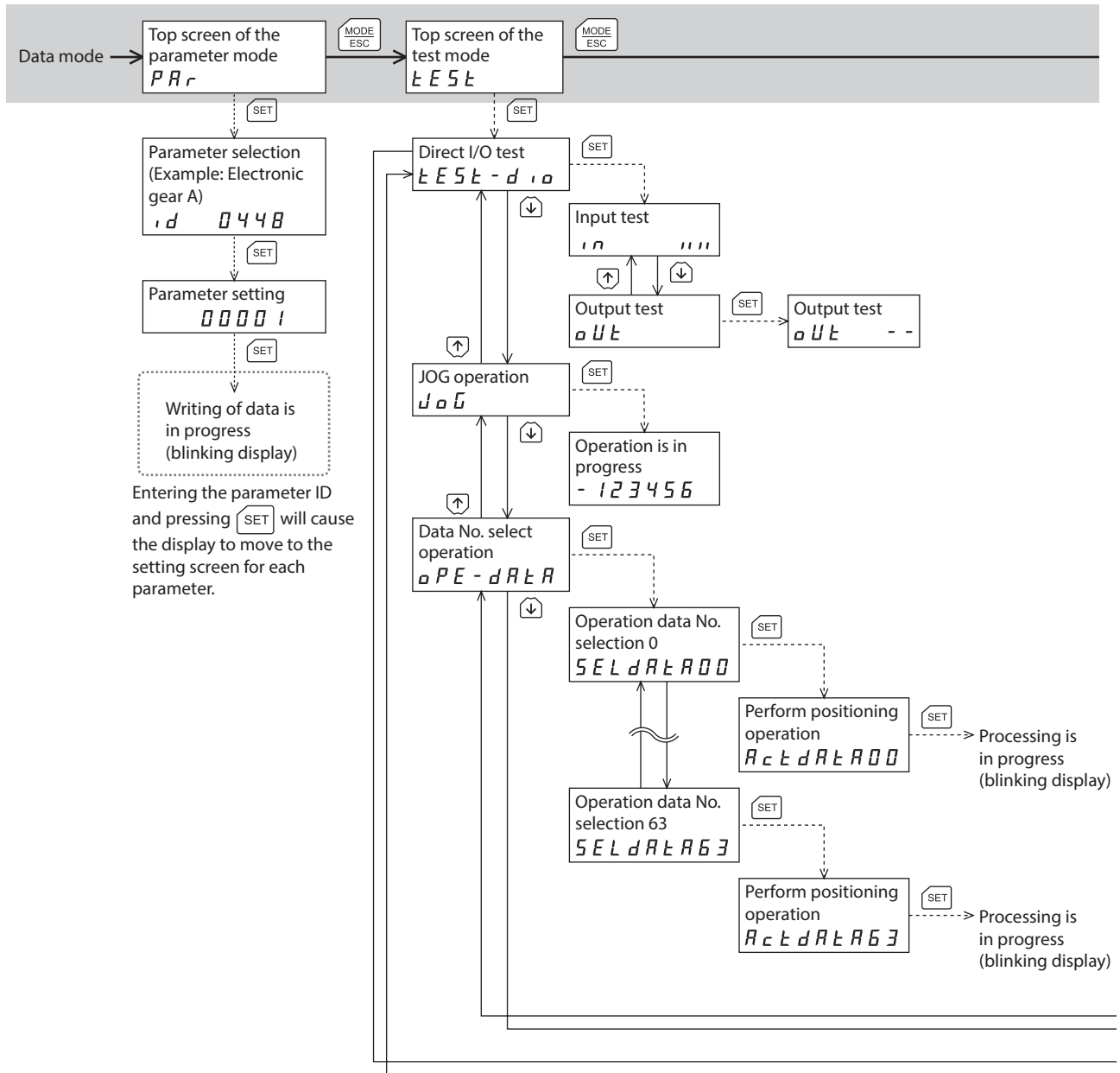


In the lower level except the top screen, press the **MODE ESC** key to return to the previous level.

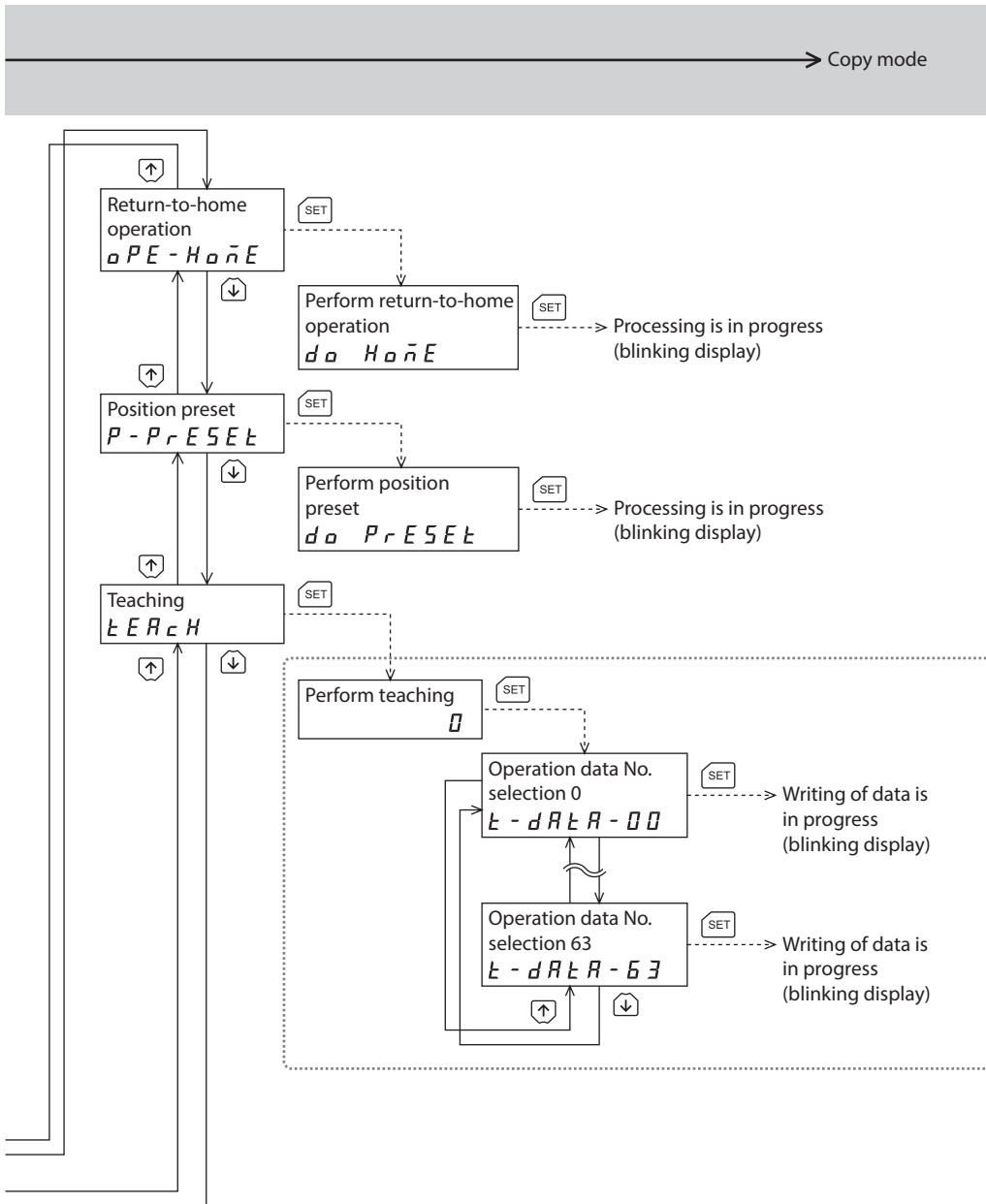
**Note**

- There are the following restrictions while the edit lock function is effective.
  - Data mode, parameter mode: Although they are displayed on the screen, they are unable to operate.
  - Clearing the alarm and warning records, clear data, position preset, teaching, copy mode: They are not displayed on the screen.
- If the HMI input is in an OFF state, functions other than monitor mode, upload, or verification cannot be executed.

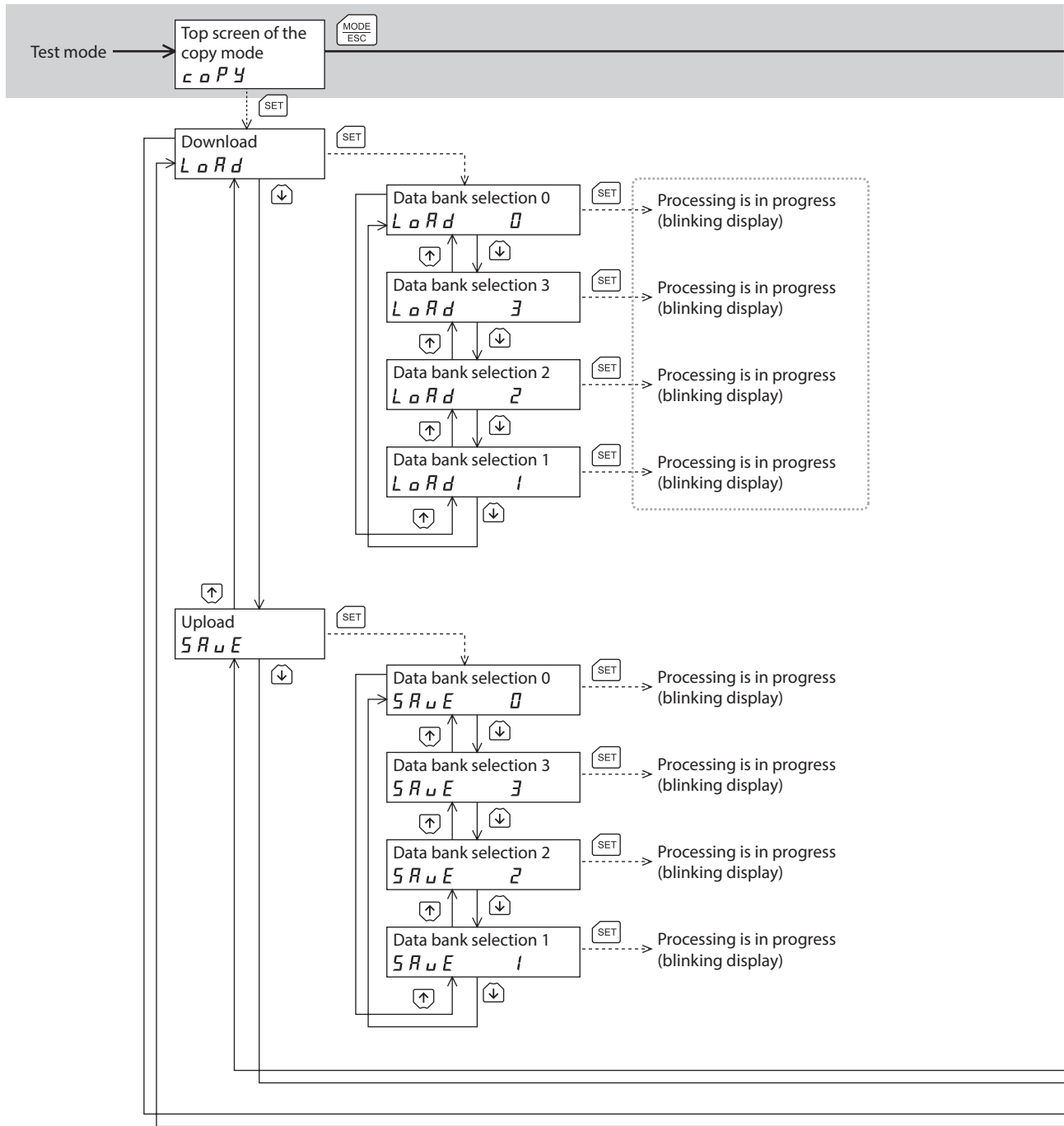




In the lower level except the top screen, press the **MODE ESC** key to return to the previous level.

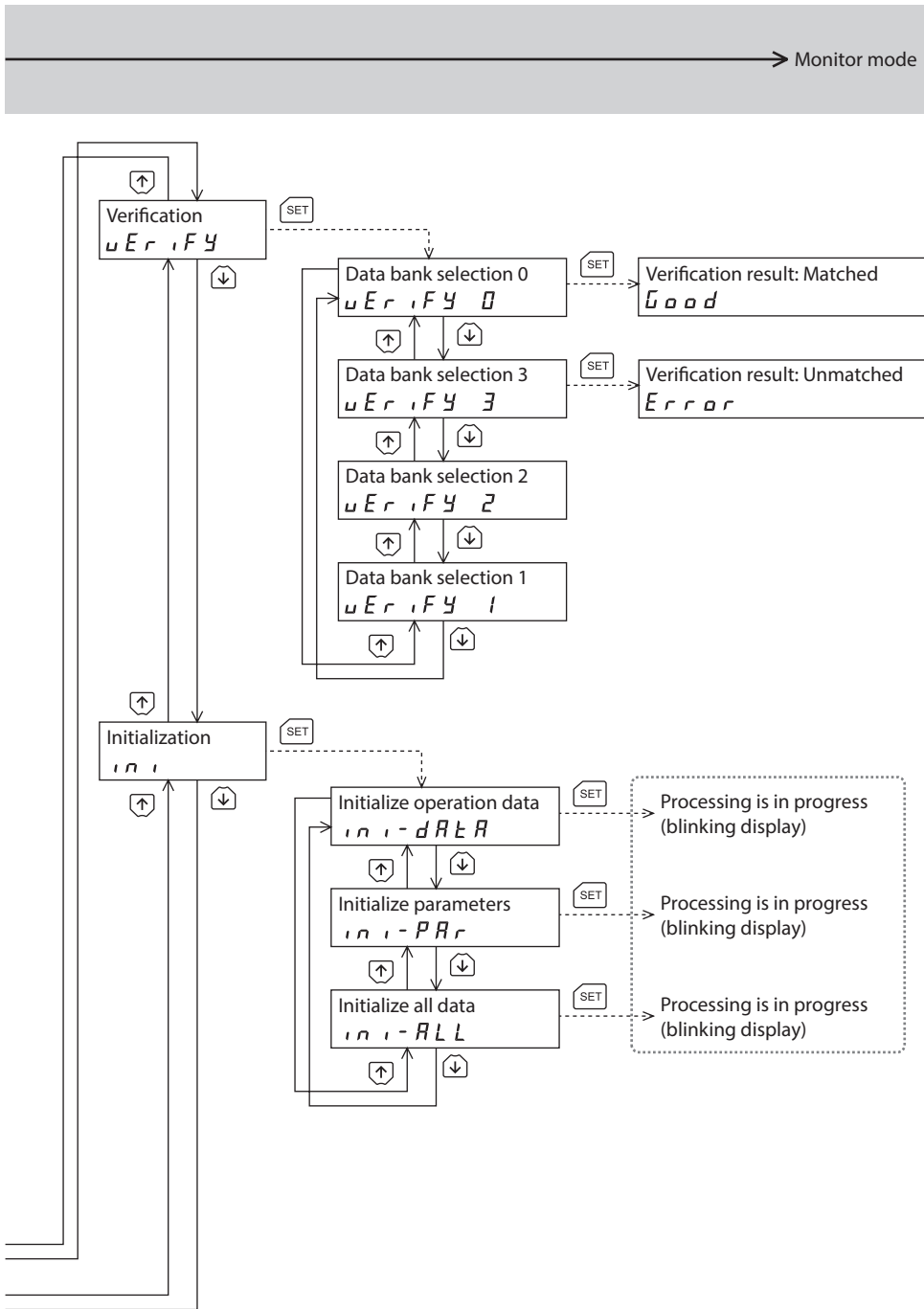


..... Broken line indicates that data writing cannot be executed when internal processing is in progress via RS-485 communication.  
 "mEm-bUSy" is displayed even when the  key is pressed.



In the lower level except the top screen, press the **MODE ESC** key to return to the previous level.





----- Broken line indicates that data writing cannot be executed when internal processing is in progress via RS-485 communication.  
"mEm-bUSy" is displayed even when the SET key is pressed.

## 6 Monitor mode

### 6.1 Overview of the monitor mode

- **Monitoring the operating status**

You can monitor the motor speed, command position, operation data number corresponding to the current operation, and operation data number currently selected in real time.

- **Checking alarms/warnings, clearing alarm/warning records, and resetting alarms**

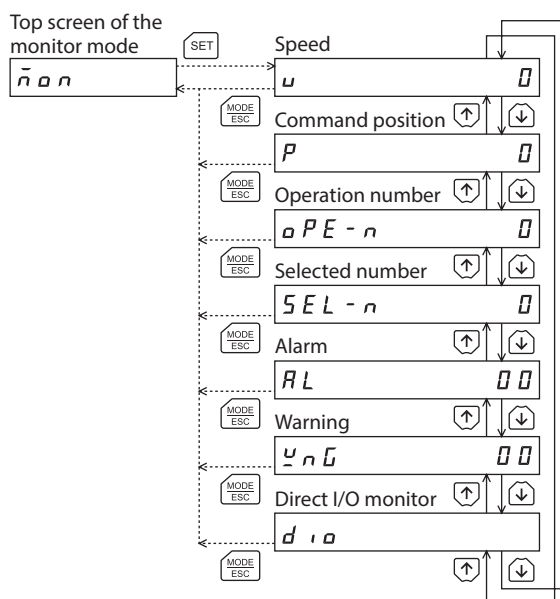
- If an alarm or warning generates, a corresponding alarm code or warning code will be displayed. You can check the code to identify the details of the alarm/warning.
- Up to ten most recent alarms/warnings can be displayed, starting from the latest one.
- You can reset the alarms currently present.
- You can clear alarm and warning records.

- **Checking I/O signals**

You can check the ON/OFF status of each I/O signal of the motor.

### 6.2 Operation in the monitor mode

1. Use the  $\left[ \begin{smallmatrix} \text{MODE} \\ \text{ESC} \end{smallmatrix} \right]$  key to select the monitor mode.
2. Press the  $\left[ \text{SET} \right]$  key in the top screen of the monitor mode.
3. Use the  $\left[ \uparrow \right]$   $\left[ \downarrow \right]$  keys to select the item you want to monitor.



## 6.3 Monitor items

### ■ Motor speed

You can check the motor rotation speed (unit: Hz).

While the motor is rotating in the CCW direction, "-" is shown in front of the displayed value. If the speed is indicated by an absolute value, no sign is shown to indicate the rotation direction. You can select the value display format using the "display mode of the data setter speed" parameter [ID: 480].

### ■ Command position

You can check the command position of the motor with reference to the home position.

If a resolution is set, an appropriate value based on the resolution is shown as steps.

### ■ Operation number

You can check the operation data number corresponding to the data used in the current positioning operation.

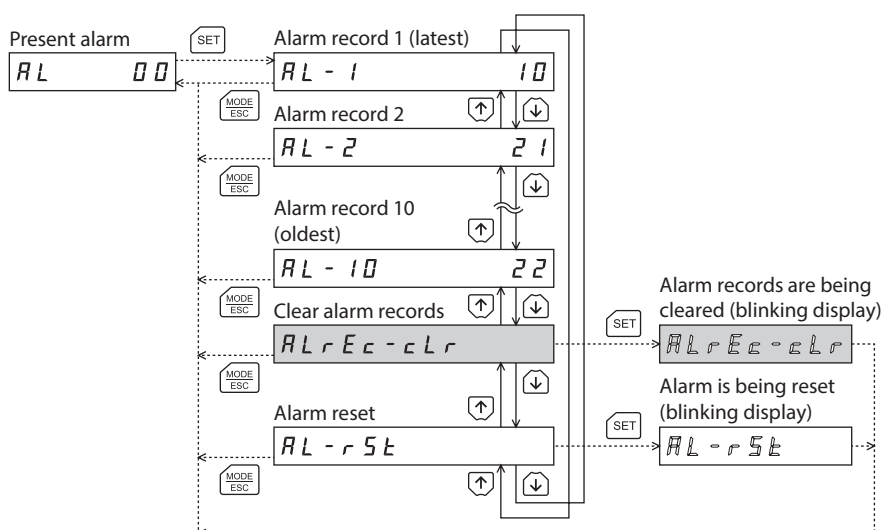
### ■ Selected number

You can check the operation data number currently selected.

### ■ Alarm

When an alarm generates, a corresponding alarm code will be displayed.

You can also reset alarms or check and clear alarm records.



\* If operations are limited by the edit lock function, the screen text in gray is not shown.

#### Note

- Do not turn off the motor power while an alarm is being reset or alarm records are being cleared (=while the display is blinking). Doing so may damage the data.
- If operations are limited by the edit lock function, the alarm records cannot be cleared.
- Some alarms cannot be reset on the **OPX-2A**. Refer to "Alarm code list" on p.20 for details. To reset these alarms, you must cycle the motor power.

### Alarm code list

Code	Alarm name	Resetting on the <b>OPX-2A</b>	Number of ALM LED blinks	
21h	Main circuit overheat	Possible	2	
22h	Overvoltage		3	
25h	Undervoltage		2	
34h	Command pulse error	Not possible	9	
41h	EEPROM error			
4Ah	Return-to-home incomplete	Possible	7	
60h	±LS both sides active			
61h	Reverse limit sensor connection			
62h	Home seeking error			
63h	No HOMES			
64h	TIM, SLIT input error			
66h	Overtravel			
67h	Software overtravel			
6Ah	Home seeking offset error			
70h	Invalid operation data			
71h	Electronic gear setting error			Not possible
81h	Network bus error			Possible
83h	Communication switch setting error			Not possible
84h	RS-485 communication error	Possible		
85h	RS-485 communication timeout			
8Eh	Network converter error	Not possible		
F0h	CPU error		Lit	

#### • How to reset an alarm

1. While an alarm is displayed, press the **[SET]** key to move to the lower level.
2. Press the **[↑]** key to select the alarm reset screen.
3. Press the **[SET]** key.  
The alarm is reset.

#### • How to check an alarm record

You can check up to ten most recent alarms, starting from the latest one.

1. While an alarm is displayed, press the **[SET]** key to move to the lower level.  
The latest alarm is displayed.
2. Press the **[↓]** key.  
The second latest alarm is displayed.
3. Every time the **[↓]** key is pressed, the next older alarm will be displayed. Use the **[↑]****[↓]** keys to select the alarm record you want to check.

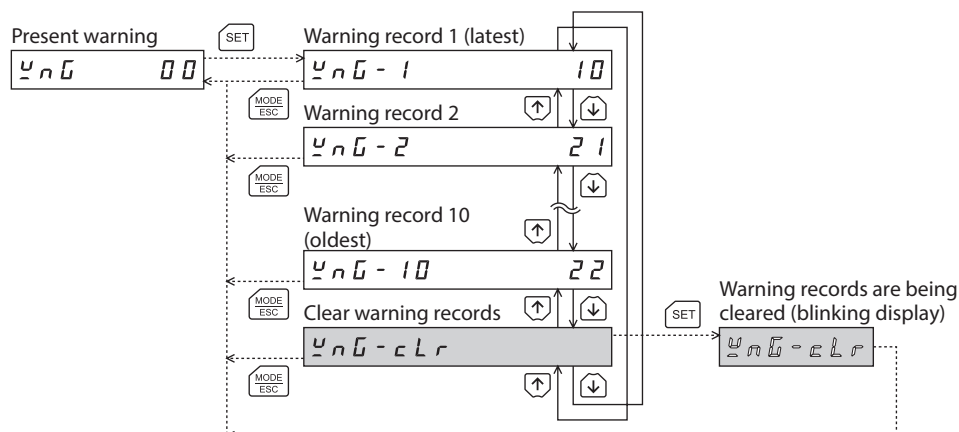
#### • How to clear all alarm records

You can clear all alarm records at once.

1. While an alarm is displayed, press the **[SET]** key to move to the lower level.
2. Press the **[↑]** key three times and select the alarm record clear screen.
3. Press the **[SET]** key.  
All alarm records are cleared.

## Warning

When a warning generates, a corresponding warning code will be displayed. You can also check or clear warning records.



\* If operations are limited by the edit lock function, the screen text in gray is not shown.

### Note

- Do not turn off the motor power while warning records are being cleared (=while the display is blinking). Doing so may damage the data.
- If operations are limited by the edit lock function, the warning records cannot be cleared.
- You can also clear the warning records by turning off the motor power.

### Warning code list

Code	Warning name
21h	Main circuit overheat
22h	Overvoltage
25h	Undervoltage
71h	Electronic gear setting error
84h	RS-485 communication error

### How to check a warning record

You can check up to ten most recent warnings, starting from the latest one.

1. While a warning is displayed, press the **[SET]** key to move to the lower level. The latest warning is displayed.
2. Press the **[↓]** key. The second latest warning is displayed.
3. Every time the **[↓]** key is pressed, the next older warning will be displayed. Use the **[↑]****[↓]** keys to select the warning record you want to check.

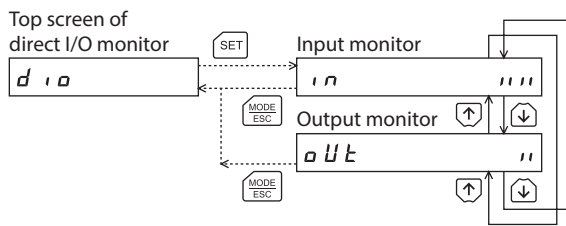
### How to clear all warning records

You can clear all warning records at once.

1. While a warning is displayed, press the **[SET]** key to move to the lower level.
2. Press the **[↑]** key and select the warning record clear screen.
3. Press the **[SET]** key. All warning records are cleared.

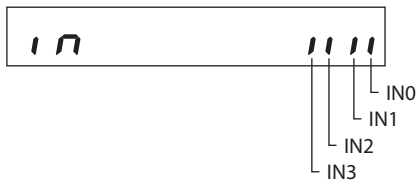
## ■ Direct I/O monitor

You can check the ON/OFF status of each I/O signal of the motor.

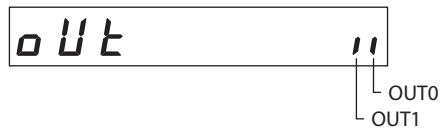


Each digit on the 7-segment LED display corresponds to a signal. If the signal is ON, the corresponding digit is lit. If the signal is OFF, the digit is unlit.

- Input monitor



- Output monitor



## 7 Data mode

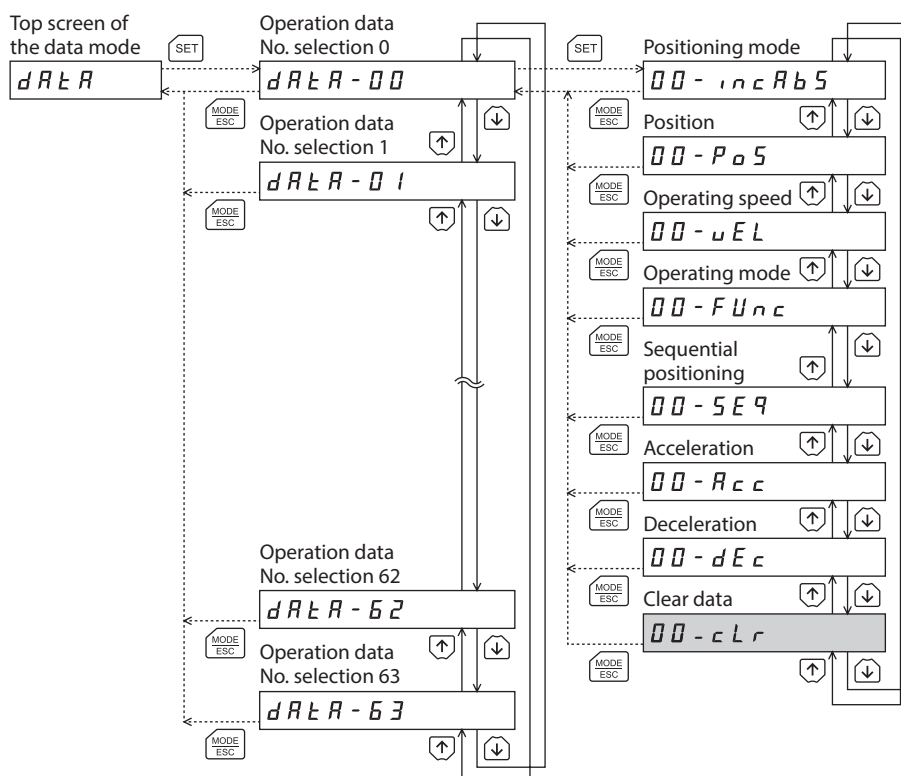
Up to 64 sets of motor operation data can be set. Once set, the operation data is stored in the motor. The data will not be lost even after the **OPX-2A** is disconnected from the motor.

Before setting operation data, read the USER MANUAL carefully to understand the basic operations, functions and other details of the motor.

- Note**
- Operation data has significant bearing on motor operation. Before setting any operation data, make sure you fully understand the content of the operation data.
  - If operations are limited by the edit lock function or the HMI input is in an OFF state, the operation data cannot be edited.
  - Operation data can also be set by selecting the ID with the parameter mode.
  - If the **[SET]** key is pressed while executing the internal processing via RS-485 communication, "mEm-bUSy" may be displayed. Check "5 Screen transitions" on p.12 when "mEm-bUSy" is displayed. Be sure to wait until all internal processing is completed, before pressing the **[SET]** key.

### 7.1 Operation in the data mode

1. Use the **[MODE/ESC]** key to select the data mode.
2. Press the **[SET]** key on the top screen of the data mode.
3. Use the **[↑]**/**[↓]** keys to select a desired operation data number.
4. Press the **[SET]** key.
5. Use the **[SET]** key to select the operation data item you want to set.
6. When pressing the **[SET]** key on the last operation data item, the display returns to the operation data No. screen.



\* If operations are limited by the edit lock function, the screen text in gray is not shown.

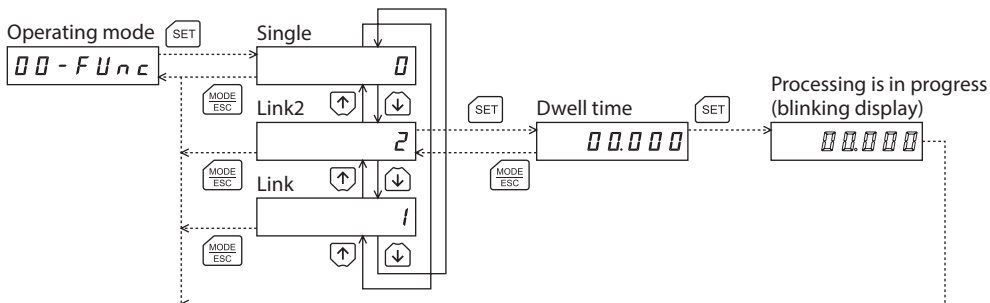
## 7.2 Setting items

Setting item	Initial value	Setting range	Description
Positioning mode	0	0: Incremental mode 1: Absolute mode	Selects how to specify the position (travel amount) in positioning operation (absolute mode or incremental mode).
Position	0	-8,388,608 to +8,388,607 step	Sets the position (distance) for positioning operation.
Operating speed	1000	1 to 1,000,000 Hz	Sets the operating speed in positioning operation and continuous operation.
Operating mode	0	0: Single 1: Link1 2: Link2	Sets the operation mode to execute positioning operation.
Sequential positioning	0	0: Disable 1: Enable	Sets enable or disable sequential positioning operation.
Acceleration	30.000	0.001 to 1000.000 (ms/kHz or s)	Sets the acceleration rate in positioning operation and continuous operation.*
Deceleration			Sets the deceleration rate in positioning operation and continuous operation.*
Dwell time	0.000	0.000 to 50.000 s	Sets the dwell time to be used in linked-motion operation 2.

\* This item is effective when the "acceleration (deceleration) rate type" parameter [ID: 326] is set to "separate." If this parameter is set to "common," the values of the "common acceleration rate" [ID: 320] and "common deceleration rate" [ID: 321] parameters will be used. (Initial value: Separate)

### ■ How to set the dwell time

When displaying the "Link2" on the "operating mode" and pressing the [SET] key, the screen to set the dwell time is displayed. Input the dwell time using the [↑][↓][←][→] keys and press the [SET] key.



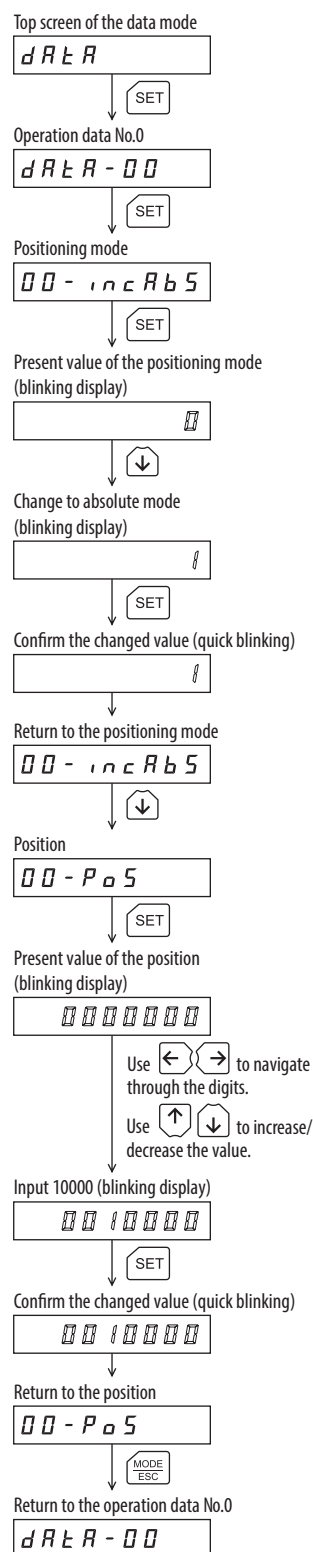


## 7.3 Setting example

This section explains how to change the the positioning mode and position of the operation data No.0.

- Positioning mode: Changes from incremental mode to absolute mode.
- Position: Changes from 0 step to 10000 steps.

1. Use the  $\left[ \begin{smallmatrix} \text{MODE} \\ \text{ESC} \end{smallmatrix} \right]$  key to select the data mode.  
The "DATA" LED is lit.
2. Press the  $\left[ \text{SET} \right]$  key on the top screen of the data mode.  
The display changes to the operation data No.0 screen.
3. Press the  $\left[ \text{SET} \right]$  key.  
The display changes to the positioning mode screen.
4. Press the  $\left[ \text{SET} \right]$  key again.  
The present set value of the positioning mode is displayed with blinking.
5. Press the  $\left[ \downarrow \right]$  key once to select "1."
6. Press the  $\left[ \text{SET} \right]$  key.  
The blinking speed of the input value becomes quickly and the value is set.  
The display returns to the positioning mode screen.
7. Press the  $\left[ \downarrow \right]$  key.  
The display changes to the position screen.
8. Press the  $\left[ \text{SET} \right]$  key.  
The present set value of the position is displayed with blinking.
9. Use the  $\left[ \uparrow \right] \left[ \downarrow \right] \left[ \leftarrow \right] \left[ \rightarrow \right]$  keys to select "10000."  
The selected digit is displayed with blinking.
10. Press the  $\left[ \text{SET} \right]$  key.  
The blinking speed of the input value becomes quickly and the value is set.  
The display returns to the position screen.
11. Press the  $\left[ \begin{smallmatrix} \text{MODE} \\ \text{ESC} \end{smallmatrix} \right]$  key.  
The display returns to the operation data No.0 screen.



## 7.4 Initialization of the selected operation data

All of the set value for the selected operation data number can be restored to the initial values.

1. Use the  $\left[ \begin{smallmatrix} \text{MODE} \\ \text{ESC} \end{smallmatrix} \right]$  key to select the data mode.  
The "DATA" LED is lit.
2. Press the  $\left[ \text{SET} \right]$  key on the top screen of the data mode.  
The display changes to the operation data No.0 screen.
3. Press the  $\left[ \text{SET} \right]$  key.  
The display changes to the positioning mode screen.
4. Press the  $\left[ \uparrow \right]$  key once.  
The display changes to the clear data screen.
5. Press the  $\left[ \text{SET} \right]$  key.  
The display changes to the screen to execute clearing.
6. Press the  $\left[ \text{SET} \right]$  key.  
The display blinks and the operation data No.0 is cleared.

Top screen of the data mode

d R t R

SET

Operation data No.0

d R t R - 0 0

SET

Positioning mode

0 0 - i n c R b S

Once

Clear data

0 0 - c L r

SET

Clear

d a 0 0 - c L r

SET

Processing is in progress  
(blinking display)

d a 0 0 - c L r

**Note** | If operations are limited by the edit lock function, the initialization cannot be performed.

## 7.5 Initialization of all operation data

The operation data saved in the motor can be restored to the initial values.

For details, refer to the screen transition of the copy mode on p.16 or "10.6 Initializing motor data" on p.42.

## 8 Parameter mode

You can set parameters relating to motor operation and control. These parameters are saved in the motor. Before setting parameters, read the "PKA Series USER MANUAL" carefully to understand the basic operations, functions and other details of the motor.

- Note**
- Parameters have significant bearing on motor operation. Before setting any parameter, make sure you fully understand the content of the parameter.
  - If operations are limited by the edit lock function or the HMI input is in an OFF state, the parameters cannot be edited.
  - If the value you have input is outside the setting range, "Error" will be displayed for 1 second. If this error display appears, input a different value that falls within the setting range.
  - If the [SET] key is pressed while executing the internal processing via RS-485 communication, "mEm-bUSy" may be displayed. Check "5 Screen transitions" on p.12 when "mEm-bUSy" is displayed. Be sure to wait until all internal processing is completed, before pressing the [SET] key.
  - If a non-existent parameter ID is entered, "id-Error" will be displayed for 1 second. Check the ID and enter the correct one.

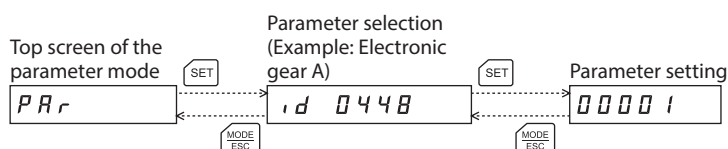
### ■ Timing for the setting value to become effective

When a parameter is changed, the timing for the new value to become effective varies depending on the parameters, which are the following three types.

- Effective immediately  
Executes the recalculation and setup immediately when writing the parameter.
- Effective after stopping the operation  
Executes the recalculation and setup after stopping the operation.
- Effective after turning the power ON again  
Executes the recalculation and setup after turning the power ON again.

### 8.1 Operation in the parameter mode

- Use the [MODE/ESC] key to select the parameter mode.
- Press the [SET] key on the top screen of the parameter mode.
- Use the [↑][↓][←][→] keys to enter the parameter ID.
- Press the [SET] key.  
The display changes to the parameter setting screen.
- Use the [↑][↓][←][→] keys to enter the value.

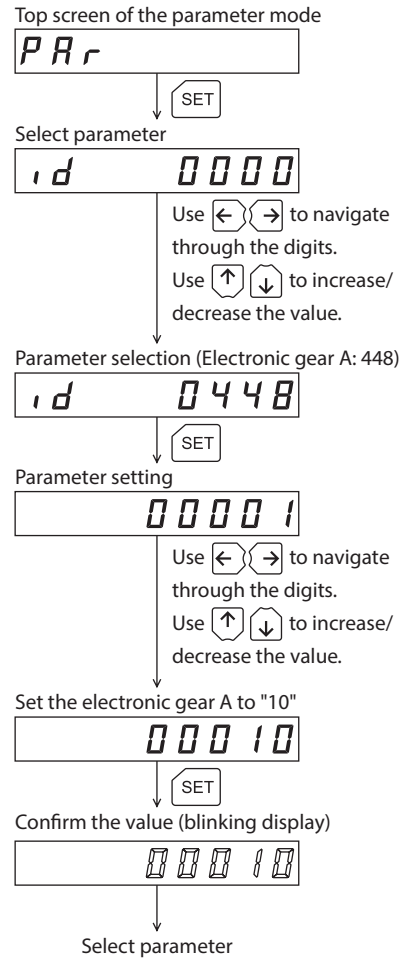


## 8.2 Setting example

Pressing [SET] on the parameter selection screen enables to set parameters.  
The setting method of the parameter is explained here.

### Example: When setting the electronic gear A (ID: 448) to "10"

1. Use the [MODE/ESC] key to select the parameter mode.  
The "PAR" LED is lit.
2. Press the [SET] key.  
The display changes to the parameter selection screen.
3. Use the [↑][↓][←][→] keys to enter "0448".
4. Press the [SET] key.  
The display changes to the parameter setting screen.
5. Use the [↑][↓][←][→] keys to enter "10".
6. Press the [SET] key again.  
The input value is set, and the display returns to the parameter selection screen.



## 8.3 Parameter list

There is a unique ID in each parameter. With the **OPX-2A**, set the parameter by selecting the ID.

### ■ Operation data

Operation data can also be set by selecting the data mode.

ID	Parameter name	Setting range	Initial value	Effective *1
512 to 575	Position No.0 to Position No.63	-8,388,608 to +8,388,607 step	0	B
576 to 639	Operating speed No.0 to Operating speed No.63	0 to 1,000,000 Hz	1000	
640 to 703	Positioning mode No.0 to Positioning mode No.63	0: Incremental mode 1: Absolute mode	0	
704 to 767	Operating mode No.0 to Operating mode No.63	0: Single 1: Link 2: Link2	0	
768 to 831	Acceleration No.0 to Acceleration No.63 *2	0.001 to 1000.000 (ms/kHz or s)	30.000	
832 to 895	Deceleration No.0 to Deceleration No.63 *2			
960 to 1023	Sequential positioning No.0 to Sequential positioning No.63	0: Disable 1: Enable	0	
1024 to 1087	Dwell time No.0 to Dwell time No.63	0.000 to 50.000 s	0.000	

\*1 Indicates the timing for the data to become effective. (B: Effective after stopping the operation)

\*2 This item is effective when the "acceleration (deceleration) rate type" parameter [ID: 326] is set to "separate". If this parameter is set to "common", the values of the "common acceleration rate" [ID: 320] and "common deceleration rate" [ID: 321] parameters will be used. (Initial value: Separate)

## ■ Parameters

ID	Parameter name	Setting range	Initial value	Effective*
256	STOP input action	0: Immediate stop 1: Deceleration stop 2: Immediate stop & Current OFF 3: Deceleration stop & Current OFF	1	A
257	Hardware overtravel	0: Disable 1: Enable	1	
258	Overtravel action	0: Immediate stop 1: Deceleration stop	0	
261	AREA1 positive direction position	-8,388,608 to 8,388,607 step	0	
262	AREA1 negative direction position			
263	AREA2 positive direction position			
264	AREA2 negative direction position			
265	AREA3 positive direction position			
266	AREA3 negative direction position			
267	Minimum ON time for MOVE output	0 to 255 ms	0	
288	RUN current	0.0 to 100.0%	100.0	
289	STOP current	0.0 to 50.0%	50.0	
293	Speed filter	0 to 200 ms	1	
294	Moving average time			
320	Common acceleration	0.001 to 1000.000 (ms/kHz or s)	30.000	
321	Common deceleration			
322	Starting speed	0 to 1,000,000 Hz	100	B
323	JOG operation speed	1 to 1,000,000 Hz	1000	
324	Acceleration/deceleration of JOG	0.001 to 1000.000 (ms/kHz or s)	30.000	
325	JOG starting speed	0 to 1,000,000 Hz	100	
326	Acceleration/deceleration type	0: Common 1: Separate	1	
327	Acceleration/deceleration unit	0: ms/kHz 1: s	0	
352	Home-seeking mode	0: 2-sensor mode 1: 3-sensor mode	1	B
353	Operation speed of home-seeking	1 to 1,000,000 Hz	1000	
354	Acceleration/deceleration of home-seeking	0.001 to 1000.000 (ms/kHz or s)	30.000	
355	Starting speed of home-seeking	1 to 1,000,000 Hz	100	
356	Position offset of home-seeking	-8,388,608 to 8,388,607 step	0	
357	Starting direction of home-seeking	0: Negative direction 1: Positive direction	1	

\* Indicates the timing for the data to become effective. (A: Effective immediately, B: Effective after stopping the operation, C: Effective after turning the power ON again)

ID	Parameter name	Setting range	Initial value	Effective*
358	SLIT detection with home-seeking	0: Disable 1: Enable	0	B
359	TIM signal detection with home-seeking		0	
388	Return-to-home incomplete alarm		0	C
416	Overheat warning	40 to 80 °C (104 to 176 °F)	80	A
419	Overvoltage warning	15.0 to 42.0 V	42.0	
420	Undervoltage warning		18.0	
448	Electronic gear A	1 to 65535	1	C
449	Electronic gear B			
450	Motor rotation direction	0: Positive direction=CCW 1: Positive direction=CW	1	
451	Software overtravel	0: Disable 1: Enable	1	A
452	Positive software limit	-8,388,608 to 8,388,607 step	8,388,607	
453	Negative software limit		-8,388,608	
454	Preset position		0	
455	Wrap setting	0: Disable 1: Enable	0	C
456	Wrap setting range	1 to 8,388,607 step	500	
480	Data setter speed display	0: Signed 1: Absolute value	0	A
2048	MS0 operation No. selection	0 to 63	0	B
2049	MS1 operation No. selection		1	
2050	MS2 operation No. selection		2	
2051	MS3 operation No. selection		3	
2052	MS4 operation No. selection		4	
2053	MS5 operation No. selection		5	
2054	HOME-P function selection	0: Home output 1: Return-to-home complete output	0	A
2064	Filter selection	0: Speed filter 1: Moving average filter	0	C
2084	JOG travel amount	1 to 8,388,607 step	1	B
2096	Backward steps in 2-sensor mode home-seeking	1 to 32767 step	200	
2176	IN0 input function selection	Refer to the table on p.33	60	C
2177	IN1 input function selection		61	
2178	IN2 input function selection		62	
2179	IN3 input function selection		18	
2192	IN0 input logic level setting	0: Normally open 1: Normally closed	0	
2193	IN1 input logic level setting			
2194	IN2 input logic level setting			
2195	IN3 input logic level setting			
2208	OUT0 output function selection	Refer to the table on p.33	65	C
2209	OUT1 output function selection		67	

\* Indicates the timing for the data to become effective. (A: Effective immediately, B: Effective after stopping the operation, C: Effective after turning the power ON again)

ID	Parameter name	Setting range	Initial value	Effective*
2224	NET-IN0 input function selection	Refer to the table on p.33.	48	C
2225	NET-IN1 input function selection		49	
2226	NET-IN2 input function selection		50	
2227	NET-IN3 input function selection		4	
2228	NET-IN4 input function selection		3	
2229	NET-IN5 input function selection		18	
2230	NET-IN6 input function selection		0	
2231	NET-IN7 input function selection		17	
2232	NET-IN8 input function selection		8	
2233	NET-IN9 input function selection		9	
2234	NET-IN10 input function selection		10	
2235	NET-IN11 input function selection		5	
2236	NET-IN12 input function selection		6	
2237	NET-IN13 input function selection		7	
2238	NET-IN14 input function selection		1	
2239	NET-IN15 input function selection	2		
2240	NET-OUT0 output function selection	Refer to the table on p.33.	48	C
2241	NET-OUT1 output function selection		49	
2242	NET-OUT2 output function selection		50	
2243	NET-OUT3 output function selection		4	
2244	NET-OUT4 output function selection		70	
2245	NET-OUT5 output function selection		67	
2246	NET-OUT6 output function selection		66	
2247	NET-OUT7 output function selection		65	
2248	NET-OUT8 output function selection		80	
2249	NET-OUT9 output function selection		73	
2250	NET-OUT10 output function selection		74	

\* Indicates the timing for the data to become effective. (A: Effective immediately, B: Effective after stopping the operation, C: Effective after turning the power ON again)



ID	Parameter name	Setting range	Initial value	Effective*
2251	NET-OUT11 output function selection	Refer to the table below.	75	C
2252	NET-OUT12 output function selection		72	
2253	NET-OUT13 output function selection		68	
2254	NET-OUT14 output function selection		0	
2255	NET-OUT15 output function selection		0	
2304	Communication timeout	0 to 10000 ms (0: Not monitored)	0	A
2305	Communication error alarm	1 to 10 times	3	
2563	Communication parity	0: None 1: Even number 2: Odd number	1	C
2564	Communication stop bit	0: 1 bit 1: 2 bit	0	
2565	Transmission waiting time	0.0 to 1000.0 ms	10.0	

\* Indicates the timing for the data to become effective. (A: Effective immediately, B: Effective after stopping the operation, C: Effective after turning the power ON again)

#### ● Setting range of input function selection

0: Not used	25: P-PRESET	48: M0
1: FWD	27: HMI	49: M1
2: RVS	32: R0	50: M2
3: HOME	33: R1	51: M3
4: START	34: R2	52: M4
5: SSTART	35: R3	53: M5
6: +JOG	36: R4	60: +LS*
7: -JOG	37: R5	61: -LS*
8: MS0	38: R6	62: HOMES*
9: MS1	39: R7	63: SLIT*
10: MS2	40: R8	
11: MS3	41: R9	
12: MS4	42: R10	
13: MS5	43: R11	
16: FREE	44: R12	
17: AWO	45: R13	
18: STOP	46: R14	
24: ALM-RST	47: R15	

#### ● Setting range of output function selection

0: Not used	33: R1	51: M3_R
1: FWD_R	34: R2	52: M4_R
2: RVS_R	35: R3	53: M5_R
3: HOME_R	36: R4	60: +LS_R
4: START_R	37: R5	61: -LS_R
5: SSTART_R	38: R6	62: HOMES_R
6: +JOG_R	39: R7	63: SLIT_R
7: -JOG_R	40: R8	65: ALM
8: MS0_R	41: R9	66: WNG
9: MS1_R	42: R10	67: READY
10: MS2_R	43: R11	68: MOVE
11: MS3_R	44: R12	70: HOME-P
12: MS4_R	45: R13	72: TIM
13: MS5_R	46: R14	73: AREA1
16: FREE_R	47: R15	74: AREA2
17: AWO_R	48: M0_R	75: AREA3
18: STOP_R	49: M1_R	80: S-BSY
32: R0	50: M2_R	

\* It can be selected using the IN0 to IN3 inputs.  
(Not possible to select the NET-IN0 to NET-IN15)

## 8.4 Initializing parameters

The parameters saved in the motor can be restored to the initial values. Perform "Initialize parameters" of the copy mode. For the operation, check the screen transitions of the copy mode on p.16, or "10.6 Initializing motor data" on p.42.

# 9 Test mode

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## 9.1 Overview of the test mode

- **Direct I/O test**

The ON/OFF status of each input signal of the motor can be checked. Also, the ON/OFF status of each output signal can be switched on the **OPX-2A**.

Perform a direct I/O test function when checking the connection status of the motor.

- **JOG operation**

The motor can be operated using the keys on the **OPX-2A**.

- **Data select operation**

Positioning operation can be performed.

- **Return-to-home operation**

Return-to-home operation can be performed.

- **Position preset**

The command position can be set to the preset position value.

- **Teaching**

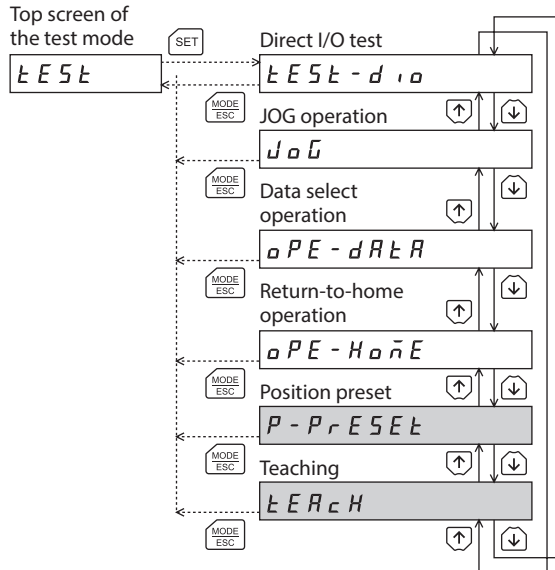
The motor can be operated using the keys on the **OPX-2A**, and the attained position can be applied to the operation data.

**Note**

- Stop the motor operation before changing to the test mode.
- When you move from the top screen of the test mode to a lower level, the following inputs will be disabled.  
START, SSTART, HOME, ±JOG, FWD, RVS and MS0 to MS5.
- In the direct I/O test, if the screen moves to the lower level, all of I/O signals and operation will be disabled.
- If the **[SET]** key is pressed while executing the internal processing via RS-485 communication, "mEm-bUSy" may be displayed. Check "5 Screen transitions" on p.12 when "mEm-bUSy" is displayed. Be sure to wait until all internal processing is completed, before pressing the **[SET]** key.
- If "Error" is displayed when data select operation, return-to-home operation, position preset or teaching function is performed, check whether an alarm generates.
- If operations are limited by the edit lock function, the position preset and teaching function cannot be executed.
- If the HMI input is in an OFF state, test mode cannot be executed.

## 9.2 Operation in the test mode

1. Use the [MODE/ESC] key to select the test mode.
2. Press the [SET] key in the top screen of the test mode.  
The display changes to the test mode item screen.
3. Use the [↑][↓] keys to select the item you want to perform.



\* If operations are limited by the edit lock function, the screen text in gray is not shown.

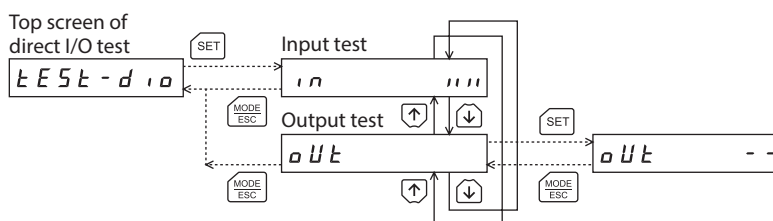
### • What happens when the [SET] key is pressed while the motor is operating

The test mode cannot be executed while operating. If the [SET] key is pressed on the selection screen of each item, the screen will not move to the lower level and "oPE-Err" will be displayed. Be sure to stop the motor operation before pressing the [SET] key.

o P E - E r r

## 9.3 Direct I/O test

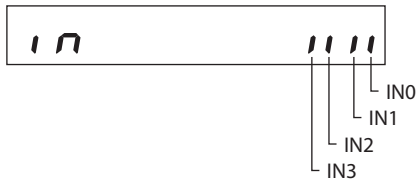
When checking the connection condition of the motor, perform the direct I/O test.



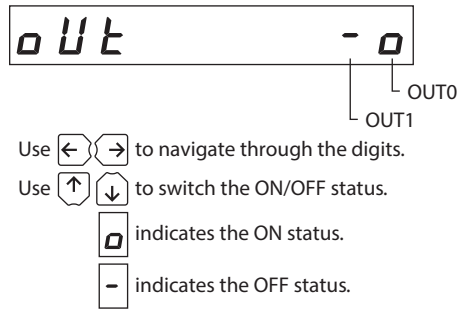
Each digit on the 7-segment LED display corresponds to a signal. The LED is lit when the input signal is ON, and it is unlit when the input signal is OFF.

Use the [↑][↓] keys to switch the ON-OFF state of the output signal. "0" is displayed when the signal is ON, while "-" is displayed when the signal is OFF.

• **Input test**

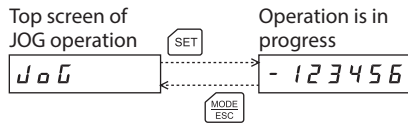


• **Output test**



## 9.4 JOG operation

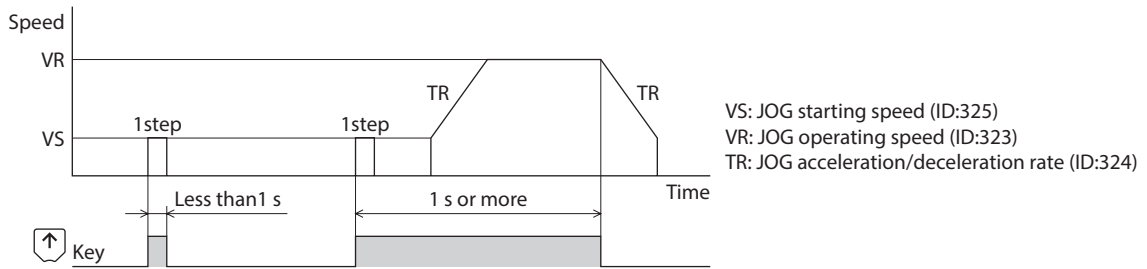
The motor can be operated using the keys on the **OPX-2A**.



Pressing the [↑] key once causes the motor to rotate one step in the positive direction. Pressing and holding the key cause the motor to rotate continuously in the positive direction.

Pressing the [↓] key once causes the motor to rotate one step in the negative direction. Pressing and holding the key cause the motor to rotate continuously in the negative direction.

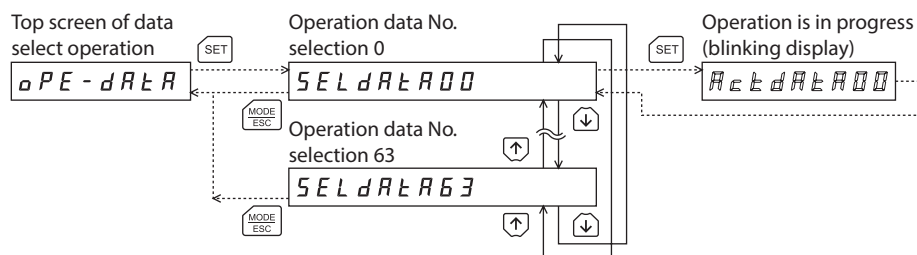
The operating speed corresponds to the value set in the "JOG operating speed" parameter [ID: 323]. Take note that when the value set in the "JOG starting speed" parameter [ID: 325] is greater than the value set in the "JOG operating speed" parameter [ID: 323], the Jog starting speed will become effective.



**Note** During JOG operation, the motor rotates at the specified operating speed while each applicable key is pressed. Before executing JOG operation, consider the status of the equipment and condition of its surroundings to confirm thoroughly that motor rotation will not cause any dangerous situation.

## 9.5 Data select operation

Selecting a desired operation data number and pressing the **[SET]** key will cause positioning operation to perform.

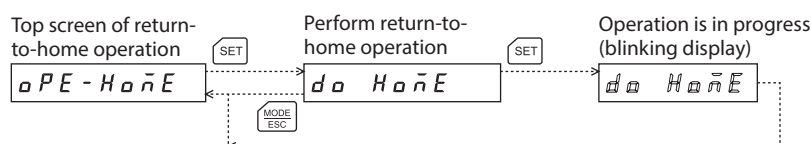


**Note** The motor rotates at the set operating speed in positioning operation. Before executing positioning operation, consider the status of the equipment and condition of its surroundings to confirm thoroughly that motor rotation will not cause any dangerous situation.

## 9.6 Return-to-home operation

Return-to-home operation can be performed.

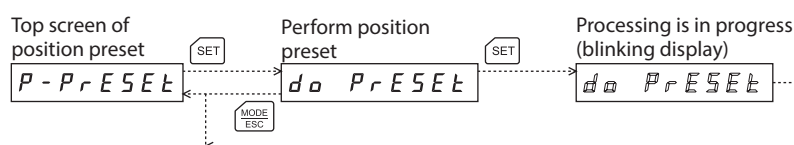
The operating speed corresponds to the value set in the "operating speed of home-seeking" parameter [ID: 353].



**Note** The motor rotates at the set operating speed in return-to-home operation. Before executing return-to-home operation, consider the status of the equipment and condition of its surroundings to confirm thoroughly that motor rotation will not cause any dangerous situation.

## 9.7 Presetting the position

In this operation, the command position is preset by rewriting the value in the "preset position" parameter [ID: 454].



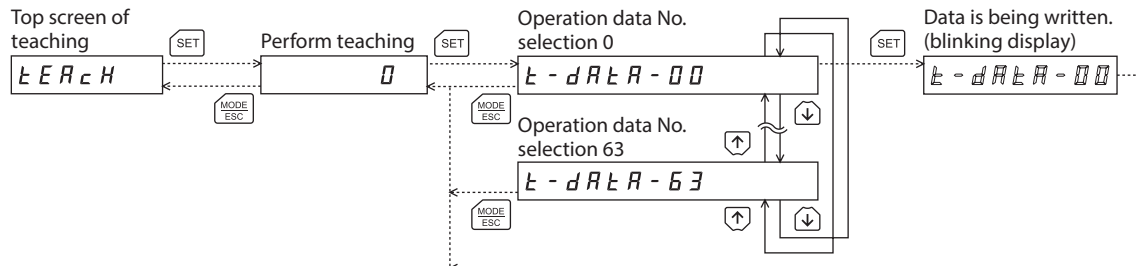
**Note** If operations are limited by the edit lock function, the preset function cannot be performed.

## 9.8 Teaching

The motor can be operated using the keys on the **OPX-2A**, and the attained position can be applied to the operation data.

The absolute mode will be automatically selected as the operation mode of any position data set by teaching.

The operating speed, acceleration/deceleration rate and starting speed of teaching are the same as the corresponding settings applicable to JOG operation.



- Note**
- The motor rotates at the set operating speed in teaching function. Before executing teaching function, consider the status of the equipment and condition of its surroundings to confirm thoroughly that motor rotation will not cause any dangerous situation.
  - If operations are limited by the edit lock function, the teaching cannot be performed.

# 10 Copy mode

The **OPX-2A** has four data banks, and operation data and parameters can be saved in each of these data banks. Since non-volatile memory is used as the data memory element, stored data will be retained even after the power is turned off.

## 10.1 Overview of the copy mode

- **Download**

Copy data saved in the **OPX-2A** to the motor.

- **Upload**

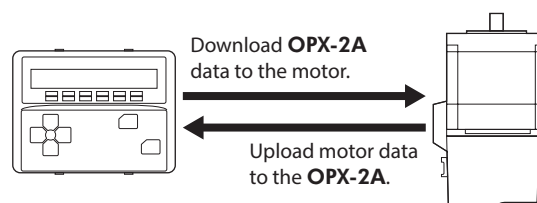
Copy data saved in the motor to the **OPX-2A**.

- **Verification**

Verify data in the **OPX-2A** against the corresponding data in the motor.

- **Initializing motor data**

Restore data saved in the motor to the initial values.



**Note**

- Stop the motor operation before changing to the copy mode.
- When moving from the top screen of the copy mode to the lower level, the following inputs will be disabled.  
START, SSTART, HOME,  $\pm$ JOG, FWD, RVS and MS0 to MS5.
- If the [SET] key is pressed while executing the internal processing via RS-485 communication, "mEm-bUSy" may be displayed. Check "5 Screen transitions" on p.12 when "mEm-bUSy" is displayed. Be sure to wait until all internal processing is completed, before pressing the [SET] key.
- If operations are limited by the edit lock function, copy mode cannot be operated.
- If the HMI input is in an OFF state, download and initialization cannot be executed.

### ■ Error of the copy mode

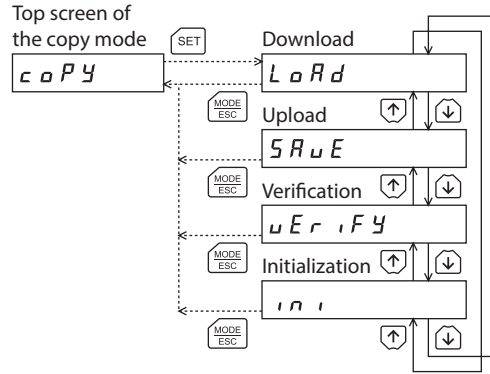
If an error occurs in download or verification, the error code will blink on the display.

The processing will not be executed and the display will return to the top screen of each processing.

Blinking display	Description	Action
<i>Prod-Err</i>	There is a discrepancy between the data in the <b>OPX-2A</b> and the data in the motor.	<ul style="list-style-type: none"> <li>• Check the product.</li> <li>• Check the data bank number on the <b>OPX-2A</b>.</li> </ul>
<i>HEAD-Err</i> <i>bcc-Err</i>	An error occurred while processing the data.	Perform download again. If the same error occurs, the data saved in the <b>OPX-2A</b> may be damaged. Upload the applicable data to set the <b>OPX-2A</b> data again.
<i>no-data</i>	The specified data bank number does not contain data.	Check the data bank number.

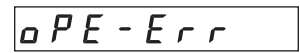
## 10.2 Operation in the copy mode

1. Use the **[MODE/ESC]** key to select the copy mode.
2. Press the **[SET]** key in the top screen of the copy mode.  
The display changes to the copy mode item screen.
3. Use the **[↑]**/**[↓]** keys to select the item you want to perform.



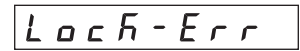
### • What happens when the **[SET]** key is pressed while the motor is operating

Downloading and initialization cannot be executed during operation. Pressing the **[SET]** key will generate an error, and "oPE-Err" will be shown. Be sure to stop the motor operation before pressing the **[SET]** key.



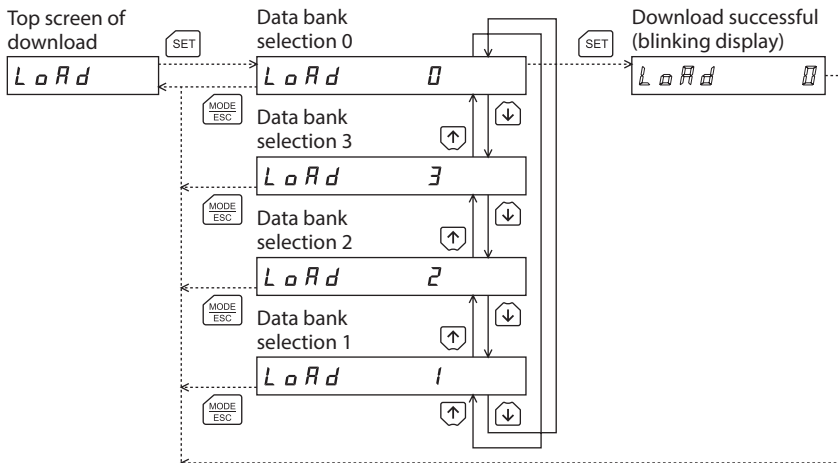
### • What happens when the **[SET]** key is pressed while the edit lock is enabled

While the edit lock is enabled, you cannot move to any lower level from the top screen of the copy mode. Pressing the **[SET]** key will generate an error, and "Lock-Err" will be shown. Be sure to cancel the edit lock before pressing the **[SET]** key. Refer to "3.6 Edit lock function" on p.8 for the procedure to cancel the edit lock.



## 10.3 Downloading to the motor

In this operation, data in the specified data bank number are downloaded to the motor.



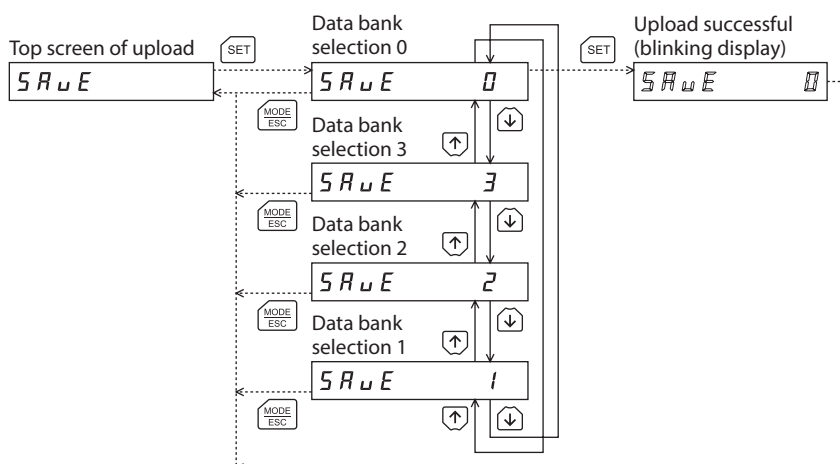
If a download error occurs, a code indicating the nature of the error will blink on the display. Download will not be performed and the display will return to the top screen of download. Refer to p.39 for details.

- Note**
- Some parameters will become effective after cycling the power. When these parameters were changed by downloading, cycle the motor power.
  - Do not turn off the motor power while the download is still in progress (=while the display is blinking). Doing so may damage the data.



## 10.4 Uploading to the OPX-2A

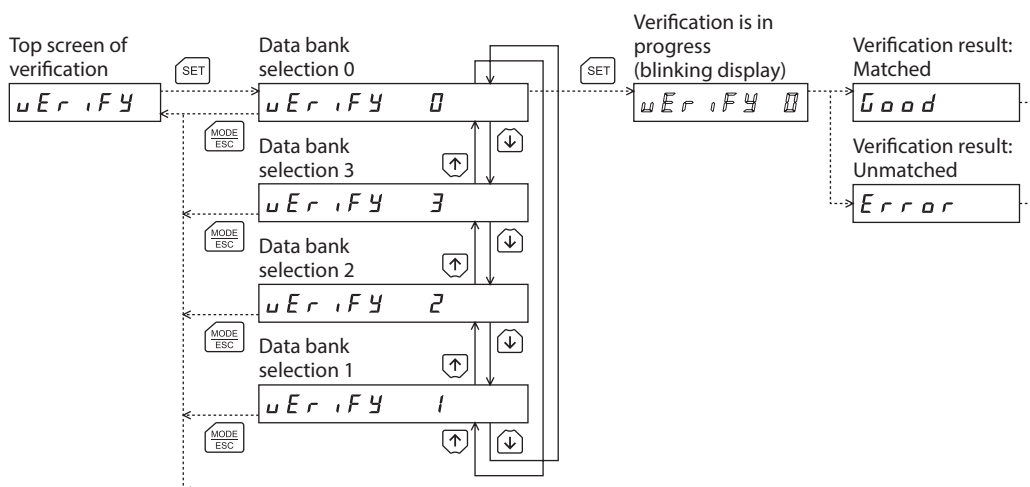
In this operation, data saved in the motor is uploaded to the specified data bank number.



**Note** Do not turn off the motor power while the upload is still in progress (=while the display is blinking). Doing so may damage the data.

## 10.5 Verifying data

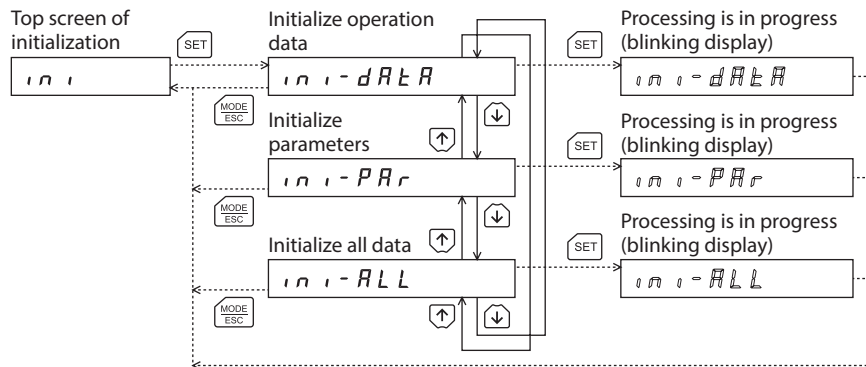
In this operation, data in the specified data bank number are verified against the corresponding data saved in the motor. If the verification finds that the two sets of data match, "Good" will be shown. If the two do not match, "Error" will be shown.



If a verification error occurs, a code indicating the nature of the error will blink on the display. Verification will not be performed and the display will return to the top screen of verification. Refer to p.39 for details.

## 10.6 Initializing motor data

In this operation, data saved in the motor are restored to their initial values.



### Note

- Some parameters will become effective after cycling the power. When these parameters were changed by initialization, cycle the motor power.
- Do not turn off the motor power while the initialization is still in progress (= while the display is blinking). Doing so may damage the data.



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