



Data Setter OPX-2A

<AR Series>

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**.

 Warning	Handling the product without observing the instructions that accompany a “Warning” symbol may result in serious injury or death.
 Caution	Handling the product without observing the instructions that accompany a “Caution” symbol may result in injury or property damage.
Note	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 driver’s protection function is triggered, first remove the cause and then clear the protection function. Continuing the operation without removing the cause of the problem may cause malfunction of the motor and driver, 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, gearhead and driver beyond their specifications, or electric shock, injury or damage to equipment may result.

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.

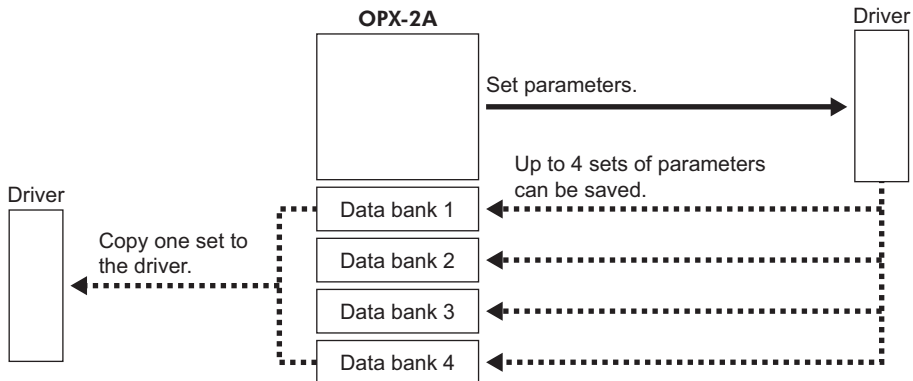
The product described in this manual has been designed and manufactured for use in general industrial machinery, and must not be used for any other purpose. Oriental Motor Co., Ltd. is not responsible for any damage caused through failure to observe this warning.

■ Overview of the product

The **OPX-2A** is a data setter that lets you set parameters, perform monitoring, etc. So that the **OPX-2A** is used correctly and safely, thoroughly read the operating manual that came with product you are using and understand the basic operating procedures and other details of the driver.

■ Features of OPX-2A

The **OPX-2A** can be used not only to set driver parameters, but it also serves as a storage location for driver data. Driver data is saved in the areas called “data banks”. Four data banks are provided.



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

- Set driver parameters
- Monitor the operating status of the motor
- The parameters set in the driver can be saved to the **OPX-2A**.
- The parameters saved in **OPX-2A** can be copied to another driver connected to the **OPX-2A**.

■ Applicable products

- ARD-A/ARD-C/ARD-S (**AR** series AC power supply input driver)
- ARD-K (**AR** series DC power supply input driver)

■ 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

RoHS (Directive 2002/95/EC 27Jan.2003) compliant

3 Preparation

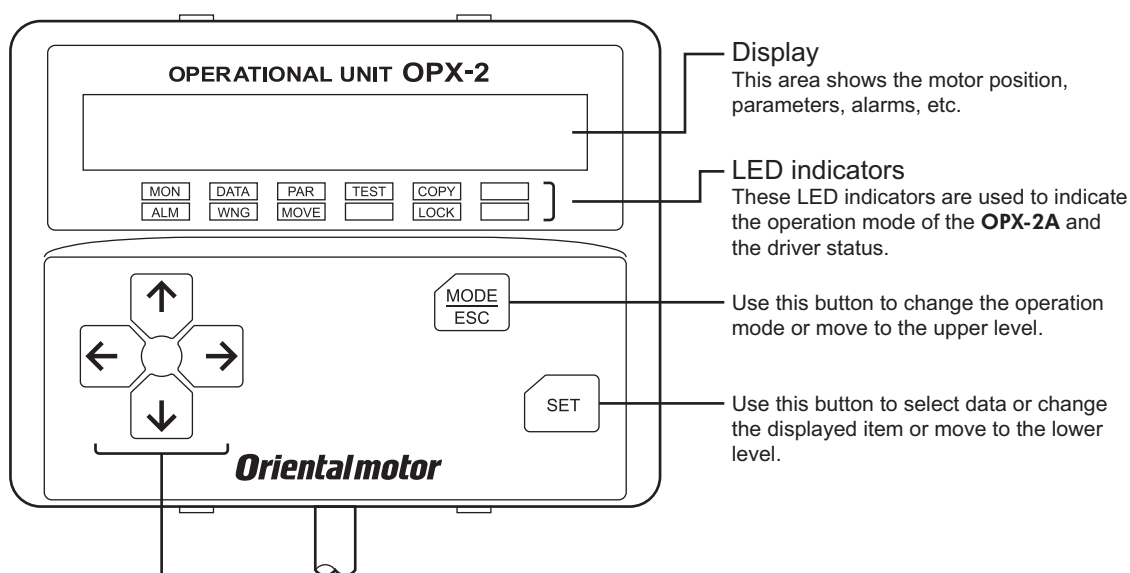
This chapter explains the items you should know before using the data setter **OPX-2A**.

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



Use these buttons to change the selected item or set data and parameters.

  Use these buttons to increase or decrease the value or change the selected item

  Use these buttons to navigate through each data or parameter to a desired digit.

■ Notation

In this manual, keys are denoted by symbols, such as $\left[\begin{smallmatrix} \text{MODE} \\ \text{ESC} \end{smallmatrix} \right]$ [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

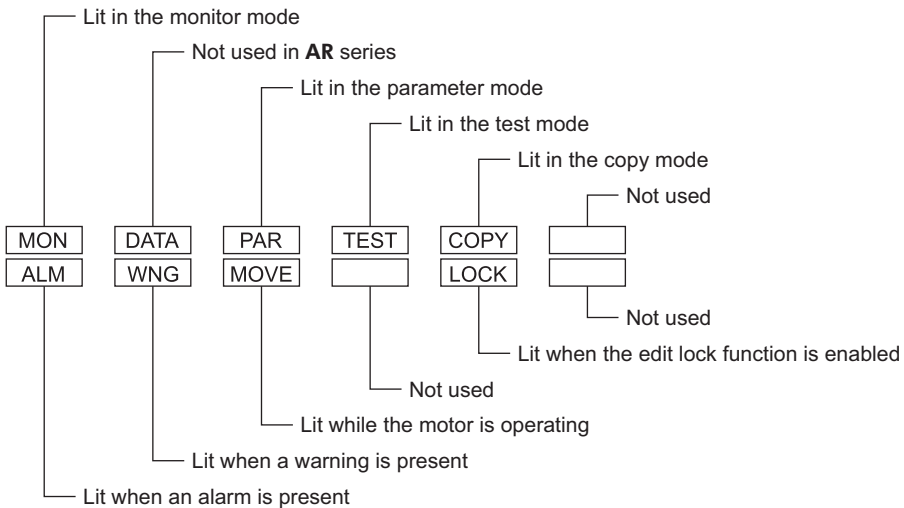
A	A	B	b	C	c	D	d	E	E	F	F	G	G	H	H	I	i	J	J
K	K	L	L	M	m	N	n	O	o	P	P	Q	q	R	r	S	S	T	t
U	U	V	v	W	w	Y	y												

• Signs

+	+	-	-
---	---	---	---

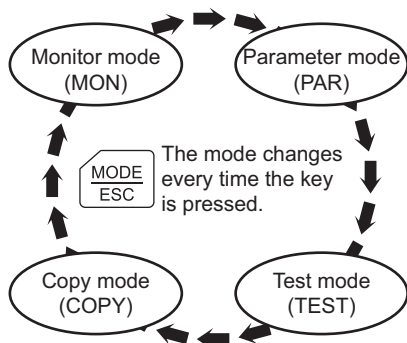
3.4 How to read the LED indicators

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.



3.5 Types of operation modes

The **OPX-2A** has multiple operation modes. 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.

3.6 Edit lock function

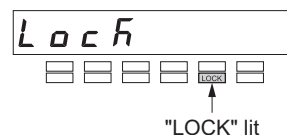
Enable the edit lock function if you want to prevent parameters from being edited or cleared. Parameters cannot be changed or deleted while the edit lock function is enabled.

- **Setting the edit lock function**

In the top screen of each operation mode, press the $\left[\begin{smallmatrix} \text{MODE} \\ \text{ESC} \end{smallmatrix} \right]$ 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.

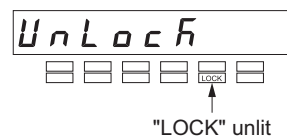


- **Canceling the edit lock function**

Again in the top screen of each operation mode, press the $\left[\begin{smallmatrix} \text{MODE} \\ \text{ESC} \end{smallmatrix} \right]$ 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.

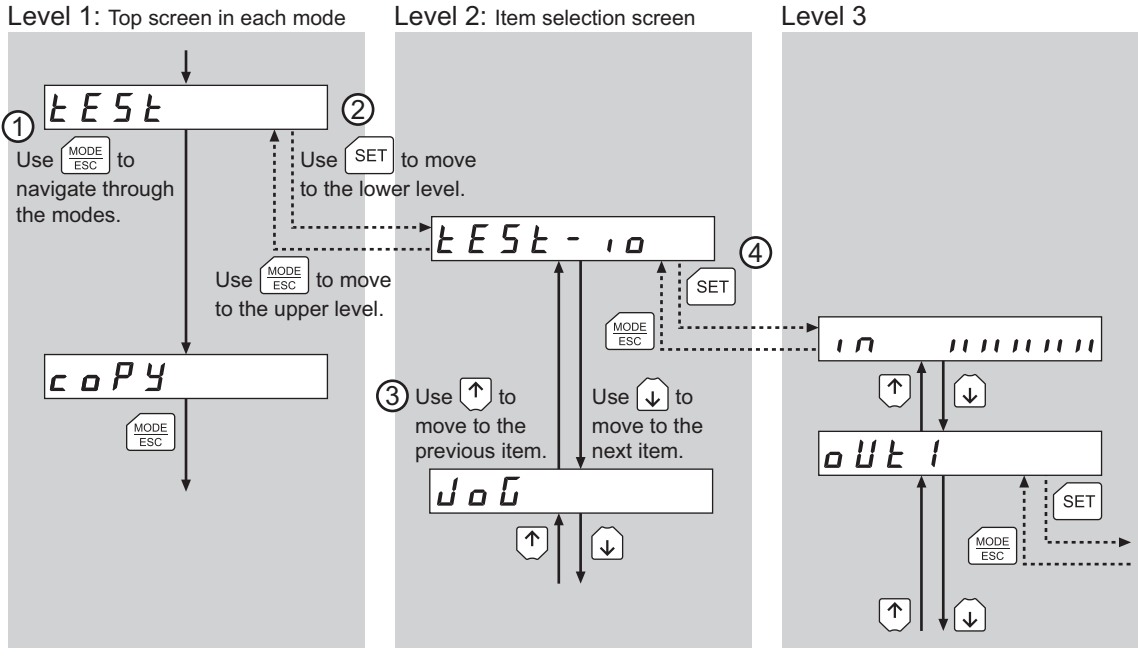


3.7 Basic operations of the OPX-2A

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

■ Operation flow

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



- ① Use the $\left[\begin{smallmatrix} \text{MODE} \\ \text{ESC} \end{smallmatrix} \right]$ 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 $\left[\begin{smallmatrix} \text{MODE} \\ \text{ESC} \end{smallmatrix} \right]$ key to select the test mode (indicated by a lit “TEST” LED). The top screen of the test mode is displayed.
- ② Press the $[\text{SET}]$ key to move to the lower level.
- ③ Use the $[\uparrow]$ $[\downarrow]$ keys to select a desired item.
- ④ To move to the lower level, press the $[\text{SET}]$ key.
To return to the previous level, press the $\left[\begin{smallmatrix} \text{MODE} \\ \text{ESC} \end{smallmatrix} \right]$ key.

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

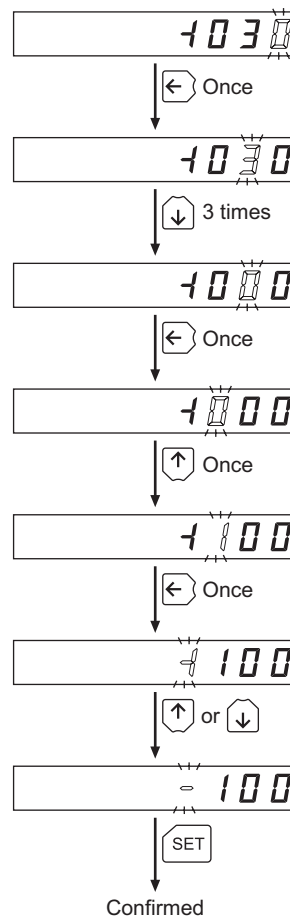
■ How to input values

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 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.



3.8 Rewriting the driver's EEPROM

Parameters are saved to the driver's EEPROM. The EEPROM can be rewritten approx. 100,000 times. The EEPROM will be rewritten after one of the following operations is performed:

- Change any parameter
- Download data from the **OPX-2A** to the driver
- Initialize driver parameters

4 Installation and connection of the OPX-2A

4.1 Location for installation

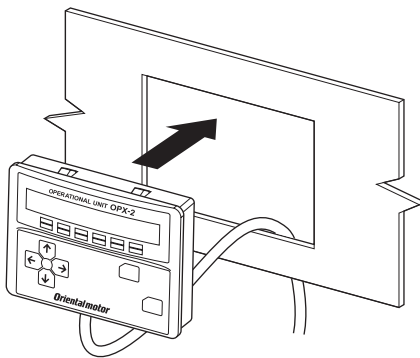
The **OPX-2A** is designed and manufactured for installation in equipment.

Install it in a well-ventilated location that provides easy access for inspection. The location must also satisfy the following conditions:

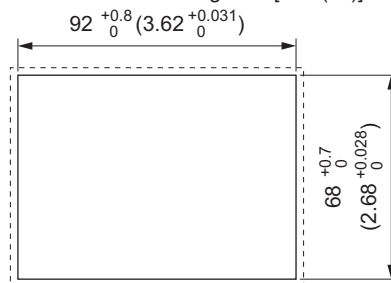
- Inside an enclosure that is installed indoors (provide vent holes)
- Operating ambient temperature 0 to +40 °C (+32 to +104 °F) (non-freezing)
- Operating ambient humidity 85% or less (no condensation)
- Area that is free of explosive atmosphere or toxic gas (such as sulfuric gas) or liquid
- Area 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 affix the **OPX-2A**.

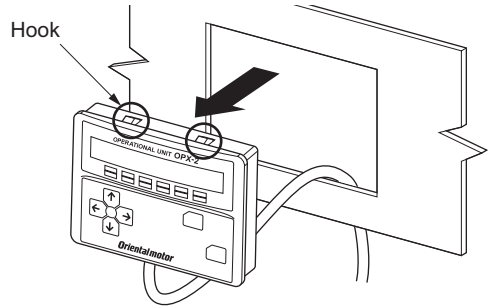


- Dimension of mounting hole [mm (in.)]



Removing method

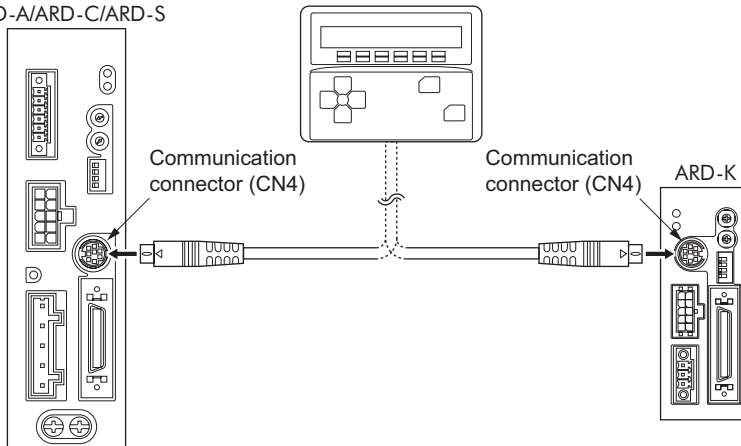
Press all of the four hooks provided on top and bottom of the **OPX-2A**. In this condition, press the **OPX-2A** forward to release.



4.3 Connecting to the driver

Plug the connector attached to the end of the **OPX-2A** cable into the communication connector (CN4) on the driver, and then turn on the power to the driver.

ARD-A/ARD-C/ARD-S

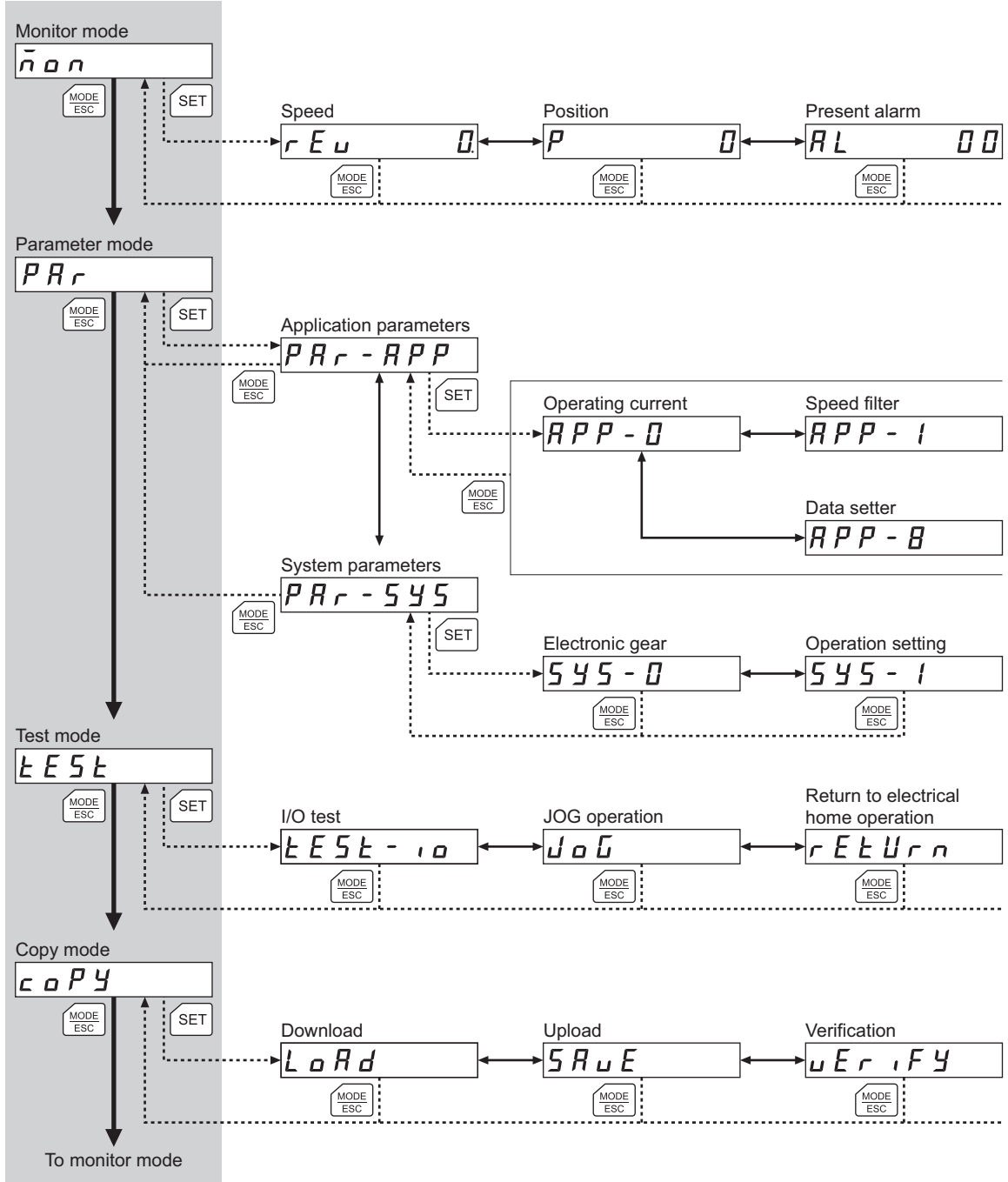


Note

- When parameters are set on the **OPX-2A**, they will be stored in the driver. Once stored in the driver, the data will not be cleared even after the **OPX-2A** is disconnected from the driver.
- Turning on the power to the driver will also turn on the power to the **OPX-2A**. Turning off the driver power will turn off the **OPX-2A** power.
- Turn off the driver power before connecting or disconnecting the **OPX-2A** cable. In the ARD-A/ARD-C/ARD-S, if 24 VDC power is being supplied, also turn off the 24 VDC power supply.

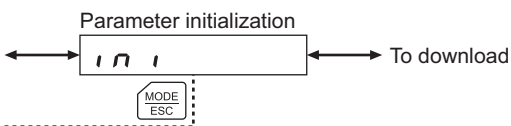
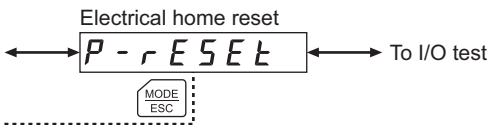
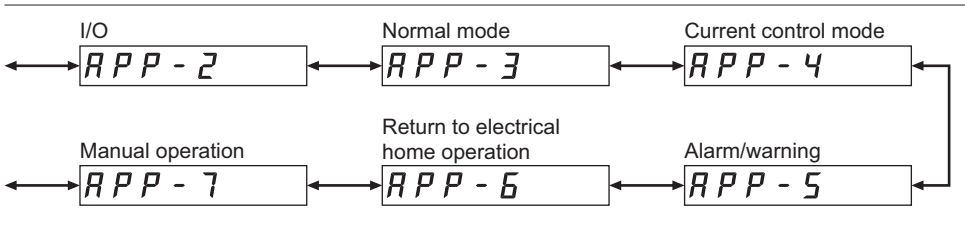
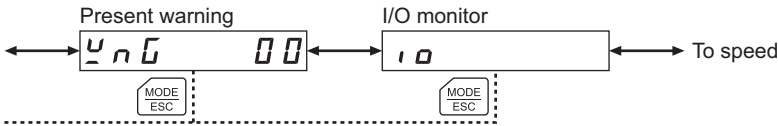
5 Screen transitions

Top screen



Note | The following operations cannot be performed while the edit lock function (p.7) is enabled:
 Edit parameters, clear alarm/warning records, reset the electrical home position, perform operations in the copy mode

↔ : Use   to navigate through the items.



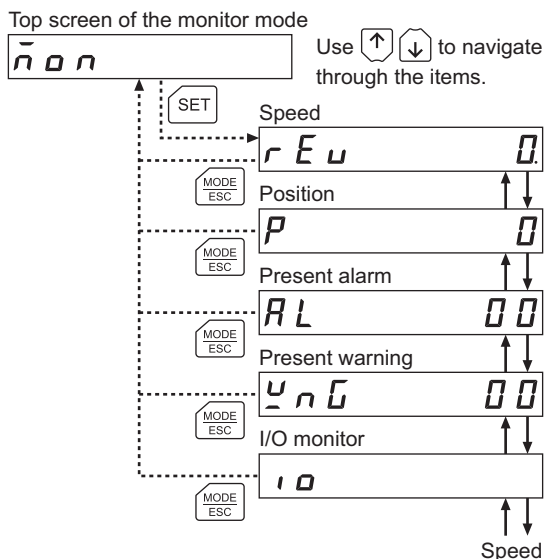
6 Monitor mode

6.1 What you can do in the monitor mode

- **Monitoring the operating status**
You can monitor the speed and position of the motor 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/warning records.
- **Checking I/O signals**
You can check the ON/OFF status of each I/O signal of the driver.

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.
The display changes to the monitor mode item screen.
3. Use the $\left[\uparrow \right]$ $\left[\downarrow \right]$ keys to select the item you want to monitor.



6.3 Monitored items

■ Speed

You can check the speed of the motor (unit: r/min).

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 rotating direction. You can select the value display format using the displayed speed on OPX-2 parameter [APP-8-00] (p.29).

You can also display the motor speed as revolutions of the gear output shaft. For this setting, use the deceleration rate of speed monitor parameter [APP-8-01] (p.29).

■ Position

You can check the current 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.

■ Present alarm

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

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

Note Do not turn off the driver power while an alarm is being reset or alarm records are being cleared (= while the display is blinking). Doing so may damage the data.

• 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 twice to select the alarm reset screen.
3. Press the **[SET]** key.
The alarm is reset.

Note Some alarms cannot be reset on the **OPX-2A**. For details, refer to “Alarm code list” on p.16. To reset these alarms, you must cycle the power.

• How to check an alarm record

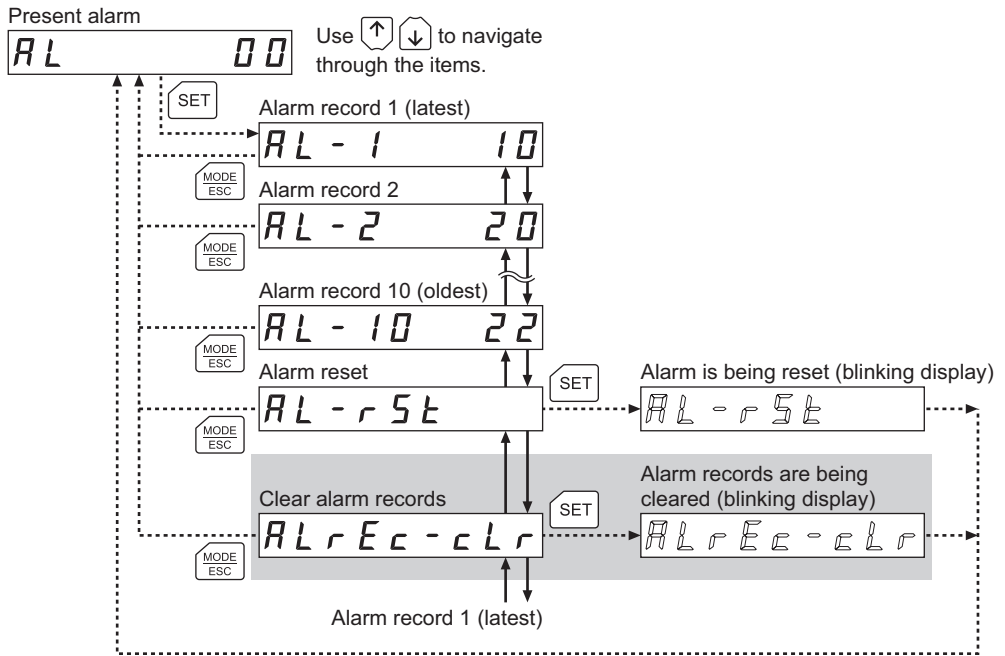
You can check up to ten most recent alarms, starting from the latest one.

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 and select the alarm record clear screen.
3. Press the **[SET]** key.
All alarm records are cleared.



* If operations are limited by the edit lock function (p.7), the screen text in gray is not shown.

Alarm code list

Code	Alarm name	Resetting on the OPX-2A	Number of times the driver's ALARM LED blinks
10	Overflow rotation during current on	Possible	4
12	Overflow rotation during current off	Possible	
20	Overcurrent protection*	Not possible	5
21	Overheat protection	Possible	2
22	Overvoltage protection	Not possible	3
23	Main power supply error*	Possible	
25	Undervoltage	Possible	
28	Sensor error during operation	Not possible	8
2D	Drive circuit error*	Not possible	5
30	Overload	Possible	2
31	Overspeed	Possible	
34	Command pulse error	Possible	
41	EEPROM error	Not possible	9
42	Initial sensor error	Not possible	8
43	Initial rotor rotation error	Not possible	
45	Motor combination error	Not possible	
51	Regeneration unit overheat*	Not possible	2
70	Abnormal operation data	Possible	7
71	Electronic gear setting error	Not possible	

* The ARD-A/ARD-C/ARD-S only.

■ Present warning

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

Note Do not turn off the driver power while warning records are being cleared (= while the display is blinking). Doing so may damage the data.

• How to check a warning record

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

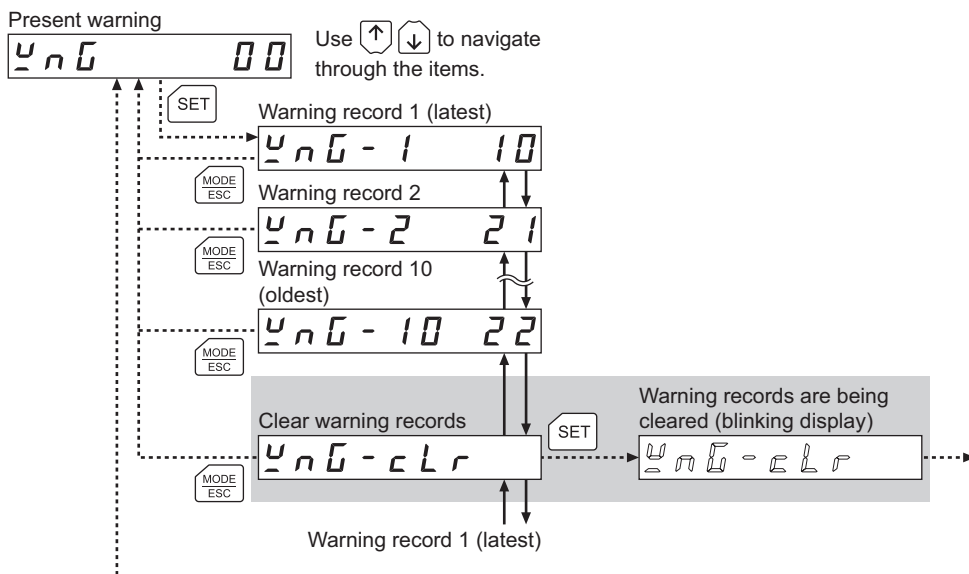
1. While a warning is displayed, press the **[SET]** key to move to the lower level.
The latest warning is displayed.
2. Press the **[↓]** key.
The second latest warning is displayed.
3. Every time the **[↓]** key is pressed, the next older warning will be displayed. Use the **[↑]** **[↓]** keys to select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

Note You can also clear warning records by turning off the driver power.



* If operations are limited by the edit lock function (p.7), the screen text in gray is not shown.

Warning code list

Code	Warning name	Code	Warning name
10	Overflow rotation during current on	25	Undervoltage
12	Overflow rotation during current off	30	Overload
21	Overheat	31	Overspeed
22	Overvoltage	70	Abnormal operation data
23	Main power supply error*	71	Electronic gear setting error

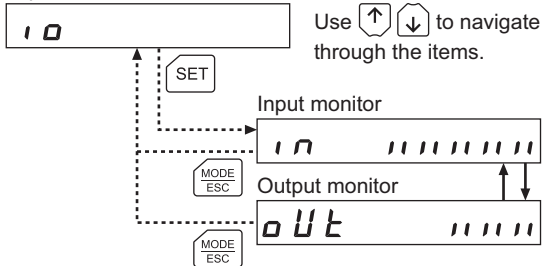
* The ARD-A/ARD-C/ARD-S only.

I/O monitor

You can check the ON/OFF status of each I/O signal of the driver (Lit: ON, Unlit: OFF).

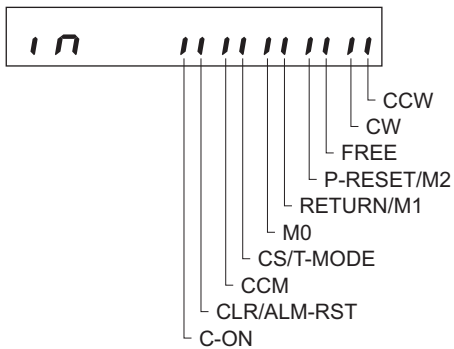
Use the [↑] [↓] keys to select the input signals or output signals.

Top screen of the I/O monitor

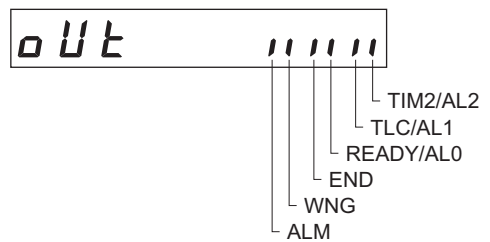


Each digit on the 7-segment LED display corresponds to a signal. If the signal is ON, the corresponding digit is lit. If the signal is OFF, the digit is unlit.

• Input signals



• Output signals



7 Parameter mode

You can set parameters relating to motor operation and control. These parameters are saved in the driver. Before setting parameters, read the **AR** Series Driver OPERATING MANUAL carefully to understand the basic operations, functions and other details of the driver.

Note | Parameters have significant bearing on motor operation. Before setting any parameter, make sure you fully understand the content of the parameter.

7.1 Types of parameters

Application parameters and system parameters are handled in the parameter mode.

■ Application parameters

When an application parameter is changed, the new parameter becomes effective immediately. Nine types of parameters are available on the levels below the application parameter screen. These parameters are classified as follows.

Parameter classification	Description
Operating current	Set the operating current to be assigned to the current setting switch.
Speed filter	Set the speed filter time constant to be set to the speed filter setting switch.
I/O	Set the parameters relating to I/O signals only.
Normal mode	Set the parameters effective only in the normal mode.
Current control mode	Set the parameters effective only in the current control mode.
Alarm/warning	Set the condition under which each alarm or warning generates.
Return to electrical home operation	Set the starting speed, acceleration/deceleration rate and operating speed to be used in the return to electrical home operation.
Manual operation	Set the starting speed, acceleration/deceleration rate and operating speed to be used in JOG operation in the test mode.
Data setter	Set the items to be displayed on the data setter.

■ System parameters

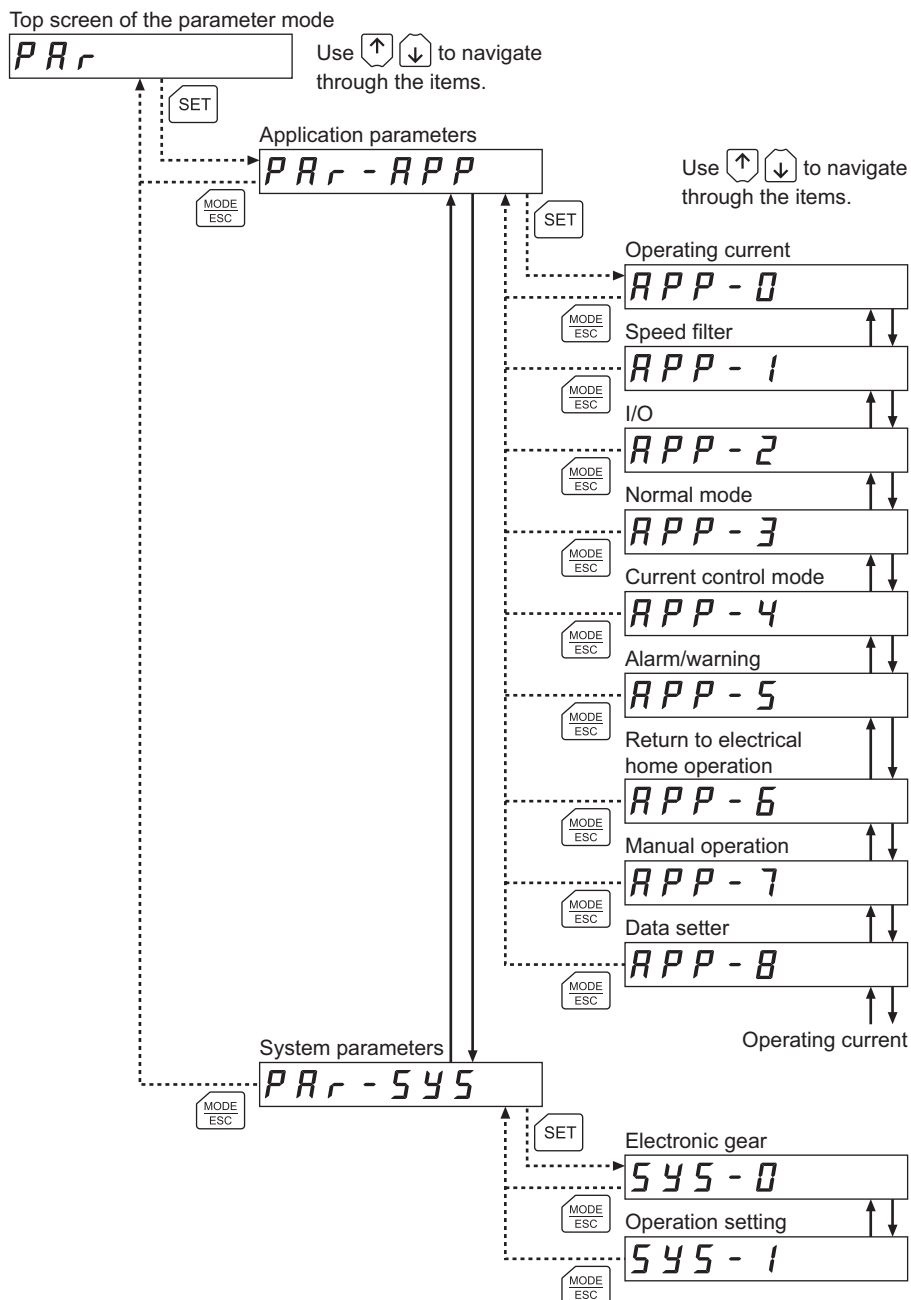
When a system parameter is changed, the new parameter will become effective only after the power is cycled. In the ARD-A/ARD-C/ARD-S, if a 24 VDC power supply is used, also cycle the 24 VDC power supply.

Two types of parameters are available on the levels below the system parameter screen. These parameters are classified as follows.

Parameter classification	Description
Electronic gear	Set the electronic gear.
Operation setting	Set the pulse input mode, motor rotation direction, excitation position, return operation, and use of the smooth drive.

7.2 Operation in the parameter mode

1. Use the $\left[\begin{smallmatrix} \text{MODE} \\ \text{ESC} \end{smallmatrix} \right]$ key to select the parameter mode.
2. Press the $\left[\text{SET} \right]$ key in the top screen of the parameter mode, and use the $\left[\uparrow \right]$ $\left[\downarrow \right]$ keys to select the application parameters or system parameters.
3. Press the $\left[\text{SET} \right]$ key again to move to the parameter item screen.
4. Use the $\left[\uparrow \right]$ $\left[\downarrow \right]$ keys to select the parameter you want to change.



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.

7.3 Setting example

Pressing the **[SET]** key in the parameter item screen enables parameter setting.
How a parameter is set is explained below.

Example: Set operating current setting 0 to “50”

1. Press the **[MODE/ESC]** key to move to the parameter mode.
The “PAR” LED is lit.
2. Press the **[SET]** key.
The display changes to the application parameter screen.
3. Press the **[SET]** key.
The display changes to the operating current parameter screen.
4. Press the **[SET]** key.
The screen for setting operating current at CURRENT ‘0’ parameter is displayed.
5. Press the **[SET]** key. Use the **[↑]** **[↓]** **[←]** **[→]** keys to input “050.0.”
6. Press the **[SET]** key again.
The input value is set, and the display returns to the screen for setting operating current at CURRENT ‘0’ parameter.

Top screen of the parameter mode

PAR

SET

Application parameter

PAR - APP

SET

Operating current parameter

APP - 0

SET

Operating current at CURRENT ‘0’ parameter

APP - 0 - 00

SET

Set operating current at
CURRENT ‘0’ to “50”

050.0

SET

Use **[←]** **[→]** to navigate through the digits.

Use **[↑]** **[↓]** to increase/decrease the value.

Confirm the value (blinking display)

050.0

Operating current at CURRENT ‘0’ parameter

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.

7.4 Description of application parameters

■ Operating current parameters

APP-0

Use to navigate through the items.

SET

Operating current at CURRENT '0'

APP-0-00

MODE ESC

Operating current at CURRENT '1'

APP-0-01

MODE ESC

Operating current at CURRENT '2'

APP-0-02

MODE ESC

Operating current at CURRENT '3'

APP-0-03

MODE ESC

Operating current at CURRENT '4'

APP-0-04

MODE ESC

Operating current at CURRENT '5'

APP-0-05

MODE ESC

Operating current at CURRENT '6'

APP-0-06

MODE ESC

Operating current at CURRENT '7'

APP-0-07

MODE ESC

Operating current at CURRENT '8'

APP-0-08

MODE ESC

Operating current at CURRENT '9'

APP-0-09

MODE ESC

Operating current at CURRENT 'A'

APP-0-10

MODE ESC

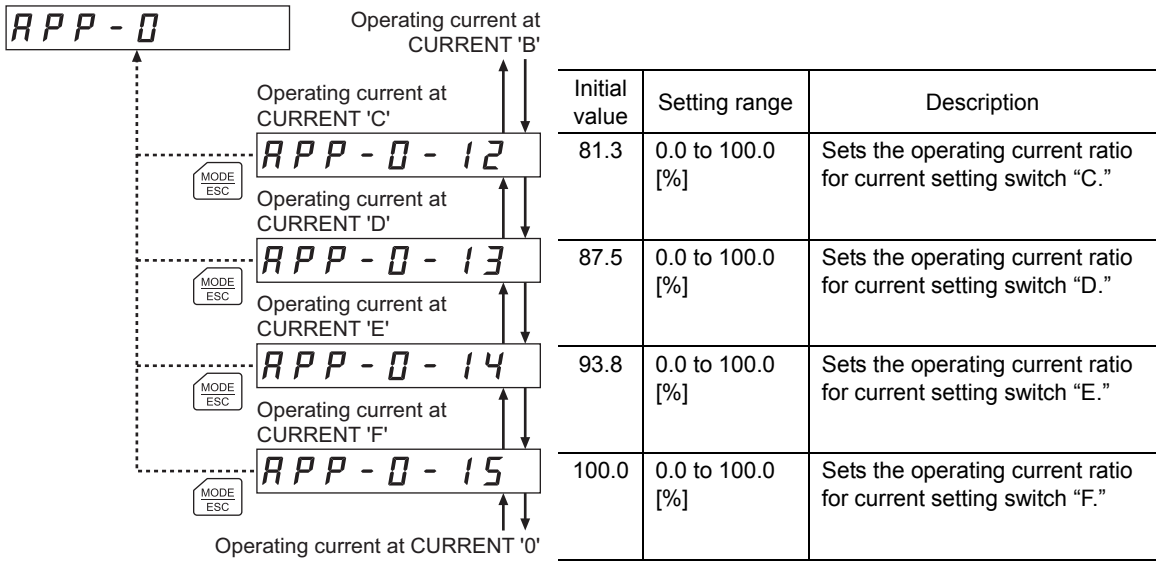
Operating current at CURRENT 'B'

APP-0-11

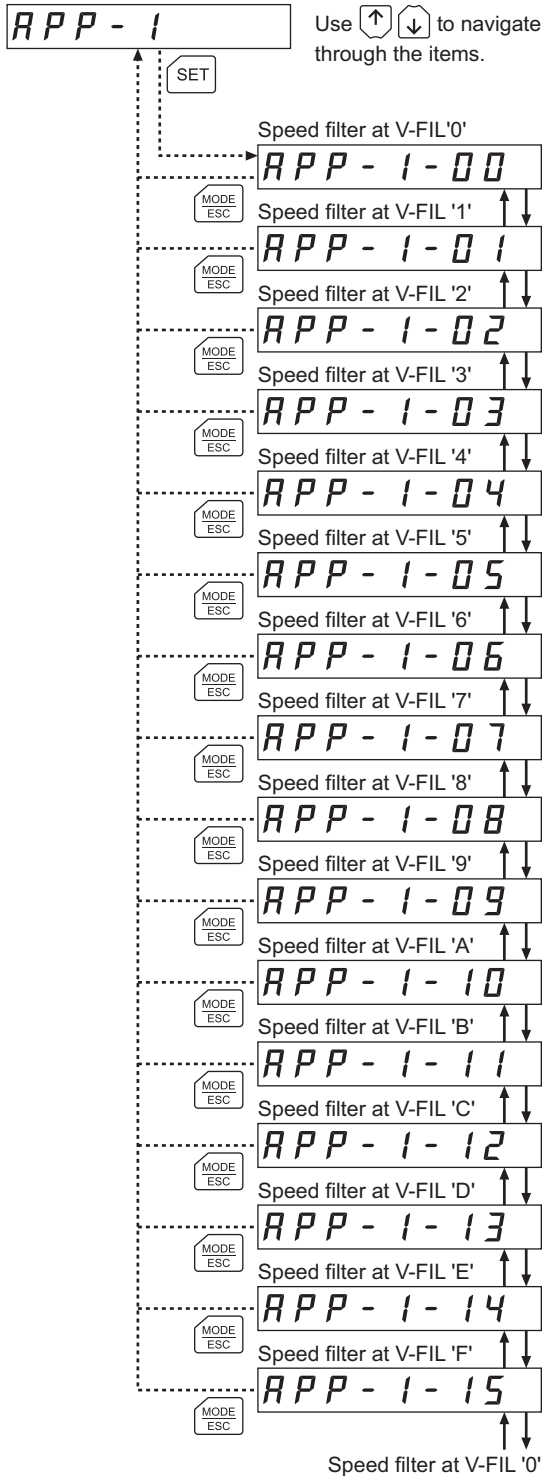
MODE ESC

Operating current at CURRENT 'C'

Initial value	Setting range	Description
6.3	0.0 to 100.0 [%]	Sets the operating current ratio for current setting switch "0."
12.5	0.0 to 100.0 [%]	Sets the operating current ratio for current setting switch "1."
18.8	0.0 to 100.0 [%]	Sets the operating current ratio for current setting switch "2."
25.0	0.0 to 100.0 [%]	Sets the operating current ratio for current setting switch "3."
31.3	0.0 to 100.0 [%]	Sets the operating current ratio for current setting switch "4."
37.5	0.0 to 100.0 [%]	Sets the operating current ratio for current setting switch "5."
43.8	0.0 to 100.0 [%]	Sets the operating current ratio for current setting switch "6."
50.0	0.0 to 100.0 [%]	Sets the operating current ratio for current setting switch "7."
56.3	0.0 to 100.0 [%]	Sets the operating current ratio for current setting switch "8."
62.5	0.0 to 100.0 [%]	Sets the operating current ratio for current setting switch "9."
68.8	0.0 to 100.0 [%]	Sets the operating current ratio for current setting switch "A."
75.0	0.0 to 100.0 [%]	Sets the operating current ratio for current setting switch "B."

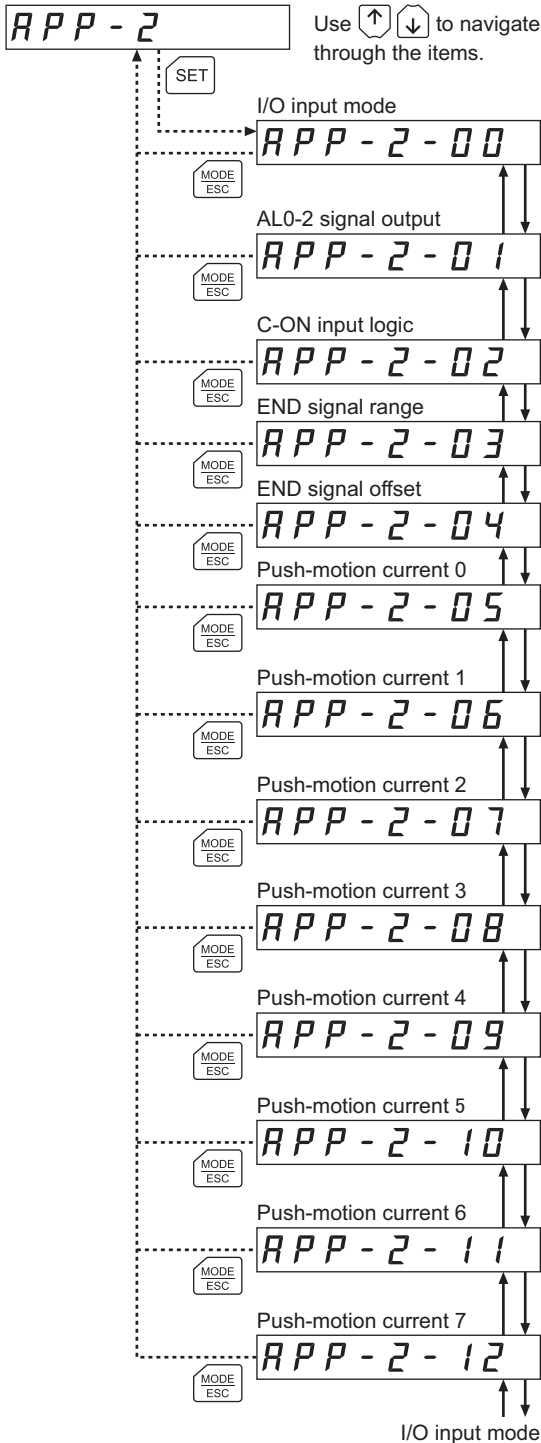


Speed filter parameters



Initial value	Setting range	Description
0	0 to 200 [ms]	Sets the filter time constant for speed filter setting switch "0."
1	0 to 200 [ms]	Sets the filter time constant for speed filter setting switch "1."
2	0 to 200 [ms]	Sets the filter time constant for speed filter setting switch "2."
3	0 to 200 [ms]	Sets the filter time constant for speed filter setting switch "3."
5	0 to 200 [ms]	Sets the filter time constant for speed filter setting switch "4."
7	0 to 200 [ms]	Sets the filter time constant for speed filter setting switch "5."
10	0 to 200 [ms]	Sets the filter time constant for speed filter setting switch "6."
20	0 to 200 [ms]	Sets the filter time constant for speed filter setting switch "7."
30	0 to 200 [ms]	Sets the filter time constant for speed filter setting switch "8."
50	0 to 200 [ms]	Sets the filter time constant for speed filter setting switch "9."
70	0 to 200 [ms]	Sets the filter time constant for speed filter setting switch "A."
100	0 to 200 [ms]	Sets the filter time constant for speed filter setting switch "B."
120	0 to 200 [ms]	Sets the filter time constant for speed filter setting switch "C."
150	0 to 200 [ms]	Sets the filter time constant for speed filter setting switch "D."
170	0 to 200 [ms]	Sets the filter time constant for speed filter setting switch "E."
200	0 to 200 [ms]	Sets the filter time constant for speed filter setting switch "F."

■ I/O parameters



Initial value	Setting range	Description
0	0: Positioning operation 1: Push-motion operation	Selects the input signal mode. For push-motion operation, refer to the explanation on p.26.
0	0: Disable 1: Enable	Changes the setting to enable/ disable alarm code output.
0	0: Contact A 1: Contact B	Changes the C-ON input logic.
1.8	0.0 to 18.0 [°]	Sets the output condition for END output.
0.0	-1.8 to 1.8 [°]	Sets the output offset for END output.
30.0	0.0 to 100.0 [%]	Sets the operating current ratio for push-motion operation.
40.0	0.0 to 100.0 [%]	Sets the operating current ratio for push-motion operation.
50.0	0.0 to 100.0 [%]	Sets the operating current ratio for push-motion operation.
60.0	0.0 to 100.0 [%]	Sets the operating current ratio for push-motion operation.
70.0	0.0 to 100.0 [%]	Sets the operating current ratio for push-motion operation.
80.0	0.0 to 100.0 [%]	Sets the operating current ratio for push-motion operation.
90.0	0.0 to 100.0 [%]	Sets the operating current ratio for push-motion operation.
100.0	0.0 to 100.0 [%]	Sets the operating current ratio for push-motion operation.

About push-motion operation

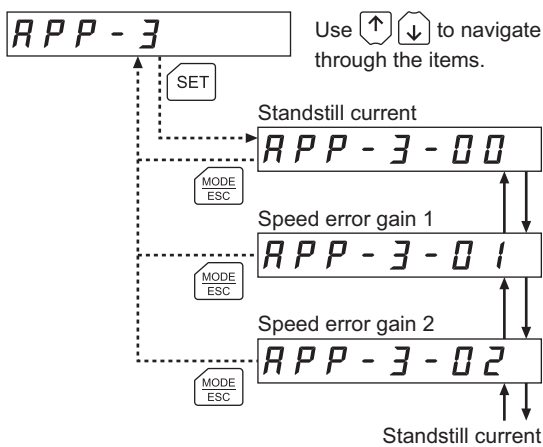
Push-motion operation is a type of operation where pulses are input to continuously pressurize the load. Set an operating current value for push-motion operation in each push-motion current parameter from 0 to 7 (from [APP-2-05] to [APP-2-12]).

The current value set in each parameter will be used to limit the output torque.

You can select a desired current setting based on a combination of ON/OFF statuses of M0 to M2 inputs.

Push-motion current parameter	Initial value (× 0.1%)	M2	M1	M0
0 [APP-2-05]	300	OFF	OFF	OFF
1 [APP-2-06]	400	OFF	OFF	ON
2 [APP-2-07]	500	OFF	ON	OFF
3 [APP-2-08]	600	OFF	ON	ON
4 [APP-2-09]	700	ON	OFF	OFF
5 [APP-2-10]	800	ON	OFF	ON
6 [APP-2-11]	900	ON	ON	OFF
7 [APP-2-12]	1000	ON	ON	ON

■ Normal mode parameters



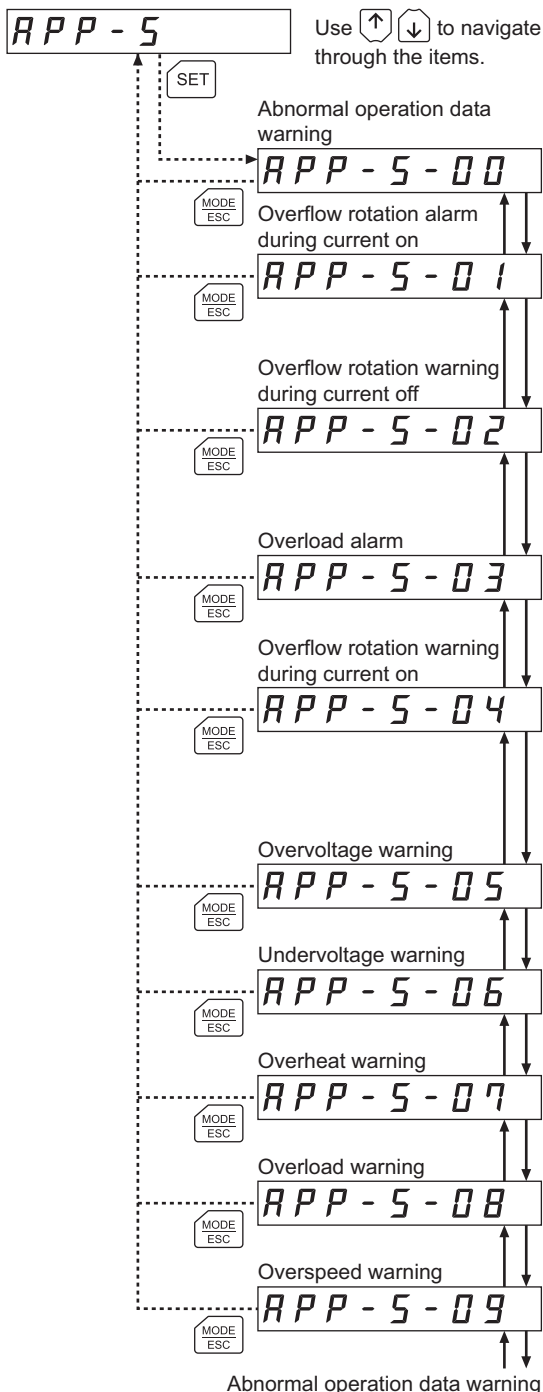
Initial value	Setting range	Description
50.0	0.0 to 50.0 [%]	Sets the standstill current as a percentage of the operating current.
45	0 to 500	Set the speed error gain. When this value is increased, motor vibration will decrease.
45	0 to 500	Set the speed error gain. When this value is increased, motor vibration at the time of speed change will decrease.

■ Current control mode parameters

Use to navigate through the items.

	Initial value	Setting range	Description
Position loop gain APP-4-00	10	1 to 50	Set the position loop gain. When this value is increased, the motor response will increase. Note, however, that an excessively large value may increase the motor overshoot or cause hunting.
Speed loop gain APP-4-01	180	10 to 200	Set the speed loop gain. When this value is increased, the motor overshoot can be suppressed. Note, however, that an excessively large value may cause the motor to oscillate.
Speed loop integral time constant APP-4-02	100.0	10.0 to 200.0 [ms]	Set the integral time constant for speed loop. When this value is decreased, the motor response will increase. Note, however, that an excessively small value may increase the motor overshoot or cause hunting.
Anti-vibration control APP-4-03	0	0: Disable 1: Enable	Changes the setting to enable/disable anti-vibration control.
Frequency of anti-vibration control APP-4-04	7.00	3.00 to 100.00 [Hz]	Sets the frequency of anti-vibration. When this setting is used, residual vibration can be suppressed at positioning even when the motor is assembled into a machine whose rigidity is low. As a result, compliance will increase.

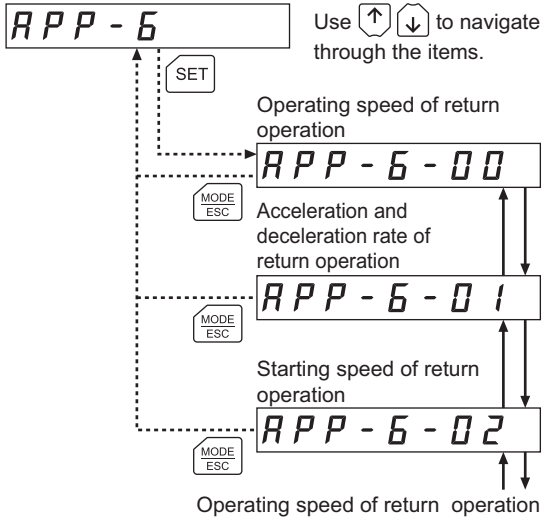
Alarm warning parameters



Initial value	Setting range	Description
0	0: Disable 1: Enable	Changes the setting to enable/disable the abnormal operation data warning output.
3.00	0.01 to 300.00 [rev]	Sets the condition under which an overflow rotation alarm during current on generates, as an amount of rotation of the motor shaft.
100.00	0.01 to 300.00 [rev]	Sets the condition under which an overflow rotation warning during current off generates, as an amount of rotation of the motor shaft.
5.0	0.1 to 30.0 [s]	Sets the condition under which an overload alarm generates.
3.00	0.01 to 300.00 [rev]	Sets the condition under which an overflow rotation warning during current on warning generates, as an amount of rotation of the motor shaft.
435 (63.0*)	320 to 450 (15.0 to 63.0*) [V]	Sets the voltage at which an overvoltage warning generates.
120 (18.0*)	120 to 280 (15.0 to 63.0*) [V]	Sets the voltage at which an undervoltage warning generates.
85	40 to 85 [°C]	Sets the temperature at which an overheat warning generates.
5.0	0.1 to 30.0 [s]	Sets the condition under which an overload warning generates.
4500	1 to 5000 [r/min]	Sets the speed at which an overspeed warning generates.

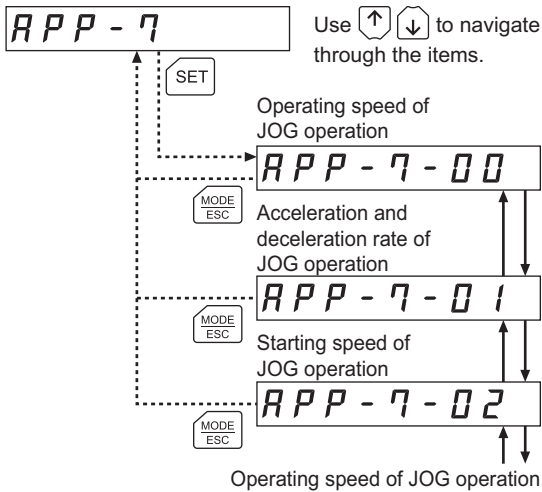
* The descriptions in () apply to the ARD-K.

Return to electrical home operation parameters



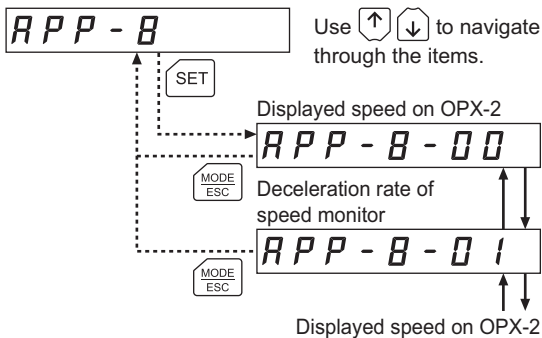
Initial value	Setting range	Description
30	1 to 4000 [r/min]	Set the operating speed of return to electrical home operation.
100.00	0.01 to 1000.00 [ms/(1000 r/min)]	Set the acceleration and deceleration rate of return to electrical home operation.
30	0 to 4000 [r/min]	Set the starting speed of return to electrical home operation.

Manual operation parameters



Initial value	Setting range	Description
30	1 to 4000 [r/min]	Set the operating speed of JOG operation.
100.00	0.01 to 1000.00 [ms/(1000 r/min)]	Set the acceleration and deceleration rate of JOG operation.
30	0 to 4000 [r/min]	Set the starting speed of JOG operation.

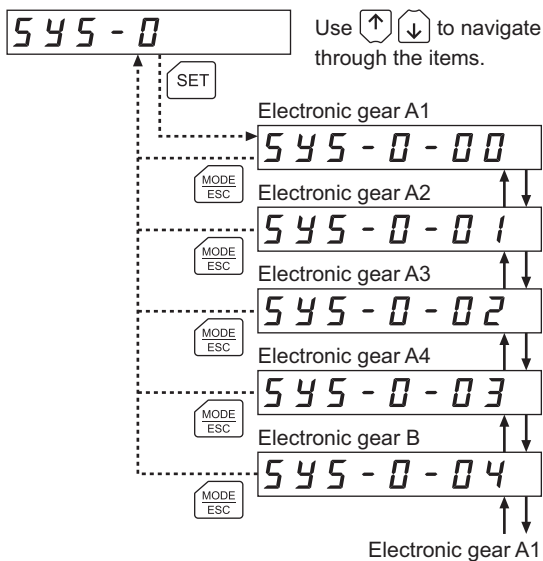
Data setter parameters



Initial value	Setting range	Description
0	0: Signed 1: Absolute value	Selects the display method of monitored speed.
1.0	1.0 to 100.0	Sets the gear ratio of geared motor for speed monitor.

7.5 Description of system parameters

■ Electronic gear parameters



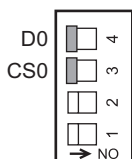
Initial value	Setting range	Description
10	1 to 1000	Sets the denominator of electronic gear to be assigned to the resolution setting switch. (4 options are available.)
1	1 to 1000	
20	1 to 1000	
2	1 to 1000	
10	1 to 1000	Sets the numerator of electronic gear to be assigned to the resolution setting switch.

The value of each resolution setting switch (No.3, No.4) can be changed as follows using the electronic gear parameters [SyS-0-00] to [SyS-0-04]. Note that the calculated value must be inside the setting range specified below:

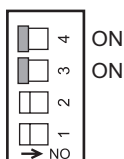
Resolution setting range: 100 to 10000 P/R

No.3 \ No.4	CS0 or OFF	CS1 or ON
D0 or OFF	$1000 \times \frac{\text{Electronic gear B [SyS-0-04]}}{\text{Electronic gear A1 [SyS-0-00]}}$	$1000 \times \frac{\text{Electronic gear B [SyS-0-04]}}{\text{Electronic gear A2 [SyS-0-01]}}$
D1 or ON	$1000 \times \frac{\text{Electronic gear B [SyS-0-04]}}{\text{Electronic gear A3 [SyS-0-02]}}$	$1000 \times \frac{\text{Electronic gear B [SyS-0-04]}}{\text{Electronic gear A4 [SyS-0-03]}}$

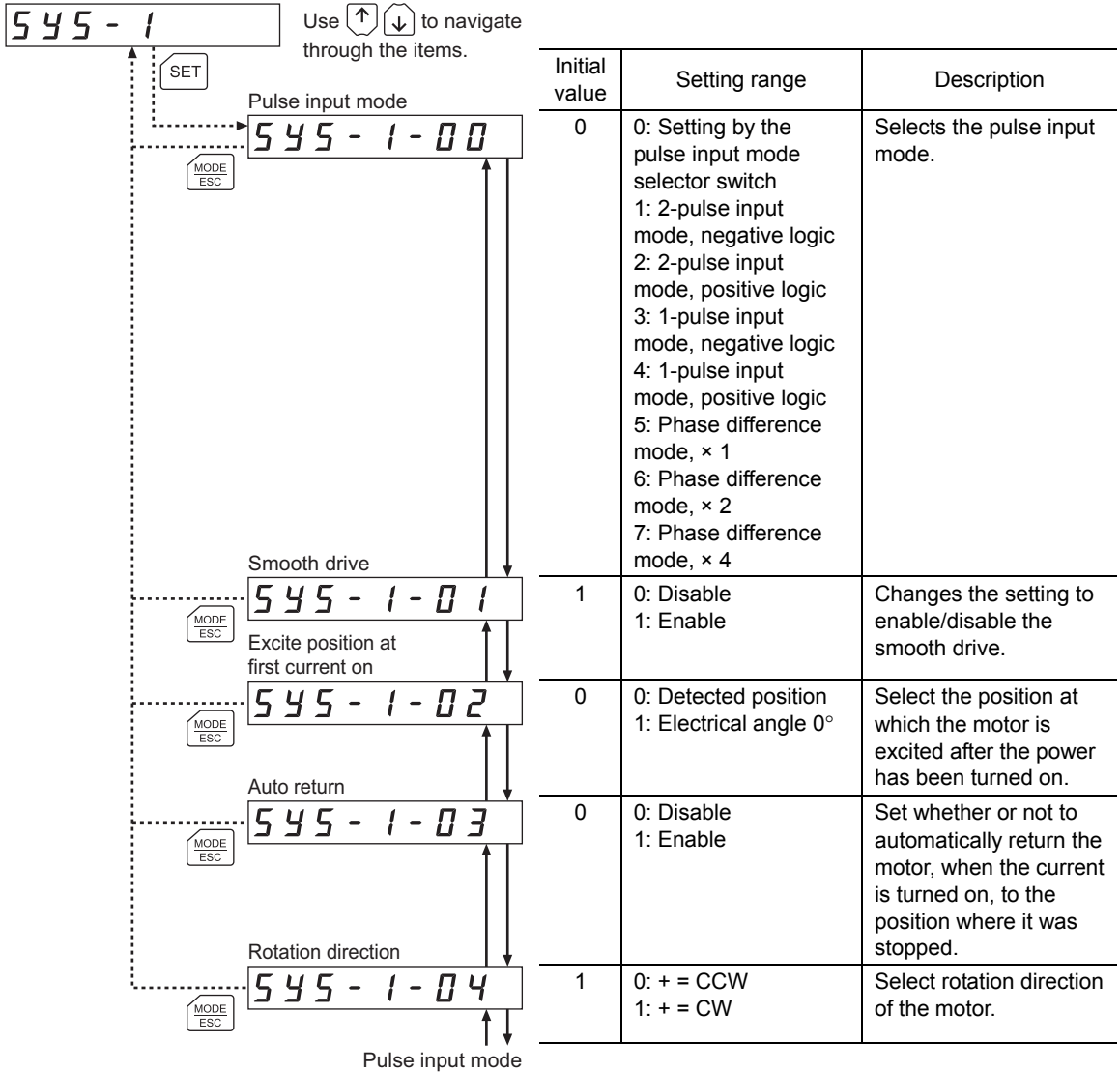
ARD-A/ARD-C/ARD-S



ARD-K



■ Operation setting parameters



7.6 Initializing parameters

You can revert parameters saved in the driver to their initial values.
For details, refer to 9.6, “Initializing driver parameters” on p.41.

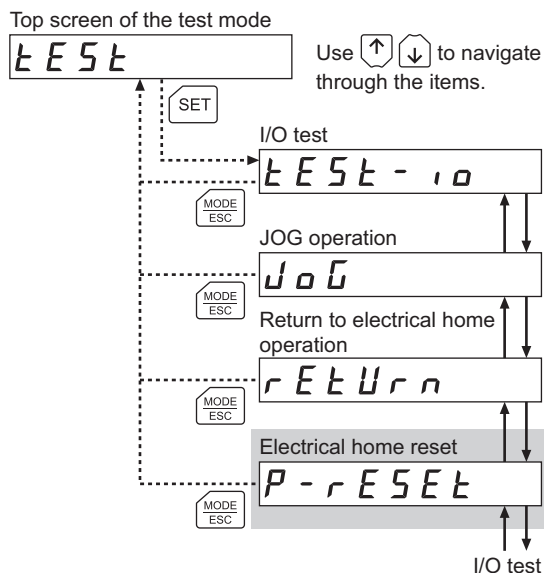
8 Test mode

8.1 What you can do in the test mode

- I/O test
You can check the ON/OFF status of each input signal of the driver.
You can also switch the ON/OFF status of each output signal on the **OPX-2A**.
There is also an I/O test function with which you can check the connection status of the driver.
- JOG operation
You can operate the motor using the keys on the **OPX-2A**.
- Return to electrical home operation
You can perform an operation that returns the motor to its electrical home position.
- Electrical home reset
You can set the current position as the electrical home position.

8.2 Operation in the test mode

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



* If operations are limited by the edit lock function (p.7), the screen text in gray is not shown.

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 CW/CCW input and RETURN input will be disabled.
- When you move from the I/O test or electrical home reset screen to a lower level, all I/O signals and operations will be disabled.

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

While the motor is operating, you cannot move to any lower level from the top screen of the test mode. Pressing the [SET] key will generate an error, and “oPE-Err” will be shown.

oPE-Err

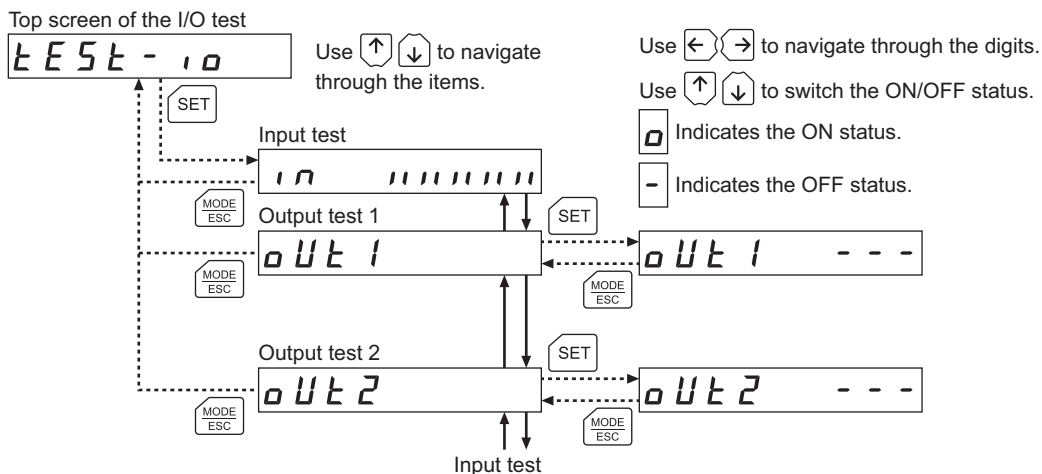
Be sure to stop the motor operation before pressing the [SET] key.

8.3 I/O test

You can check the ON/OFF status of each input signal of the driver.

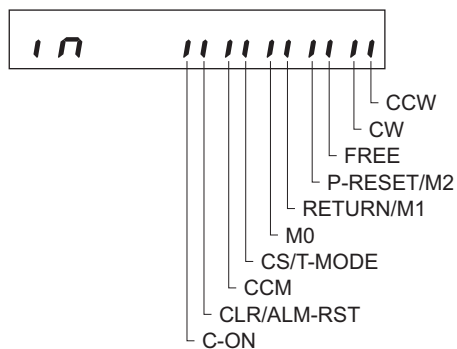
You can also switch the ON/OFF status of each output signal on the **OPX-2A**.

There is also an I/O test function with which you can check the connection status of the driver.

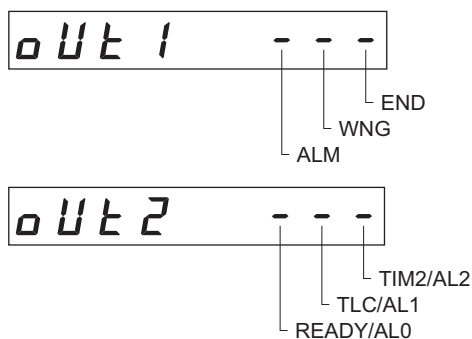


Each digit on the 7-segment LED display corresponds to a signal. If the signal is ON, the corresponding digit is lit. If the signal is OFF, the digit is unlit. Use the \uparrow \downarrow keys to switch the ON/OFF status of an output signal.

• Input signals



• Output signals

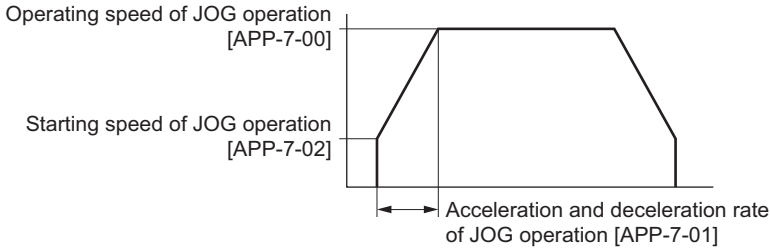


8.4 JOG operation

You can operate the motor using the keys on the **OPX-2A**.

The operating speed corresponds to the value set in the operating speed of JOG operation parameter [APP-7-00].

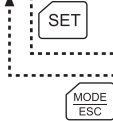
If the value set in the starting speed of JOG operation parameter [APP-7-02] is greater than the value set in the operating speed of JOG operation parameter [APP-7-00], the starting speed of JOG operation is used.



Note During JOG operation, the motor rotates at the specified operating speed while each applicable key is pressed. Before commencing 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.

Top screen of JOG operation

JOG



Operation is in progress

- 123456

↑ Pressing once causes the motor to rotate one step in the forward direction. Pressing and holding the key causes the motor to rotate continuously in the forward direction.

↓ Pressing once causes the motor to rotate one step in the reverse direction. Pressing and holding the key causes the motor to rotate continuously in the reverse direction.

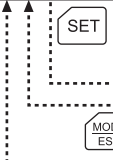
8.5 Return to electrical home operation

You can perform an operation that returns the motor to its electrical home position.

Note During a return to electrical home operation, the motor rotates at the specified operating speed while each applicable key is pressed. Before commencing the return to electrical 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.

Top screen of the return to electrical home operation

rEtUrN



Perform return to electrical home operation

do r t n

Operation is in progress (blinking display)

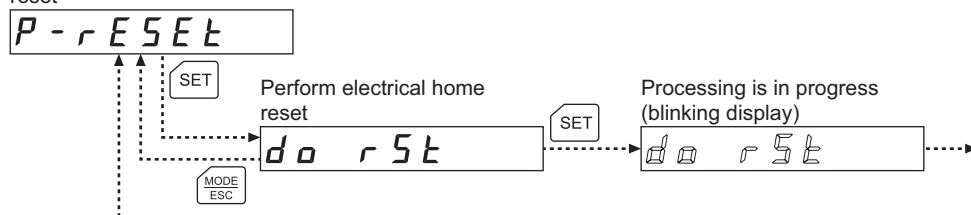
do r t n

8.6 Electrical home reset

You can set the current position as the electrical home position.

Note If operations are limited by the edit lock function (p.7), the electrical home position cannot be reset.

Top screen of electrical home reset



9 Copy mode

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

In the copy mode, you can download parameters saved in the **OPX-2A** to the driver. You can also upload parameters saved in the driver to the **OPX-2A**.

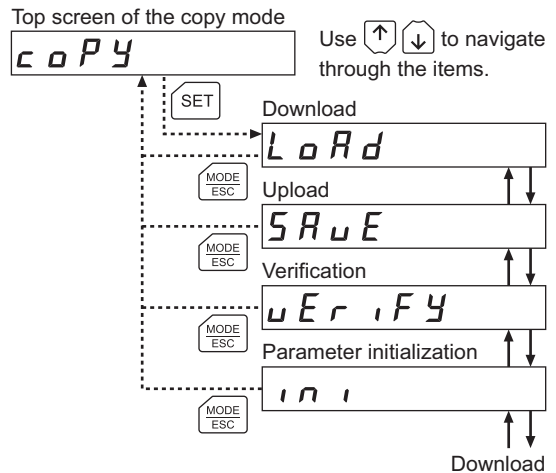
It is also possible to verify parameters in the **OPX-2A** against the corresponding parameters in the driver, or revert driver parameters to their initial values.

9.1 What you can do in the copy mode

- **Download**
Copy parameters saved in the **OPX-2A** to the driver.
- **Upload**
Copy parameters saved in the driver to the **OPX-2A**.
- **Verification**
Verify parameters in the **OPX-2A** against the corresponding parameters in the driver.
- **Initializing driver parameters**
Revert parameters saved in the driver to their initial values.

9.2 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.

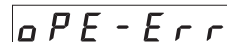


Note

- Stop the motor operation before changing to the copy mode.
- When you move from the top screen of the copy mode to a lower level, the CW/CCW input and RETURN input will be disabled.
- Data cannot be copied between the ARD-A/ARD-C/ARD-S and ARD-K.

- What happens when the 【SET】 key is pressed while the motor is operating

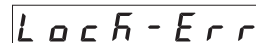
While the motor is operating, you cannot move to any lower level from the top screen of the copy mode. Pressing the 【SET】 key will generate an error, and “oPE-Err” will be shown.

A rectangular box containing the text "oPE-Err" in a monospaced font.

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

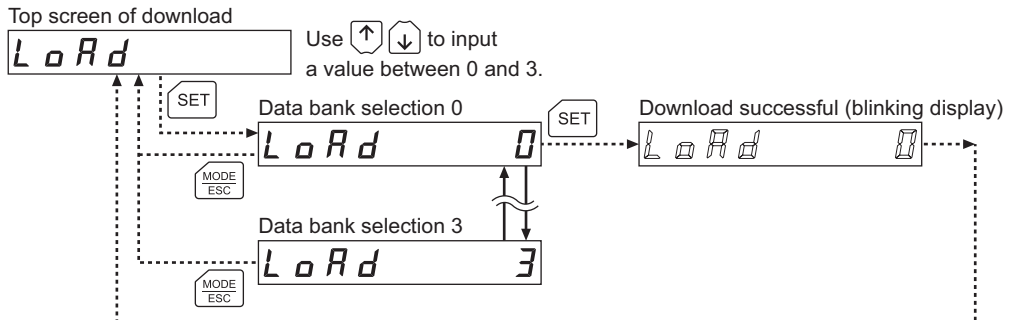
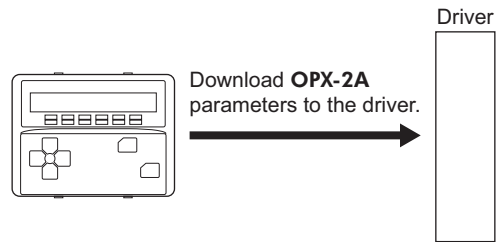
While the edit lock is enabled, you cannot move to any lower level from the top screen of the copy mode. Pressing the 【SET】 key will generate an error, and “Lock-Err” will be shown.

A rectangular box containing the text "Lock-Err" in a monospaced font.

Be sure to cancel the edit lock before pressing the 【SET】 key. Refer to p.7 for the procedure to cancel the edit lock.

9.3 Downloading to the driver

In this operation, parameters of the specified data bank number are downloaded to the driver.



Note

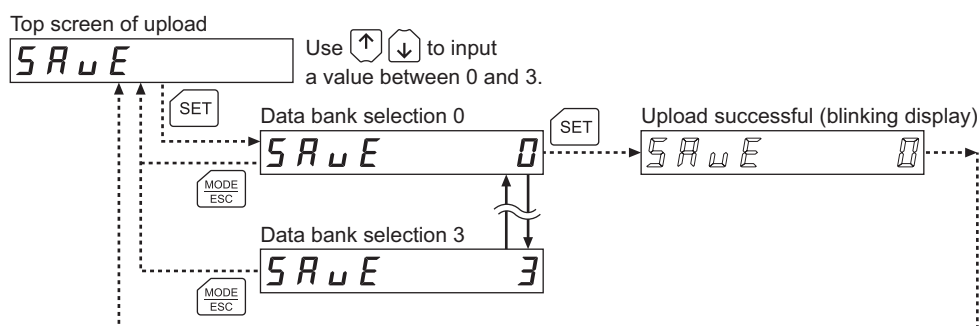
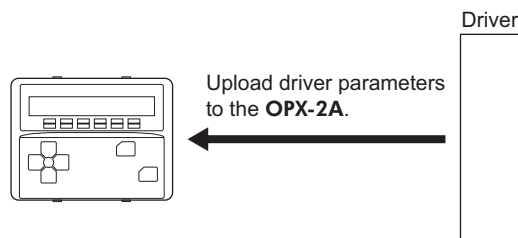
- System parameters that have been changed will become effective after the power is cycled. If the system parameters have been changed as a result of the download, cycle the driver power. In the ARD-A/ARD-C/ARD-S, if a 24 VDC power supply is used, also cycle the 24 VDC power supply.
- Do not turn off the driver power while the download is still in progress (= while the display is blinking). Doing so may damage the data.

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.

Blinking display	Description	Action
<i>Prod-Err</i>	The product series of the driver to which data is downloaded is wrong.	<ul style="list-style-type: none"> • Check the product series of the driver. • Check the data bank number on the OPX-2A.
<i>HEAD-Err</i> <i>bcc-Err</i>	An error occurred while data was being downloaded.	Perform download again. If the same error occurs, the data saved in the OPX-2A may be damaged. Upload the applicable data to set the OPX-2A data again.
<i>no-dAtA</i>	The specified data bank number does not contain parameters.	Check the data bank number.
<i>dAtA-Err</i>	An error occurred while data was being written.	Perform download again.

9.4 Uploading to the OPX-2A

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

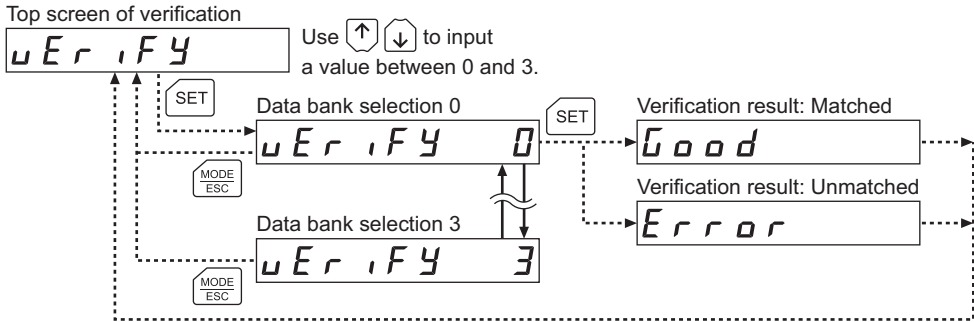


Note Do not turn off the driver power while the upload is still in progress (= while the display is blinking). Doing so may damage the data.

9.5 Verifying parameters

In this operation, parameters in the specified data bank number are verified against the corresponding parameters saved in the driver.

If the verification finds that the two sets of parameters match, “Good” will be shown. If the two do not match, “Error” will be shown.



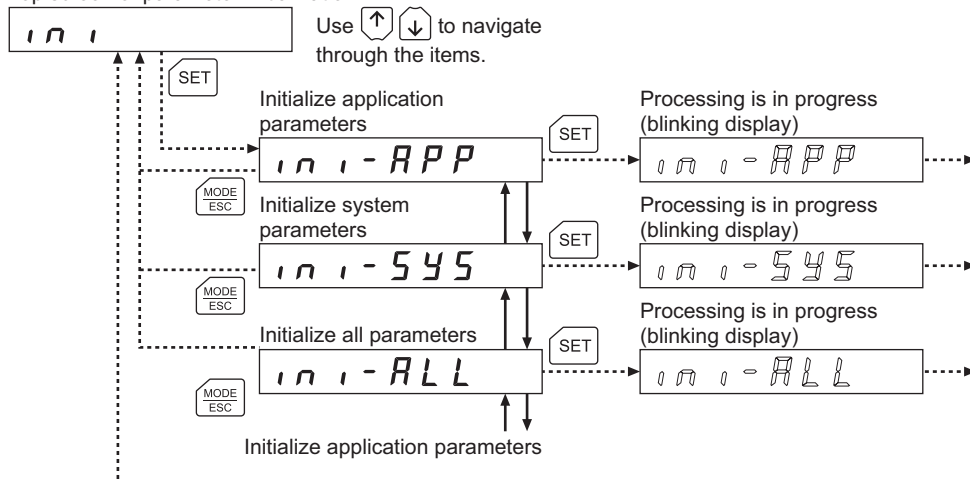
If a verification error occurs, a code indicating the nature of the error will blink on the display. Verification will not be performed and the display will return to the top screen of verification.

Blinking display	Description	Action
<i>Prod-Err</i>	The product series of the driver against which data is verified is wrong.	<ul style="list-style-type: none"> • Check the product series of the driver. • Check the data bank number on the OPX-2A.
<i>HEAD-Err</i>	An error occurred while data was being verified.	Perform verification again. If the same error occurs, the data saved in the OPX-2A may be damaged. Upload the applicable data to set the OPX-2A data again.
<i>bcc-Err</i>		
<i>no-dAtA</i>	The specified data bank number does not contain parameters.	Check the data bank number.

9.6 Initializing driver parameters

In this operation, parameters saved in the driver are reverted to their initial values.

Top screen of parameter initialization



Note

- System parameters that have been changed will become effective after the power is cycled. If the system parameters have been changed as a result of the initialization, cycle the driver power. In the ARD-A/ARD-C/ARD-S, if a 24 VDC power supply is used, also cycle the 24 VDC power supply.
- Do not turn off the driver power while the initialization is still in progress (= while the display is blinking). Doing so may damage the data.

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