Thank you for purchasing an Oriental Motor product. This 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.
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 protective function is triggered, first stop operation and turn off the driver 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 actuator 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 actuator and driver 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**
- Dispose the product correctly in accordance with laws and regulations, or instructions of local governments.
Introduction

Only qualified personnel of electrical and mechanical engineering should work with the product. Use the product correctly after thoroughly reading the “1 Safety precautions” on p.2. In addition, be sure to observe the contents described in warning, caution, and note in this manual. 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 “[CRK Series FLEX Built-in Controller type USER MANUAL](#)” and understand the basic operating procedures and other details of the driver.

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

**Specifications**

<table>
<thead>
<tr>
<th>Connection</th>
<th>Mini DIN, 8 pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>External dimensions</td>
<td>96 (W) × 72 (H) × 21.5 (D) mm (3.78 (W) × 2.83 (H) × 0.85 (D) in.)</td>
</tr>
<tr>
<td>Cable length</td>
<td>5 m (16.4 ft.)</td>
</tr>
<tr>
<td>Mass</td>
<td>0.25 kg (8.8 oz)</td>
</tr>
</tbody>
</table>

**RoHS Directive**

The products do not contain the substances exceeding the restriction values of RoHS Directive (2011/65/EU).
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
- Information.......................... 1 copy

### 3-2 Names and functions of parts

- **Display**
  - This area shows the motor position, operation data, parameters, alarms, etc.

- **LED indicators**
  - These LED indicators are used to indicate the operation mode of the **OPX-2A** and the driver status.
  - Switches the operation mode.
  - Moves to the upper level.
  - Stop the motor immediately while being operated in test mode.

- **Use this button to select data or change the displayed item or move to the lower level.**

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 ![MODE][SET][↑][↓][←][→]. 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 2 3 4 5 6 7 8 9 0
```

- Alphabets

```
A B C D E F G H I J K L
M N O P Q R S T U V W Y
```

- Symbols

```
+ -
```

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. When the actuator is operated or the edit lock function is enabled, the corresponding LED is also lit.

```
Lit in the monitor mode
Lit in the data mode
Lit in the parameter mode
Lit in the test mode
Lit when an alarm is present
Lit when a warning is present
Lit while the motor is operating
Lit in the copy mode
Lit when the edit lock function is enabled
Not used
```

3-5  Types of operation modes

The OPX-2A has multiple operation modes. The operation mode will change every time the [MODE] 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 Basic operations of the OPX-2A

Use the six keys \[ \text{MODE} \rightarrow \text{SET} \rightarrow \text{ITEM} \rightarrow \text{SELECT} \] to set data or operate the actuator.

#### Operation flow

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

1. **Level 1:** Top screen in each mode
   - **TEST**
     - Use \[ \text{ITEM} \] to navigate through the modes.

2. **Level 2:** Item selection screen
   - **TEST 10**
     - Use \[ \text{SET} \] to move to the lower level.
     - Use \[ \text{ITEM} \] to move to the upper level.

3. **Level 3**
   - **IN 1**
     - Use \[ \text{ITEM} \] to move to the next item.
   - **IN 2**
     - Use \[ \text{ITEM} \] to move to the previous item.

---

1. Use the \[ \text{MODE} \] 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 \[ \text{MODE} \] 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 \[ \text{ITEM} \] 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 \[ \text{MODE} \] key.

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

---

**Note**

If the \[ \text{SET} \] 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 “mE-m-bUSY” will be shown on the display. Be sure to wait until all internal processing is completed, before pressing the \[ \text{SET} \] 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 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.

3-7 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] 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 [MODE] 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.

3-8 Rewriting the driver’s non-volatile memory

Operation data and parameters are saved to the driver’s non-volatile memory. The non-volatile memory can be rewritten approx. 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 driver
• Initialize driver operation data and 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.)]

![Mounting Hole Dimensions](image)

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 data edit connector (CN3) on the driver, and then turn on the power to the driver.

Note
- When operation data and 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.
There are the following restrictions while the edit lock function is effective.

- Data mode, parameter mode, copy mode:
  Although they are displayed on the screen, they are unable to operate.
- Clearing the alarm and warning records, clear data, position preset, encoder counter preset, teaching: They are not displayed on the screen.
In the lower level except the top screen, press the [ESC] key to return to the previous level.
Screen transitions

Test mode

System parameters

Speed parameters

Return-to-home parameters

Alarm/warning parameters

Common parameters

Common acceleration rate

Common deceleration rate

Starting speed

Jog operating speed

Jog acceleration (deceleration) rate

Jog starting speed

Acceleration (deceleration) rate type

Home-seeking mode

Operating speed of home-seeking

Acceleration (deceleration) rate of home-seeking

Starting speed of home-seeking

Position offset of home-seeking

Starting direction of home-seeking

SLIT detection with home-seeking

TIM signal detection with home-seeking

Backward steps in 2-sensor mode home-seeking

Steppout detection band

Overvoltage warning

Overheat warning

Software overtravel

Positive software limit

Negative software limit

Display mode of the data setter speed

Communication timeout action

Receive period

Response interval

Receive monitoring

Steppout detection action

In the lower level except the top screen, press the [SET] key to return to the previous level.
Screen transitions

Copy mode

- Return-to-home operation
  - Perform return-to-home operation
  - Processing is in progress (blinking display)

- Position preset
  - Perform position preset
  - Processing is in progress (blinking display)

- Encoder counter preset
  - Perform encoder counter preset
  - Processing is in progress (blinking display)

- Teaching
  - Perform teaching
  - Data is being written (blinking display)

- Operation data No.
  - Data is being written (blinking display)

- Operation data No.
  - Data is being written (blinking display)

In the lower level except the top screen, press the key to return to the previous level.
Screen transitions

Test mode → Copy mode → Copy mode

Download

Load

Data bank selection 0
Load 0
Processing is in progress (blinking display)

Data bank selection 3
Load 3
Processing is in progress (blinking display)

Data bank selection 2
Load 2
Processing is in progress (blinking display)

Data bank selection 1
Load 1
Processing is in progress (blinking display)

Upload

Data bank selection 0
Upload 0
Processing is in progress (blinking display)

Data bank selection 3
Upload 3
Processing is in progress (blinking display)

Data bank selection 2
Upload 2
Processing is in progress (blinking display)

Data bank selection 1
Upload 1
Processing is in progress (blinking display)

Verification

Data bank selection 0
Verify 0
Verification result: Matched Good

Data bank selection 3
Verify 3
Verification result: Unmatched Error

Data bank selection 2
Verify 2

Data bank selection 1
Verify 1
Screen transitions

Monitor mode

In the lower level except the top screen, press the [Esc] key to return to the previous level.
Monitor mode

6 Monitor mode

6-1 Overview of the monitor mode

- Monitoring the operating status
  You can monitor the actuator command speed, command position, encoder counter value, operation data number corresponding to the current operation, and currently selected operation data number, in real time.

  A range capable to monitor with the OPX-2A is from −19,999,999 to 19,999,999 with up to eight digit numbers. However, only seven digit numbers can be shown on the display of the OPX-2A, so only the last seven digit numbers are shown when the monitored value is eight digit numbers, and a dot is marked on the lower right of the display.

  - Display example

<table>
<thead>
<tr>
<th>Actual value</th>
<th>−19,999,999</th>
<th>−10,000,001</th>
<th>−10,000,000</th>
<th>10,000,000</th>
<th>10,000,001</th>
<th>19,999,999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displayed value</td>
<td>−9999999.</td>
<td>−0000001.</td>
<td>−0000000.</td>
<td>0000000.</td>
<td>0000001.</td>
<td>9999999.</td>
</tr>
</tbody>
</table>

- 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 also clear alarm/warning records.
  • You can reset the alarms currently present.

- 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 [MODE] key to select the monitor mode.
2. Press the [SET] key in the top screen of the monitor mode.
3. Use the [↑][↓] keys to select the item you want to monitor.
6-3 Monitor items

■ Command speed
You can check the command speed of the actuator (unit: Hz).
When the moving part of the actuator moves in the backward 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 moving direction. You can select the value display format using the "display mode of the data setter speed" parameter [APP-6-03] (p.32).

■ Command position
You can check the command position of the actuator with reference to the home position. If a resolution is set, an appropriate value based on the resolution is shown as steps.

■ Encoder count
You can check the encoder counter value.

■ 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 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.
- Some alarms cannot be reset on the OPX-2A. Check by the following table. To reset these alarms, you must cycle the driver power.
**Alarm code list**

<table>
<thead>
<tr>
<th>Code</th>
<th>Alarm name</th>
<th>Resetting on the OPX-2A</th>
<th>Number of times the driver’s ALARM LED blinks</th>
</tr>
</thead>
<tbody>
<tr>
<td>10h</td>
<td>Overflow</td>
<td>Possible</td>
<td>4</td>
</tr>
<tr>
<td>21h</td>
<td>Overheat</td>
<td>Possible</td>
<td>2</td>
</tr>
<tr>
<td>22h</td>
<td>Overvoltage</td>
<td>Not possible</td>
<td>3</td>
</tr>
<tr>
<td>41h</td>
<td>EEPROM error</td>
<td>Not possible</td>
<td>9</td>
</tr>
<tr>
<td>60h</td>
<td>±LS both sides active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>61h</td>
<td>Reverse limit sensor connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>62h</td>
<td>Home seeking error</td>
<td>Possible</td>
<td></td>
</tr>
<tr>
<td>63h</td>
<td>No HOMES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>64h</td>
<td>TIM, Z, SLIT input error</td>
<td></td>
<td></td>
</tr>
<tr>
<td>66h</td>
<td>Overtravel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>67h</td>
<td>Software overtravel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6Ah</td>
<td>Home seeking offset error</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70h</td>
<td>Invalid operation data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>84h</td>
<td>RS-485 communication error</td>
<td>Not possible</td>
<td></td>
</tr>
<tr>
<td>85h</td>
<td>RS-485 communication timeout</td>
<td>Possible</td>
<td></td>
</tr>
<tr>
<td>81h</td>
<td>Network bus error</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8Ah</td>
<td>Network converter error</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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.

**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.
### Warning

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

#### Warning code list

<table>
<thead>
<tr>
<th>Code</th>
<th>Warning name</th>
</tr>
</thead>
<tbody>
<tr>
<td>10h</td>
<td>Overflow</td>
</tr>
<tr>
<td>21h</td>
<td>Overheat</td>
</tr>
<tr>
<td>22h</td>
<td>Overvoltage</td>
</tr>
<tr>
<td>84h</td>
<td>RS-485 communication error</td>
</tr>
</tbody>
</table>

#### 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.

---

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

**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.
- You can also clear the warning records by turning off the driver power.
Monitor mode

- **I/O monitor**
  You can check the ON/OFF status of each I/O signal of the driver.

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

- **Input signals**
  - Input monitor 1
  - Input monitor 2
  - Input monitor 3

- **Output signals**
  - Output monitor
7 Data mode

Up to 63 sets of actuator operation data can be set. Once set, the operation data is stored in the driver. The data will not be lost even after the OPX-2A is disconnected from the driver. Before setting operation data, read the “CRK Series FLEX Built-in Controller type USER MANUAL” carefully to understand the basic operations, functions and other details of the driver.

Note
- Operation data has significant bearing on actuator 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, operation data cannot be edited.

7-1 Operation in the data mode

1. Use the [MODE] 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.
   The display changes to the operation data screen.
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.
• 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 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 [SET] key.

### 7-2 How to select the operation data number

You can select a desired operation data set based on a combination of ON/OFF statuses of M0 through M5 inputs of the driver.

<table>
<thead>
<tr>
<th>Operation data number</th>
<th>M5</th>
<th>M4</th>
<th>M3</th>
<th>M2</th>
<th>M1</th>
<th>M0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequential positioning</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>1</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>2</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>61</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>62</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>63</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

### 7-3 Setting items

<table>
<thead>
<tr>
<th>Setting item</th>
<th>Setting range</th>
<th>Initial value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positioning mode</td>
<td>inc: Incremental mode</td>
<td>inc</td>
<td>Selects how to specify the position (travel amount) in positioning operation (absolute mode or incremental mode).</td>
</tr>
<tr>
<td>Position</td>
<td>−8,388,608 to +8,388,607 steps</td>
<td>0</td>
<td>Sets the position (distance) for positioning operation.</td>
</tr>
<tr>
<td>Operating speed</td>
<td>1 to 500,000 Hz</td>
<td>1000</td>
<td>Sets the operating speed in positioning operation and continuous operation.</td>
</tr>
<tr>
<td>Operating mode</td>
<td>SnGL: Single Lin1: Link1 Lin2: Link2</td>
<td>SnGL</td>
<td>Sets perform positioning operation as single-motion or linked-motion operation.</td>
</tr>
<tr>
<td>Sequential positioning</td>
<td>0: Disable 1: Enable</td>
<td>0</td>
<td>Sets enable or disable sequential positioning operation.</td>
</tr>
<tr>
<td>Acceleration rate</td>
<td>0.001 to 1000.000 ms/kHz</td>
<td>30.000</td>
<td>Sets the acceleration rate in positioning operation and continuous operation. *</td>
</tr>
<tr>
<td>Deceleration rate</td>
<td>0.001 to 1000.000 ms/kHz</td>
<td>30.000</td>
<td>Sets the deceleration rate in positioning operation and continuous operation. *</td>
</tr>
<tr>
<td>Dwell time</td>
<td>0 to 50.000 s</td>
<td>0</td>
<td>Sets the dwell time to be used in linked-motion operation 2.</td>
</tr>
</tbody>
</table>

* This item is effective when the “acceleration (deceleration) rate type” parameter [APP-2-09] is set to “separate”. If this parameter is set to “common”, the values of the “common acceleration rate” [APP-2-00] and “common deceleration rate” [APP-2-01] parameters will be used (initial value: common).
How to set the dwell time

When displaying the “Lin2” 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.

7-4 Setting example

This section explains the positioning mode of the operation data No.1 and how to change the position.
- Positioning mode: Changes from incremental mode to absolute mode.
- Position: Changes from 0 step to 10000 steps.

1. Use the [MODE] key to select the data mode. The “DATA” LED is lit.

2. Press the [SET] key on the top screen of the data mode. The display changes to the operation data No.1 screen.

3. Press the [SET] key. The display changes to the positioning mode screen.

4. Press the [SET] key again. The present set value of the positioning mode is displayed with blinking.

5. Press the [↓] key once to select “Ab5.”

6. Press the [SET] 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 [↓] key. The display changes to the position screen.

8. Press the [SET] key. The present set value of the position is displayed with blinking.

9. Use the [↑][↓][←][→] keys to select “10000.” The selected digit is displayed with blinking.

Use [←][→] to navigate through the digits. Use [↑][↓] to increase/decrease the value.
Data mode

   The blinking speed of the input value becomes quickly and the value is set.
   The display returns to the position screen.

   Input 10000 (blinking display)
   
   Confirm the changed value (quick blinking)
   
   Return to the position

    The display returns to the operation data No.1 screen.

   Return to the operation data No.1

7-5 Initialization of the selected operation data

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

1. Use the [MODE/ESC] key to select the data mode.
   The “DATA” LED is lit.

   Top screen of the data mode

2. Press the [SET] key on the top screen of the data mode.
   The display changes to the operation data No.1 screen.

   Operation data No.1

3. Press the [SET] key.
   The display changes to the positioning mode screen.

   Positioning mode

4. Press the [↑] key once.
   The display changes to the clear data screen.

   Clear data

5. Press the [SET] key.
   The display changes to the screen to execute clearing.

   Clear

6. Press the [SET] key.
   The display blinks and the operation data No.1 is cleared.

   Processing is in progress (blinking display)

7-6 Initialization of all operation data

All of the operation data saved in the driver can be reverted to the initial values.
Perform “Initialize operation data” of the copy mode.
For the operation, check the screen transitions of the copy mode on p.16, or “10-6 Initializing driver data” on p.41.
You can set parameters relating to actuator operation and control. These parameters are saved in the driver. Before setting parameters, read the “CRK Series FLEX Built-in Controller type USER MANUAL” carefully to understand the basic operations, functions and other details of the driver.

**Note**
- Parameters have significant bearing on actuator operation. Before setting any parameter, make sure you fully understand the content of the parameter.
- If operations are limited by the edit lock function, parameters cannot be edited.

## 8-1 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. Six types of parameters are available on the levels below the application parameter screen. These parameters are classified as follows.

<table>
<thead>
<tr>
<th>Parameter classification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O parameters</td>
<td>Sets the parameters relating to I/O signals.</td>
</tr>
<tr>
<td>Motor parameters</td>
<td>Sets the parameters relating to motor.</td>
</tr>
<tr>
<td>Speed parameters</td>
<td>Sets the parameters relating to speed.</td>
</tr>
<tr>
<td>Return-to-home parameters</td>
<td>Sets the parameters relating to return-to-home operation.</td>
</tr>
<tr>
<td>Alarm/warning parameters</td>
<td>Sets the condition under which each alarm or warning generates.</td>
</tr>
<tr>
<td>Common parameters</td>
<td>Sets the software overtravel, data setter display mode, RS-485 communication period, and whether to enable or disable misstep detection.</td>
</tr>
</tbody>
</table>

### System parameters

When a system parameter is changed, the new parameter will become effective only after the power is cycled. Two types of parameters are available on the levels below the system parameter screen. These parameters are classified as follows.

<table>
<thead>
<tr>
<th>Parameter classification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation setting parameters</td>
<td>Sets the parameters relating to motor operation.</td>
</tr>
<tr>
<td>Communication parameters</td>
<td>Sets the parameters relating to RS-485 communication.</td>
</tr>
</tbody>
</table>
8-2 Operation in the parameter mode

1. Use the [MODE] key to select the parameter mode.
2. Press the [SET] key on the top screen of the parameter mode.
3. Use the [↑][↓] keys to select the application parameters or system parameters.
4. Press the [SET] key.
   The display changes to the parameter type selection screen.
5. Press the [SET] key.
   The display changes to the parameter item screen.
6. Use the [↑][↓] 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.
  - If the [SET] 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 [SET] key.
8-3 Setting example

Pressing the [SET] key on the parameter item screen enables parameter setting.
This section explains how to assign the ZSG output to the OUT1 output.

1. Use the [MODE] key to select the parameter mode.
The “PAR” LED is lit.

2. Press the [SET] key on the top screen of the parameter mode.
The display changes to the application parameter screen.

3. Press the [SET] key.
The display changes to the I/O parameter screen.

4. Press the [SET] key again.
The display changes to the START input mode parameter screen.

5. Press the [↓] key five times to change the value to “6”.
The display changes to the OUT1 signal mode selection parameter screen.

6. Press the [SET] key.
The present set value of the OUT1 output is displayed with blinking.

7. Use the [↑][↓][←][→] keys to select “10”.
“10” indicates the ZSG output.

8. Press the [SET] key.
The blinking speed of the input value becomes quickly and the value is set.
The display returns to the OUT1 signal mode selection parameter screen.
## 8-4 Description of application parameters

### I/O parameters

<table>
<thead>
<tr>
<th>Parameter item screen</th>
<th>Parameter name</th>
<th>Description</th>
<th>Setting range</th>
<th>Initial value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>APP-0-00 START input mode</td>
<td>Sets whether to input the START input signal via I/O or RS-485 communication.</td>
<td>0: RS-485 communication</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1: I/O</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-01 I/O STOP input</td>
<td>Changes the setting to enable/disable STOP input of I/O.</td>
<td>0: Disable</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1: Enable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-02 STOP action</td>
<td>Sets how the motor should stop when a STOP input is turned ON.</td>
<td>0: Immediate stop</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1: Decelerate stop</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>2: Immediate stop&amp;Current OFF</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>3: Decelerate stop&amp;Current OFF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-03 STOP contact configuration</td>
<td>Sets the STOP input logic.</td>
<td>0: Make (N.O.)</td>
<td>1</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>1: Brake (N.C.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-04 C-ON logic configuration</td>
<td>Sets the C-ON logic for RS-485 communication.</td>
<td>0: 0=Not excited, 1=Excited</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1: 0=Excited, 1=Not excited</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-06 OUT1 signal mode selection</td>
<td>Sets the function assigned to the OUT1 to OUT4 output.</td>
<td>5: AREA</td>
<td>5</td>
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<td></td>
<td></td>
<td></td>
<td>6: TIM</td>
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<td></td>
<td>7: READY</td>
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<td>8: WNG</td>
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<td>9: HOME-P</td>
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<td>10: ZSG</td>
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<td>11: R-OUT1</td>
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<td>12: R-OUT2</td>
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<td>13: STEPOUT</td>
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<td>14: O.H.</td>
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<td>15: R-OUT3</td>
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<td></td>
<td>16: R-OUT4</td>
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<tr>
<td></td>
<td>APP-0-07 OUT2 signal mode selection</td>
<td>Sets the function assigned to the OUT1 to OUT4 output.</td>
<td>5: AREA</td>
<td>7</td>
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<td>6: TIM</td>
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<td>7: READY</td>
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<td>8: WNG</td>
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<td>9: HOME-P</td>
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<td>10: ZSG</td>
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<td>11: R-OUT1</td>
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<td>12: R-OUT2</td>
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<td>13: STEPOUT</td>
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<td>14: O.H.</td>
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<td>15: R-OUT3</td>
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<td>16: R-OUT4</td>
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<td></td>
<td>APP-0-08 OUT3 signal mode selection</td>
<td>Sets the function assigned to the OUT1 to OUT4 output.</td>
<td>5: AREA</td>
<td>8</td>
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<td>6: TIM</td>
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<td>7: READY</td>
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<td>8: WNG</td>
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<td>9: HOME-P</td>
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<td>10: ZSG</td>
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<td>11: R-OUT1</td>
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<td>12: R-OUT2</td>
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<td>13: STEPOUT</td>
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<td>14: O.H.</td>
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<td>15: R-OUT3</td>
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<td>16: R-OUT4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-09 OUT4 signal mode selection</td>
<td>Sets the function assigned to the OUT1 to OUT4 output.</td>
<td>5: AREA</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6: TIM</td>
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<td>7: READY</td>
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<td>8: WNG</td>
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<td>9: HOME-P</td>
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<td>10: ZSG</td>
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<td>11: R-OUT1</td>
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<td></td>
<td>12: R-OUT2</td>
<td></td>
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<td>13: STEPOUT</td>
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<td>14: O.H.</td>
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<td>15: R-OUT3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16: R-OUT4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-10 HOME/P-PRESET input switching</td>
<td>Sets whether to use HOME or P-PRESET input.</td>
<td>0: HOME</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1: P-PRESET</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-11 Motor excitation mode</td>
<td>Sets whether to control the motor excitation via I/O or RS-485 communication.</td>
<td>0: RS-485 communication</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1: I/O</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-12 HOME/FWD/RVS input mode</td>
<td>Sets whether to input the HOME, FWD and RVS input signals via I/O or RS-485 communication.</td>
<td>0: RS-485 communication</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1: I/O</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-13 Data No. input mode</td>
<td>Sets whether to input the M0 to M5 input signals via I/O or RS-485 communication.</td>
<td>0: RS-485 communication</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1: I/O</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-14 AWO contact configuration</td>
<td>Sets the AWO input logic.</td>
<td>0: Make (N.O.)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1: Brake (N.C.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-16 Hardware overtravel detection</td>
<td>Sets whether to enable or disable hardware overtravel detection using LS inputs.</td>
<td>0: Disable</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1: Enable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-17 LS contact configuration</td>
<td>Sets the ±LS input logics.</td>
<td>0: Make (N.O.)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1: Brake (N.C.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-18 HOMES contact configuration</td>
<td>Sets the HOMES input logic.</td>
<td>0: Make (N.O.)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1: Brake (N.C.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-19 SLIT contact configuration</td>
<td>Sets the SLIT input logic.</td>
<td>0: Make (N.O.)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1: Brake (N.C.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-20 Overtravel action</td>
<td>Sets the motor action to take place upon the occurrence of overtravel.</td>
<td>0: Immediate stop</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1: Decelerate stop</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-21 Preset position</td>
<td>Sets the preset position.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-22 Area 1</td>
<td>Sets the range for AREA output. The AREA output will be ON when the motor is inside the area set by the area 1 and area 2.</td>
<td>−8,388,608 to +8,388,607 step</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>APP-0-23 Area 2</td>
<td>Sets the range for AREA output. The AREA output will be ON when the motor is inside the area set by the area 1 and area 2.</td>
<td>−8,388,608 to +8,388,607 step</td>
<td></td>
</tr>
<tr>
<td></td>
<td>APP-0-26 Encoder counter preset value</td>
<td>Sets the encoder counter preset value.</td>
<td>0: Preset</td>
<td></td>
</tr>
</tbody>
</table>
### Motor parameters

<table>
<thead>
<tr>
<th>Parameter item screen</th>
<th>Parameter name</th>
<th>Description</th>
<th>Setting range</th>
<th>Initial value</th>
</tr>
</thead>
<tbody>
<tr>
<td>APP-1-00</td>
<td>Operating current</td>
<td>Sets the motor operating current based on the rated current being 100%.</td>
<td>5 to 100%</td>
<td>100</td>
</tr>
<tr>
<td>APP-1-01</td>
<td>Standstill current</td>
<td>Sets the motor standstill current as a percentage of the rated current, based on the rated current being 100%.</td>
<td>5 to 50%</td>
<td>50</td>
</tr>
</tbody>
</table>

### Speed parameters

<table>
<thead>
<tr>
<th>Parameter item screen</th>
<th>Parameter name</th>
<th>Description</th>
<th>Setting range</th>
<th>Initial value</th>
</tr>
</thead>
<tbody>
<tr>
<td>APP-2-00</td>
<td>Common acceleration rate</td>
<td>Sets the common acceleration rate in positioning operation and continuous operation.</td>
<td>0.001 to 1000.000 ms/kHz</td>
<td>30.000</td>
</tr>
<tr>
<td>APP-2-01</td>
<td>Common deceleration rate</td>
<td>Sets the common deceleration rate in positioning operation and continuous operation.</td>
<td>1 to 500,000 Hz</td>
<td>100</td>
</tr>
<tr>
<td>APP-2-02</td>
<td>Starting speed</td>
<td>Sets the starting speed in positioning operation and continuous operation. The motor will operate at the starting speed if the operating speed is below the starting speed.</td>
<td>1 to 500,000 Hz</td>
<td>100</td>
</tr>
<tr>
<td>APP-2-06</td>
<td>Jog operating speed</td>
<td>Sets the operating speed for JOG operation.</td>
<td>0.001 to 1000.000 ms/kHz</td>
<td>30.000</td>
</tr>
<tr>
<td>APP-2-07</td>
<td>Jog acceleration (deceleration) rate</td>
<td>Sets the acceleration/deceleration rate for JOG operation.</td>
<td>0.001 to 1000.000 ms/kHz</td>
<td>30.000</td>
</tr>
<tr>
<td>APP-2-08</td>
<td>Jog starting speed</td>
<td>Sets the starting speed for JOG operation.</td>
<td>1 to 500,000 Hz</td>
<td>100</td>
</tr>
<tr>
<td>APP-2-09</td>
<td>Acceleration (deceleration) rate type</td>
<td>Sets whether to use the common acceleration/deceleration rate or the acceleration/deceleration rate specified for the operation data.</td>
<td>0: Common 1: Separate</td>
<td>0</td>
</tr>
</tbody>
</table>

### Return-to-home parameters

<table>
<thead>
<tr>
<th>Parameter item screen</th>
<th>Parameter name</th>
<th>Description</th>
<th>Setting range</th>
<th>Initial value</th>
</tr>
</thead>
<tbody>
<tr>
<td>APP-3-00</td>
<td>Home-seeking mode</td>
<td>Sets the mode for return-to-home operation.</td>
<td>0: 2 sensors 1: 3 sensors</td>
<td>1</td>
</tr>
<tr>
<td>APP-3-02</td>
<td>Operating speed of home-seeking</td>
<td>Sets the operating speed for return-to-home operation.</td>
<td>1 to 500,000 Hz</td>
<td>100</td>
</tr>
<tr>
<td>APP-3-03</td>
<td>Acceleration (deceleration) rate of home-seeking</td>
<td>Sets the acceleration/deceleration rate for return-to-home operation.</td>
<td>0.001 to 1000.000 ms/kHz</td>
<td>30.000</td>
</tr>
<tr>
<td>APP-3-04</td>
<td>Starting speed of home-seeking</td>
<td>Sets the starting speed for return-to-home operation.</td>
<td>1 to 500,000 Hz</td>
<td>100</td>
</tr>
<tr>
<td>APP-3-05</td>
<td>Position offset of home-seeking</td>
<td>Sets the amount of offset from mechanical home.</td>
<td>−8,388,608 to +8,388,607 step</td>
<td>0</td>
</tr>
<tr>
<td>APP-3-06</td>
<td>Starting direction of home-seeking</td>
<td>Sets the starting direction for home detection.</td>
<td>0: Negative direction 1: Positive direction</td>
<td>1</td>
</tr>
<tr>
<td>APP-3-07</td>
<td>SLIT detection with home-seeking</td>
<td>Sets whether or not to concurrently use the SLIT input for return-to-home operation.</td>
<td>0: Disable 1: Enable</td>
<td>0</td>
</tr>
<tr>
<td>APP-3-08</td>
<td>TIM signal detection with home-seeking</td>
<td>Sets whether or not to concurrently use the TIM (ZSG) output for return-to-home operation.</td>
<td>0: Disable 1: Enable (TIM) 2: Enable (ZSG)</td>
<td>0</td>
</tr>
<tr>
<td>APP-3-09</td>
<td>Backward steps in 2-sensor mode home-seeking</td>
<td>Sets the travel amount after the motor pulls out from the LS sensor in 2-sensor return-to-home operation.</td>
<td>0 to 32767 step</td>
<td>200</td>
</tr>
</tbody>
</table>
### Alarm/warning parameters

<table>
<thead>
<tr>
<th>Parameter item screen</th>
<th>Parameter name</th>
<th>Description</th>
<th>Setting range</th>
<th>Initial value</th>
</tr>
</thead>
<tbody>
<tr>
<td>APP-4-00</td>
<td>Stepout detection band</td>
<td>Sets the judgment condition for misstep detection using the deviation (angle) between the command position and encoder counter value.</td>
<td>0.1 to 360.0 deg</td>
<td>7.2</td>
</tr>
<tr>
<td>APP-4-17</td>
<td>Overvoltage warning</td>
<td>Sets the voltage at which an overvoltage warning generates.</td>
<td>25.0 to 35.0 V</td>
<td>31.0</td>
</tr>
<tr>
<td>APP-4-19</td>
<td>Overheat warning</td>
<td>Sets the temperature at which an overheat warning generates.</td>
<td>40 to 85 °C (104 to 185 °F)</td>
<td>85</td>
</tr>
</tbody>
</table>

### Common parameters

<table>
<thead>
<tr>
<th>Parameter item screen</th>
<th>Parameter name</th>
<th>Description</th>
<th>Setting range</th>
<th>Initial value</th>
</tr>
</thead>
<tbody>
<tr>
<td>APP-6-00</td>
<td>Software overtravel</td>
<td>Sets whether to enable or disable software overtravel detection using soft limits.</td>
<td>0: Disable 1: Enable</td>
<td>1</td>
</tr>
<tr>
<td>APP-6-01</td>
<td>Positive software limit</td>
<td>Sets the value of soft limit in + direction.</td>
<td>−8,388,608 to +8,388,607 steps</td>
<td>8,388,607</td>
</tr>
<tr>
<td>APP-6-02</td>
<td>Negative software limit</td>
<td>Sets the value of soft limit in − direction.</td>
<td>−8,388,608</td>
<td></td>
</tr>
<tr>
<td>APP-6-03</td>
<td>Display mode of the data setter speed</td>
<td>Sets the display method of monitored speed in the OPX-2A.</td>
<td>0: Signed 1: Absolute</td>
<td>0</td>
</tr>
<tr>
<td>APP-6-06</td>
<td>Communication timeout action</td>
<td>Sets how to stop the motor when a communication timeout occurs.</td>
<td>0: Immediate stop 1: Decelerate stop</td>
<td>1</td>
</tr>
<tr>
<td>APP-6-07</td>
<td>Receive period</td>
<td>Sets the receive period for RS-485 communication.</td>
<td>0: Function disabled 0.01 to 9.99 sec.</td>
<td>0</td>
</tr>
<tr>
<td>APP-6-08</td>
<td>Response interval</td>
<td>Sets the response period for RS-485 communication.</td>
<td>0 to 1000 ms</td>
<td>50</td>
</tr>
<tr>
<td>APP-6-09</td>
<td>Receive monitoring</td>
<td>Sets the receive monitor period for RS-485 communication.</td>
<td>0.01 to 9.99 sec.</td>
<td>0.10</td>
</tr>
<tr>
<td>APP-6-10</td>
<td>Stepout detection action</td>
<td>Sets the operation to be performed when the deviation between the command position and encoder counter value reaches the stepout detection band.</td>
<td>0: No operation (alarm/warning not present) 1: Warning 2: Alarm</td>
<td>0</td>
</tr>
</tbody>
</table>

### 8-5 Description of system parameters

#### Operation setting parameters

<table>
<thead>
<tr>
<th>Parameter item screen</th>
<th>Parameter name</th>
<th>Description</th>
<th>Setting range</th>
<th>Initial value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYS-0-10</td>
<td>Motor rotation direction</td>
<td>Sets the rotation direction of motor output shaft.</td>
<td>0: Positive direction =CCW * 1: Positive direction =CW</td>
<td>1</td>
</tr>
<tr>
<td>SYS-0-12</td>
<td>Stepout detection</td>
<td>Sets whether to enable or disable the misstep detection function.</td>
<td>0: Disable 1: Enable</td>
<td>0</td>
</tr>
<tr>
<td>SYS-0-13</td>
<td>Motor step angle</td>
<td>Sets the motor step angle.</td>
<td>See the following table.</td>
<td>0</td>
</tr>
<tr>
<td>SYS-0-14</td>
<td>Encoder electronic gear A</td>
<td>Sets the encoder electronic gear A.</td>
<td>1 to 250,000</td>
<td>500</td>
</tr>
<tr>
<td>SYS-0-15</td>
<td>Encoder electronic gear B</td>
<td>Sets the encoder electronic gear B.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*If the parameter is set to 0, the moving part will move in the backward direction when inputting the CW signal. If the parameter is set to 1, the moving part will move in the forward direction when inputting the CW signal. See p.19 for the moving direction of the actuator.
### “Motor step angle” parameter [SYS-0-13] setting range

<table>
<thead>
<tr>
<th>Setting</th>
<th>Step angle</th>
<th>Number of divisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.72º</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>0.36º</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>0.288º</td>
<td>2.5</td>
</tr>
<tr>
<td>3</td>
<td>0.18º</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>0.144º</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>0.09º</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>0.072º</td>
<td>10</td>
</tr>
<tr>
<td>7</td>
<td>0.036º</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Setting</th>
<th>Step angle</th>
<th>Number of divisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>0.0288º</td>
<td>25</td>
</tr>
<tr>
<td>9</td>
<td>0.018º</td>
<td>40</td>
</tr>
<tr>
<td>10</td>
<td>0.0144º</td>
<td>50</td>
</tr>
<tr>
<td>11</td>
<td>0.009º</td>
<td>80</td>
</tr>
<tr>
<td>12</td>
<td>0.0072º</td>
<td>100</td>
</tr>
<tr>
<td>13</td>
<td>0.00576º</td>
<td>125</td>
</tr>
<tr>
<td>14</td>
<td>0.0036º</td>
<td>200</td>
</tr>
<tr>
<td>15</td>
<td>0.00288º</td>
<td>250</td>
</tr>
</tbody>
</table>

- Step angles are theoretical values.
- Travel amount per one step: Ball screw lead [mm] × step angle/360º (mm)

### Communication parameters

<table>
<thead>
<tr>
<th>Parameter item screen</th>
<th>Parameter name</th>
<th>Description</th>
<th>Setting range</th>
<th>Initial value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYS-1-00</td>
<td>Communication axis number</td>
<td>Sets the axis number for RS-485 communication.</td>
<td>0 to 31</td>
<td>15</td>
</tr>
<tr>
<td>SYS-1-01</td>
<td>Communication protocol</td>
<td>Sets the protocol for RS-485 communication.</td>
<td>0: Modbus RTU 1: GW Ver.1</td>
<td>0</td>
</tr>
<tr>
<td>SYS-1-02</td>
<td>Communication parity</td>
<td>Sets the parity for RS-485 communication.</td>
<td>0: None 1: Even number 2: Odd number</td>
<td>1</td>
</tr>
<tr>
<td>SYS-1-03</td>
<td>Communication stop bit</td>
<td>Sets the stop bit for RS-485 communication.</td>
<td>0: 1 bit 1: 2 bits</td>
<td>0</td>
</tr>
<tr>
<td>SYS-1-04</td>
<td>Transmission waiting time</td>
<td>Sets the transmission waiting time for RS-485 communication.</td>
<td>0 to 1000.0 (1=0.1 ms)</td>
<td>10.0</td>
</tr>
<tr>
<td>SYS-1-05</td>
<td>Communication timeout</td>
<td>Sets the condition in which a communication timeout occurs in RS-485 communication.</td>
<td>0: Not monitored 1 to 10000 ms</td>
<td>0</td>
</tr>
<tr>
<td>SYS-1-06</td>
<td>Communication error alarm</td>
<td>Sets the condition in which a RS-485 communication error alarm generates. A communication error alarm generates after a RS-485 communication error has occurred by the number of times set here.</td>
<td>1 to 10 times</td>
<td>3</td>
</tr>
</tbody>
</table>

### 8-6 Initializing parameters

You can revert parameters saved in the driver to their initial values. Perform “Initialize operation data” of the copy mode. For the operation, check the screen transitions of the copy mode on p.16, or “10-6 Initializing driver data” on p.41.
9 Test mode

9-1 Overview of 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 actuator using the keys on the OPX-2A.

- **Positioning operation**
  You can perform the positioning operation.

- **Return-to-home operation**
  You can perform the return-to-home operation.

- **Position preset**
  You can set the preset value as the command position.

- **Encoder counter preset**
  You can set the preset value as the encoder counter value.

- **Teaching**
  You can operate the actuator using the keys on the OPX-2A and set the attained position in the operation data.

9-2 Operation in the test mode

1. Use the [MOOD] 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.
Stop the actuator operation before changing to the test mode.
- When you move from the top screen of the test mode to a lower level, following inputs will be disabled.
  START input, FWD input, RVS input, HOME/P-PRESET input and M0 to M5 inputs.
- If the [SET] 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 [SET] key.

What happens when the [SET] key is pressed while the actuator 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. Be sure to stop the actuator operation before pressing the [SET] key.

9-3 I/O test

When checking the connection condition of the driver, perform the 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. “□” is displayed when the signal is ON, while “□” is displayed when the signal is OFF.

Input signals

Output signals
9-4 JOG operation

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

Top screen of JOG operation

![JOG operation screen]

Operation is in progress

<table>
<thead>
<tr>
<th>Operation</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jog</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pressing the [↑] key once causes the moving part of the actuator to move one step in the forward direction. Pressing and holding the key causes the moving part to move continuously in the forward direction.

Pressing the [↓] key once causes the moving part of the actuator to move one step in the backward direction. Pressing and holding the key causes the moving part to move continuously in the backward direction.

The operating speed corresponds to the value set in the "Jog operating speed" parameter [APP-2-06].

Take note that when the value set in the "Jog starting speed" parameter [APP-2-08] is greater than the value set in the "Jog operating speed" parameter [APP-2-06], the Jog starting speed will become effective.

![Jog speed diagram]

<table>
<thead>
<tr>
<th>Jog operating speed</th>
<th>Jog starting speed</th>
<th>Jog acceleration (deceleration) rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>[APP-2-06]</td>
<td>[APP-2-08]</td>
<td>[APP-2-07]</td>
</tr>
</tbody>
</table>

**Note**

During operation, the actuator operates at the set operating speed while the applicable key is pressed. Before performing operation, consider the status of the equipment and condition of its surroundings to confirm thoroughly that actuator operation will not cause any dangerous situations.

9-5 Positioning operation

Select a desired operation data number and then press the [SET] key, and positioning operation will be performed.

Top screen of positioning operation

![Positioning operation screen]

Operation data No. selection

<table>
<thead>
<tr>
<th>Operation data No. selection 1</th>
<th>Operation data No. selection 63</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEL d R A R D I</td>
<td>SEL d R A R G 3</td>
</tr>
</tbody>
</table>

Operation is in progress (blinking display)

**Note**

During operation, the actuator operates at the set operating speed. Before performing operation, consider the status of the equipment and condition of its surroundings to confirm thoroughly that actuator operation will not cause any dangerous situations.

9-6 Return-to-home operation

You can perform a return-to-home operation.

The operating speed corresponds to the value set in the "operating speed of home-seeking" parameter [APP-3-02].

Top screen of return-to-home operation

![Return-to-home operation screen]

Perform return-to-home operation

<table>
<thead>
<tr>
<th>Perform return-to-home operation</th>
<th>Operation is in progress (blinking display)</th>
</tr>
</thead>
<tbody>
<tr>
<td>d R A n E</td>
<td>d R A n E</td>
</tr>
</tbody>
</table>
During operation, the actuator operates at the set operating speed. Before performing operation, consider the status of the equipment and condition of its surroundings to confirm thoroughly that actuator operation will not cause any dangerous situations.

9-7 Presetting the position

In this operation, the command position is preset by rewriting the value in the "preset position" parameter [APP-0-21].

- Top screen of position preset
- Perform position preset
- Processing is in progress (blinking display)

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

9-8 Presetting the encoder counter

In this operation, the encoder counter is preset by rewriting the value in the "encoder counter preset value" parameter [APP-0-26].

- Top screen of encoder counter preset
- Perform encoder counter preset
- Processing is in progress (blinking display)

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

9-9 Teaching

You can operate the actuator using the keys on the OPX-2A and set the attained position in 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: During operation, the actuator operates at the set operating speed. Before performing operation, consider the status of the equipment and condition of its surroundings to confirm thoroughly that actuator operation will not cause any dangerous situations.

Note: 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 an 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 driver.

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

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

- **Initializing driver data**
  Revert data saved in the driver to their initial values.

### 10-2 Operation in the copy mode

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

#### What happens when the [SET] key is pressed while the actuator 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. Be sure to stop the actuator 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 p.7 for the procedure to cancel the edit lock.

**Note**

- Stop the actuator operation before changing to the copy mode.
- When you move from the top screen of the copy mode to a lower level, following inputs will be disabled. START input, FWD input, RVS input, HOME-P/PRESET input and M0 to M5 inputs.
- If the [SET] 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 [SET] key.
10-3  Downloading to the driver

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

![Diagram of download process]

**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.
- 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.

<table>
<thead>
<tr>
<th>Blanking display</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prod-Err</td>
<td>The product series of the driver to which data is downloaded is wrong.</td>
<td>• Check the product series of the driver.</td>
</tr>
<tr>
<td>HErr-d-Err</td>
<td>An error occurred while data was being downloaded.</td>
<td>• Check the data bank number on the OPX-2A.</td>
</tr>
<tr>
<td>bcc-Err</td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>na-dAttA</td>
<td>The specified data bank number does not contain data.</td>
<td>Check the data bank number.</td>
</tr>
</tbody>
</table>
10-4 Uploading to the OPX-2A

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

Upload driver data to the OPX-2A.

10-5 Verifying data

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

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.
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.

<table>
<thead>
<tr>
<th>Blinking display</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
</table>
| Prod-Err         | The product series of the driver against which data is verified is wrong. | • Check the product series of the driver.  
• Check the data bank number on the OPX-2A. |
| Head-Err         | 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. |
| bcc-Err          | The specified data bank number does not contain data. | Check the data bank number. |

### 10-6 Initializing driver data

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

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<table>
<thead>
<tr>
<th>Top screen of initialization</th>
<th>Initialize operation data</th>
<th>Processing is in progress (blinking display)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initialize application parameters</td>
<td>Processing is in progress (blinking display)</td>
</tr>
<tr>
<td></td>
<td>Initialize system parameters</td>
<td>Processing is in progress (blinking display)</td>
</tr>
<tr>
<td></td>
<td>Initialize all data</td>
<td>Processing is in progress (blinking display)</td>
</tr>
</tbody>
</table>

**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.
- 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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