

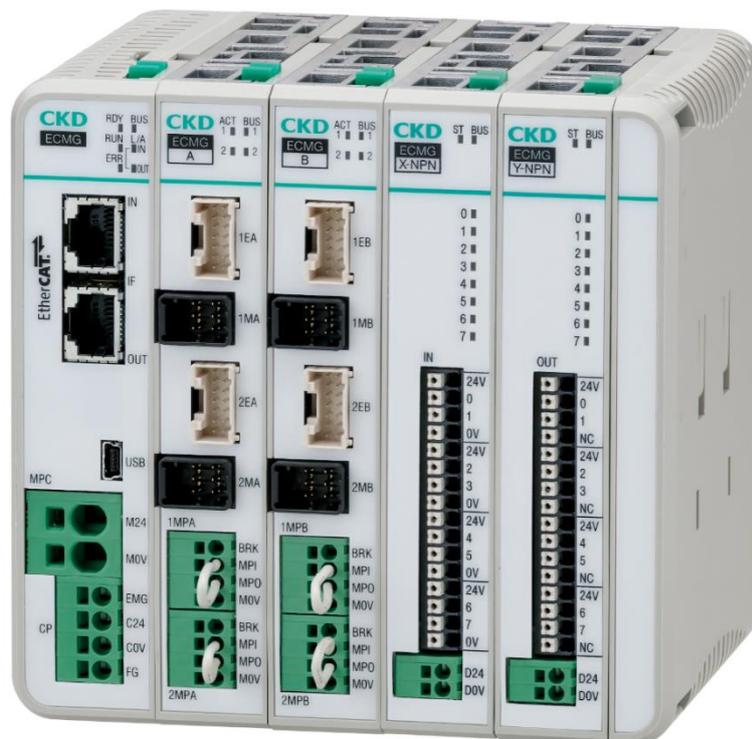
## Controller for Electric actuators

### ECMG-S series

### Input/output unit

# INSTRUCTION MANUAL

SM-A97303-A



- Read this Instruction Manual before using the product.
- Read the safety notes carefully.
- Keep this Instruction Manual in a safe and convenient place for future reference.

# PREFACE

Thank you for purchasing **this CKD controller for electric actuators “ECMG-S Series Input/output Unit.”** This Instruction Manual contains basic matters such as installation and usage instructions in order to ensure optimal performance of the product. Please read this Instruction Manual thoroughly and use the product properly.

Keep this Instruction Manual in a safe place and be careful not to lose it.

Product specifications and appearances presented in this Instruction Manual are subject to change without notice.

# SAFETY INFORMATION

When designing and manufacturing any device incorporating the product, the manufacturer has an obligation to ensure that the device is safe. To that end, make sure that the safety of the machine mechanism of the device and the electric system that controls such mechanism is ensured.

Ensure to observe organization's standards, laws and regulations etc. for safety related to design and management of the equipment.

In order to use our products safely, it is important to select, use, handle, and maintain the products properly.

Observe the warnings and precautions described in this Instruction Manual to ensure device safety. Although various safety measures have been adopted in the product, customer's improper handling may lead to an accident. To avoid this:

## **Thoroughly read and understand this Instruction Manual before using the product.**

To explicitly indicate the severity and likelihood of a potential harm or damage, precautions are classified into three categories: "DANGER", "WARNING", and "CAUTION".

 <b>DANGER</b>	Indicates an imminent hazard. Improper handling will cause death or serious injury to people.
 <b>WARNING</b>	Indicates a potential hazard. Improper handling may cause death or serious injury to people.
 <b>CAUTION</b>	Indicates a potential hazard. Improper handling may cause injury to people or damage to property.

Precautions classified as "CAUTION" may still lead to serious results depending on the situation. All precautions are equally important and must be observed.

Other general precautions and tips on using the product are indicated by the following icon.

	Indicates general precautions and tips on using the product.
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## Precautions on Product Use

### DANGER

**Do not use this product for the following applications.**

- Medical equipment pertaining to sustainment and management of human life and body
- Mechanism and mechanical device for transferring and transporting people
- Critical parts for securing safety in a mechanical device

### WARNING

**The product must be handled by the person who has sufficient knowledge and experience.**

This product is designed and manufactured as equipment and parts for general industrial machinery.

**Use the product within the specifications.**

It cannot be used outside of product-specific specifications. Never modify or additionally process the product.

Since this product is intended for use in general industrial machinery equipment and parts, it is not applicable to be used outdoors or in the following conditions and environments.

(It will be applicable if you consult with our company at the time of its adoption and understand the specifications of our company's product. However, even in such a case, take safety measures to avoid danger in case of failure.)

- Use in equipment and applications that come into direct contact with nuclear power, railways, aviation, ships, vehicles, medical equipment, beverages and food.
- Use in applications requiring safety, such as recreational equipment, emergency shut off circuits, press machines, brake circuits, and safety measures.
- Use in applications that are expected to have a significant impact on people and property and require special safety.

**Never handle the product or remove the equipment until safety is confirmed.**

- Check and maintain the machinery and equipment only after confirming that all systems related to the product are safe. Turn off the power supply of the equipment and the corresponding equipment to prevent a short circuit.
- Even when the operation is stopped, there may be a high-temperature part or a charging part. Handle the product and remove the equipment carefully.

## Precautions on Product Disposal

### CAUTION

**When disposing of the product, comply with laws pertaining to disposal and cleaning of wastes and have an industrial waste disposal company dispose of the product.**

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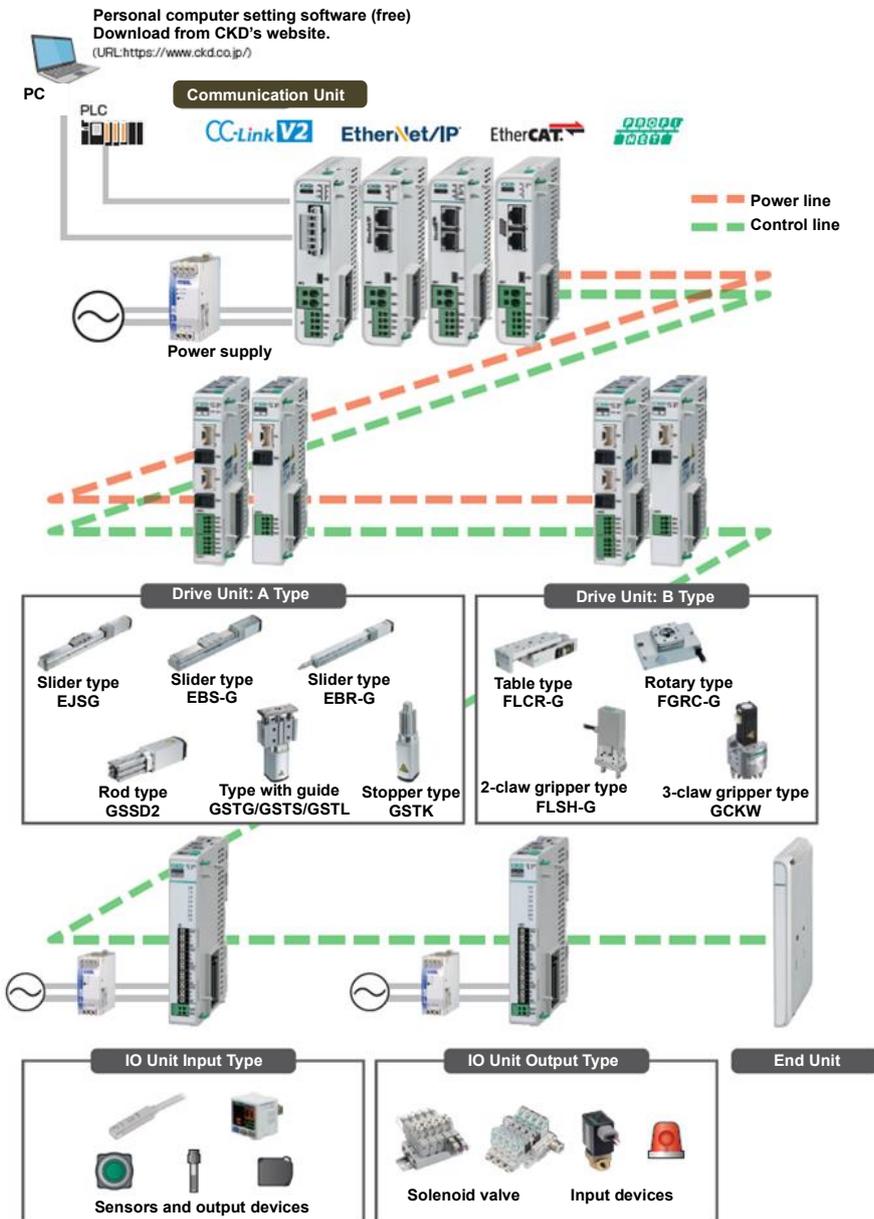
# 1. PRODUCT OVERVIEW

## 1.1 System Overview



- CC-Link is a registered trademark of Mitsubishi Electric Corporation.
- EtherCAT® is the patented technology and registered trademark licensed by German Beckhoff Automation GmbH & Co. KG.
- EtherNet/IP® is a registered trademark of ODVA.
- PROFINET is a standard based on Industrial Ethernet proposed by the Profibus Organization.
- Windows is a registered trademark of Microsoft Corporation in the United States, Japan, and other countries.
- Other company and product names in this document are company's trademarks or registered trademarks.

### 1.1.1 System structure



Components in the system structure that are available from CKD are listed below.

	Component	Product name/Model no.
<b>Multi-axis controller ECMG series</b>	Communication unit	ECMG-C series
	Drive unit	ECMG-D series
	Input/output unit	ECMG-S series
	End unit	ECMG-P series
<b>Accessories</b>	Communication connector (CC-Link) Note 1	1 port: MSTB 2,5/5-STF-5,08 ABGYAU (PHOENIX CONTACT) 2 ports: TFKC2,5/5-STF-5,08AU (PHOENIX CONTACT)
<b>Sold separately</b>	Actuator	EJSG/EBS-G/EBR-G/GSSD2/GSTG/GSTS/GSTL/GSTK/ FLCR-G/FGRC-G/FLSH-G/GCKW series
	Motor cable	EA-CBLM*-*
	Encoder cable	EA-CBLE*-*
	Motor and encoder relay cable	EA-CBLME*-*
	24 VDC power supply Note 2	EA-PWR-KHNA240F-24
<b>Provided for free</b>	PC setting software	S-Tools

Note 1: Please select a communication connector with either 1 or 2 ports when purchasing a communication units with CC-Link specification.

Note 2: The recommended power supply differs depending on the power supply capacity. Refer to Instruction Manual (SM-A62471) for details.

To use this product as a product conforming to the European standards, refer to Instruction Manual (SM-A62471) and follow the instructions.

## 1.1.2 Workflow

Follow the steps below to wire and set the controller so that it can be operated from the PLC. This Instruction Manual explains step 7. Refer to Instruction Manual (SM-A62471) for other procedures.

### 1 Unpack

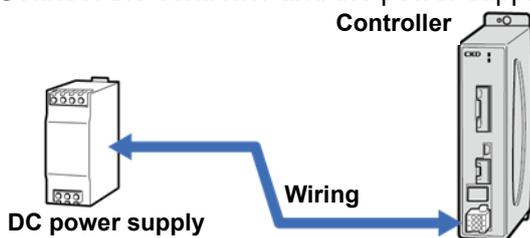
Take the product out of the box. Refer to Instruction Manual (SM-A62471) for details.

### 2 Assemble the unit

Connect the communication unit, input/output unit and end unit. Refer to Instruction Manual (SM-A62471) for details.

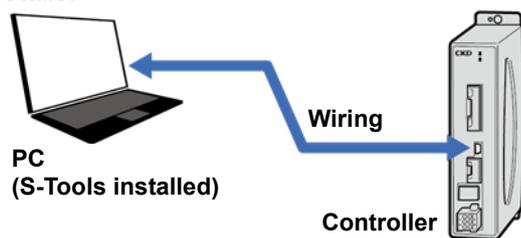
### 3 Connect the power supply

Connect the controller and the power supply. Refer to Instruction Manual (SM-A62471) for details.



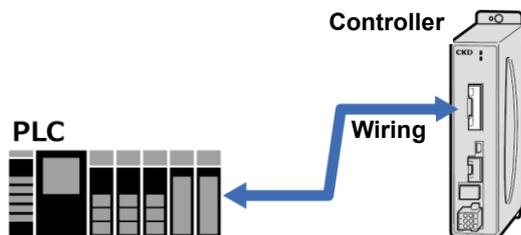
### 4 Connect S-Tools

Connect the controller and a PC with S-Tools installed. Refer to Instruction Manual (SM-A62471) for details.



### 5 Connecting a PLC

Connect the controller and the PLC. Refer to Instruction Manual (SM-A62471) for details.



**6** Set the communication settings

Use S-Tools to set the parameters for controller communication. Set the master by following the instruction manual by the manufacturer of the master unit. If necessary, import the setting file. Refer to Instruction Manual (SM-A62471) for details.

**7** Set the parameters

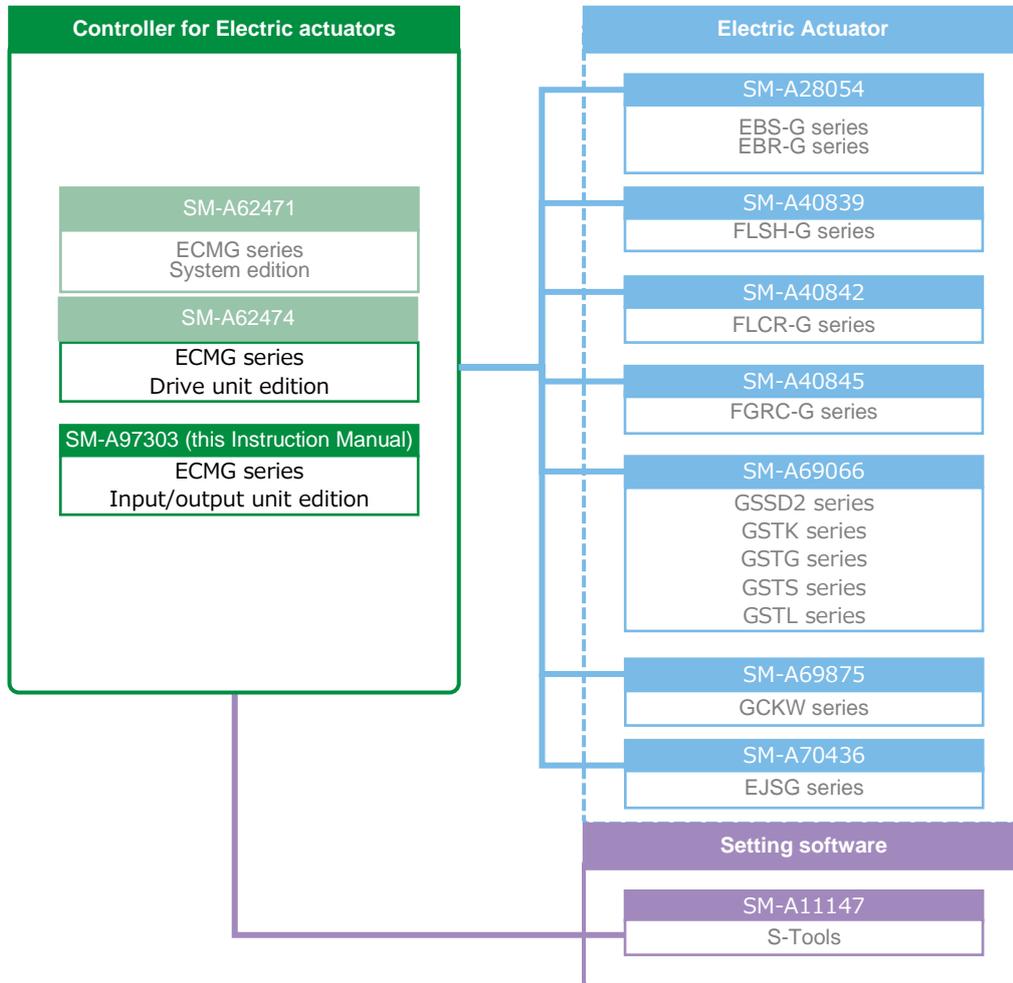
Determine the controller setting. Refer to "3.2 3.2" for details.

**8** Start operation

Operate the PLC to detect the signals input to the input unit and operate the signals to be output from the output unit.

## 1.2 Instruction Manuals Related to This Product

This manual covers input/output units only. Refer to Instruction Manual (SM-A62471) for other unit information such as communication specifications. The instruction manuals related to this product are as follows.



## 1.3 Software version updates

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### 1.3.1 List of versions

#### ■ Software version of ECMG-C (communication unit)

Below is shown the software version of ECMG-C (communication unit) required to use this product.

#### <ECMG-C (communication unit)>

Unit name	Software ver.
ECMG-C Series	Version 1.03.00 or later

### 1.3.2 How to check the version

The controller software version can be checked from the controller information in the S-Tools [Model information] view.

Actuator information

Information of actuator connected last time	Information of actuator being connected
Model number <input type="text"/>	Model number <input type="text"/>
	Software ver. <input type="text"/>

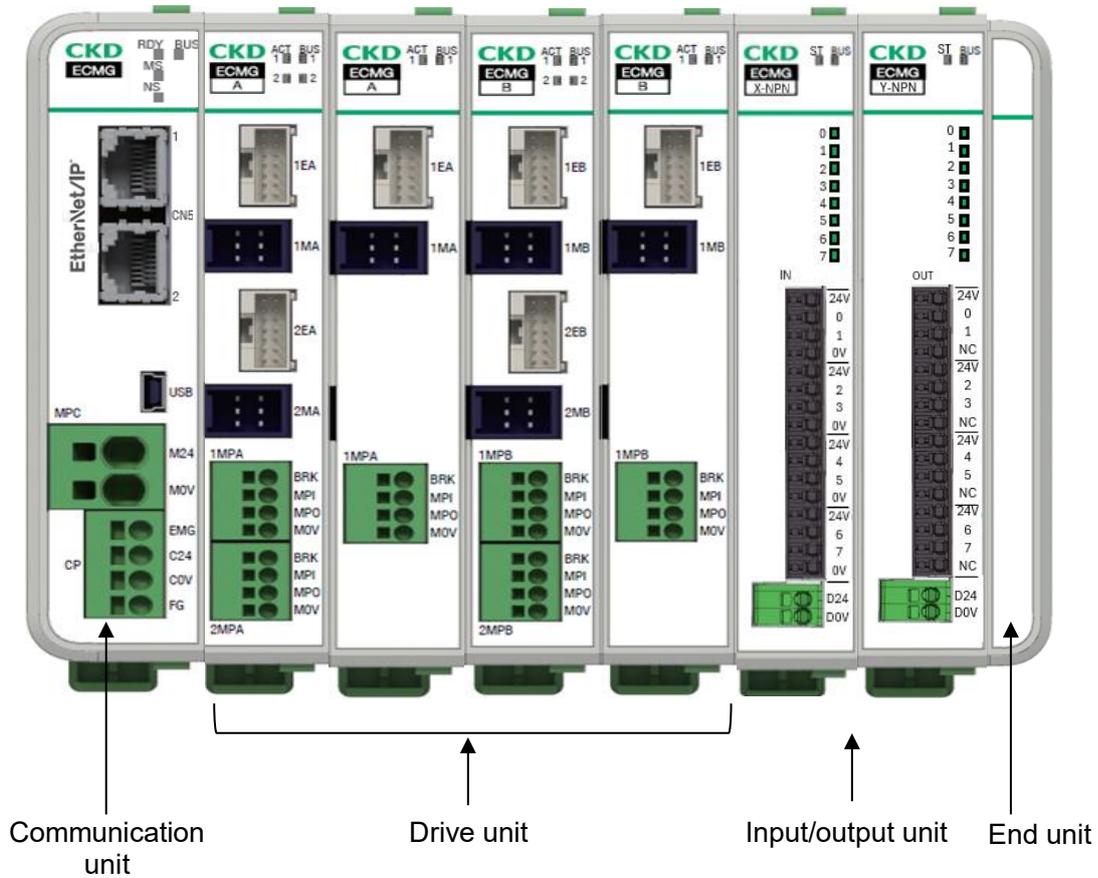
<<

When actuator information does not match  
Reconnect it to the actuator connected last time or overwrite the actuator information and cycle the power.   
After performing overwriting, reset the point data and parameter.

Controller information

Model number <input type="text"/>	Interface information
Serial number <input type="text"/>	Interface specifications <input type="text"/>
Software ver. <input type="text"/>	Software ver. <input type="text"/>

# 1.4 Unit composition



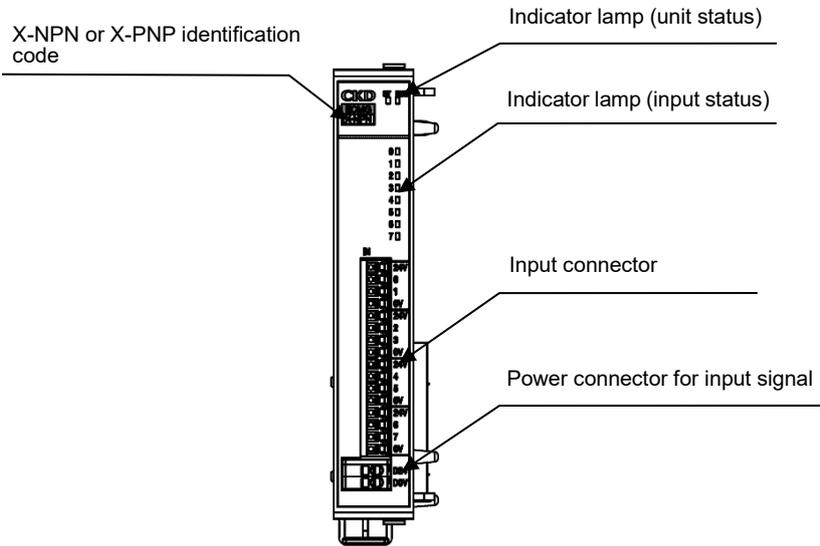
Part name	Explanation	No. of connected units
Communication unit	This unit directly communicates with external devices such as PLCs and PCs.	1 unit
Drive unit	This unit drives the electric actuator. There are units that can be connected with 1 axis and units that can be connected with 2 axes. There are A type and B type, and the connectable actuators are different.	1 to 8 units Note 1
Input/output unit	Units for operating the input/output signals Input type and output type are available. There are units for NPN connection and units for PNP connection.	1 to 8 units Note 1
End unit	This unit indicates the end of a unit connection.	1 unit

Note 1: It is necessary to connect one or more drive units or input/output units.

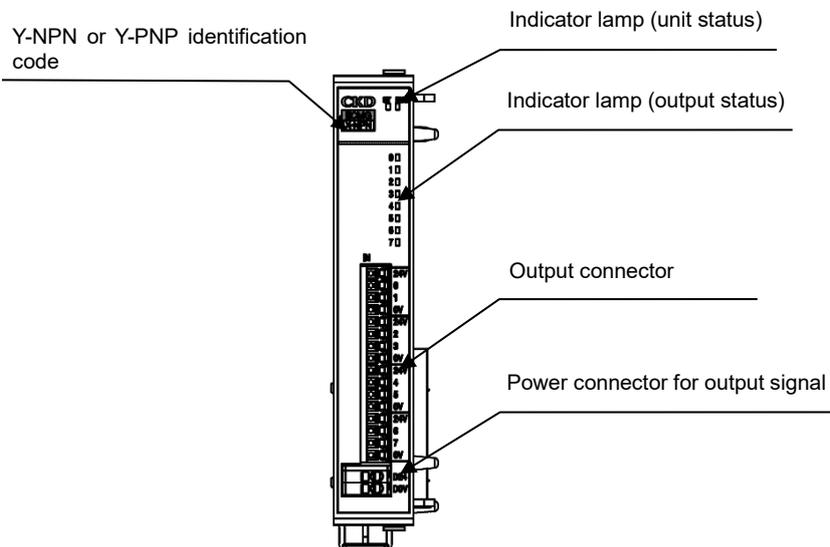
## 1.5 Name of each part

### 1.5.1 Name of each part of input/output unit

#### ■ Input type NPN/PNP 8 points



#### ■ Output type NPN/PNP 8 points



Name	Code	Description			
Controller identification code	X-NPN X-PNP Y-NPN Y-PNP	Identification code: X-NPN	Identification code: X-PNP	Identification code: Y-NPN	Identification code: Y-PNP
		Unit type: input type		Unit type: output type	
		NPN connection	PNP connection	NPN connection	PNP connection
Indicator lamp (Unit status)	ST, BUS	Indicates the input/output unit status. Refer to "0" for information on LED indications.			
Indicator lamp (Input, output status)	0 to 7	Indicates the input signal status of each point.		Indicates the output signal status of each point.	
Input/output connector	0 to 7 0 V, 24 V NC	<p>0 to 7: Input signal</p> <p>0 V, 24 V: One block is provided for 2 input signals. 0 V and 24 V are prepared for each. 24 V is connected with D24 of the power connector, and 0 V is connected with D0V of the power connector.</p>		<p>0 to 7: Output signal</p> <p>0 V, 24 V: One block is provided for 2 output signals. 24 V is prepared for NPN connection, and 0 V is prepared for PNP connection. 24 V is connected with D24 of the power connector, and 0 V is connected with D0V of the power connector.</p> <p>NC: Not connected internally.</p>	
Power supply connector	24 D, 0 VD	Connector for connecting the power supply for signal			

## 1.6 LED indication

### 1.6.1 LED indication of input/output unit



Part name	Color	Explanation
ST	Green	Displays the status of the input/output unit.
	Red	Displays the occurrence status of input/output unit alarm.
BUS	Green	Displays the communication status between units.
	Red	Displays the alarm occurrence status during communication between units.

#### ■ ST lamp

Controller status		RDY
Control power OFF		Off
Normal		Lit green
At alarm occurrence	At the time of the occurrence of alarm which cannot be released	Lit red
	At the time of the occurrence of alarm which can be released	Blinking red (lit once per second)
At the time of the occurrence of warning		Blinking red (lit once every two seconds)

#### ■ BUS lamp

Controller status (Inter-unit communication status)		BUS
Control power OFF		Off
Normal	During normal operation	Lit green
	During initialization	Blinking green (lit once per second)
At alarm occurrence	When an internal communication error occurs	Lit red
	At the time of the occurrence of alarm which can be released	Blinking red (lit once per second)

## 1.7 Model Number Indication

### 1.7.1 Display of the model number of input/output unit

The input/output unit is available in two types, input type and output type.

#### ■ Input type

ECMG-SNNN30-**XN**DNN

Specifications for input/output unit	
XN	Input type NPN 8 points
XP	Input type PNP 8 points

#### ■ Output type

ECMG-SNNN30-**YN**DNN

Specifications for input/output unit	
YN	Output type NPN 8 points
YP	Output type PNP 8 points

## 1.8 Specifications

### 1.8.1 Basic specifications

Item		Description	
Unit type		Input type NPN/PNP 8 points	Output type NPN/PNP 8 points
Devices to be connected		Sensor, etc.	Solenoid valve, indicator lamp, etc.
Setting tool External interface		Depending on communication unit	
Power supply voltage	Control power supply*3	DC24V±10%	
	Input/output unit power supply		
Consumption current	Control power supply*3	100 mA *1	
	Input/output unit power supply	5mA	8mA
Insulation resistance		10 MΩ or more with 500 VDC	
Withstand voltage		500 VAC, 1 minute	
Operating ambient temperature		0 to 40°C (Non-freezing)	
Operating ambient humidity		35 to 80%RH (Non-condensing)	
Storage ambient temperature		-10 to 50°C (Non-freezing)	
Storage ambient humidity		35 to 80%RH (Non-condensing)	
Operating atmosphere		No corrosive gas, explosive gas, or dust	
Degree of protection		IP20	
Weight		About 295 g	
Maximum number of connectable units		8 units (excluding the drive unit) *2	

\*1 Current consumption per input/output unit

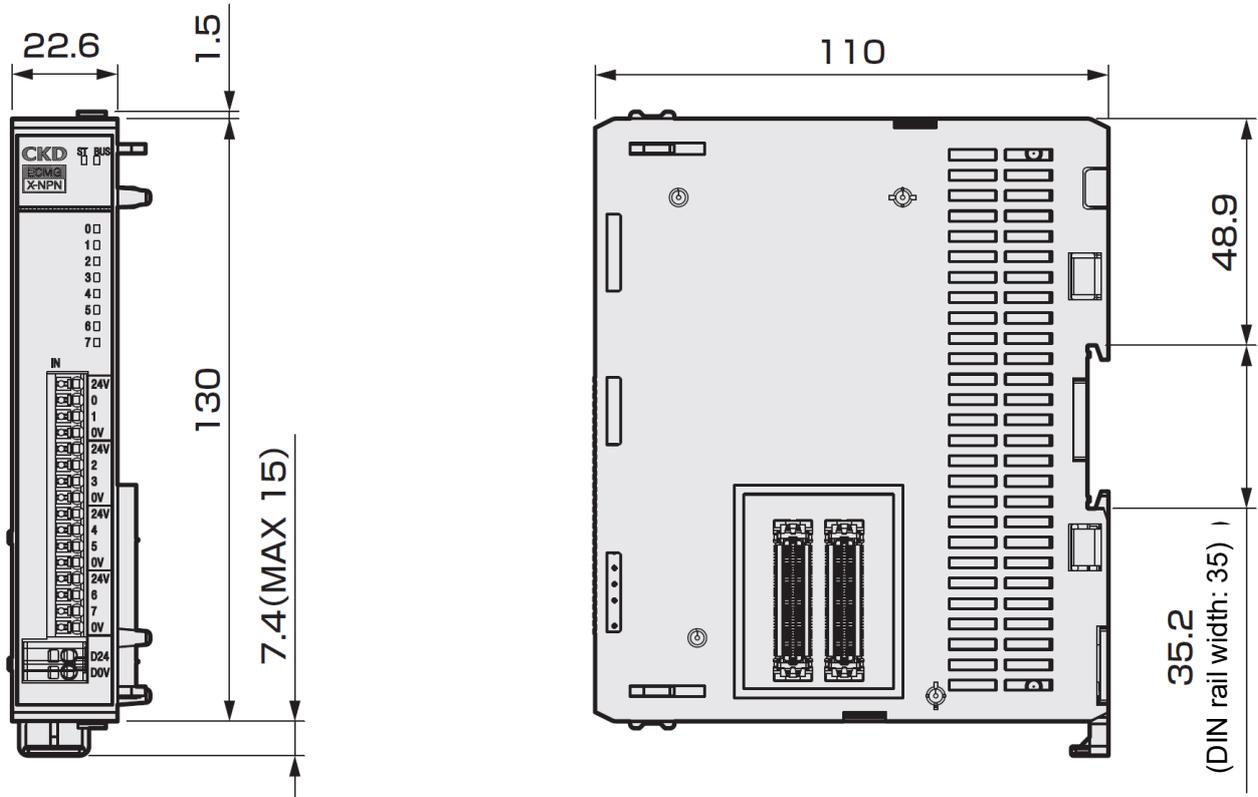
\*2 The maximum number of CC-Link connectable units is limited by the data size.

For details, please refer to the communication specifications.

\*3 All control power is supplied from the communication unit ECMG-C. The required power supply capacity varies depending on the unit configuration. See "Selection of model" in "Electric Actuators" (catalog RJ-014).

# 1.9 Dimensions

## ■ Input/output unit



\* The input type NPN/PNP 8-point and output type NPN/PNP 8-point units have the same external dimensions.

## 2. INSTALLATION

### DANGER

**Do not use in locations with ignitable, flammable, or explosive substances or other such dangerous substances.**

This may cause ignition, ignition, or explosion.

**Do not work with wet hands.**

Doing so may cause electric shock.

**Prevent water and oil from splashing onto the product.**

A fire, electric leakage, or failure may occur. Even oil drops and oil mists are prohibited.

**When connecting a personal computer, prevent frame ground of the computer from being grounded.**

If a plus terminal of the product is grounded, connecting the product to a PC with a USB cable may cause short-circuit in the DC power supply.

**Make sure to hold and secure a workpiece to install the product.**

An injury may occur if the product falls down, falls off, or operates abnormally.

**Use a DC stabilized power supply (24 VDC  $\pm$  10%) with sufficient capacity as a power supply for the controller and the input/output circuit.**

If the product is directly connected to an AC power supply, a fire, burst or damage may occur.

**Install overcurrent protective equipment (such as a breaker for wiring and a circuit protector) on the power supply on the primary side when wiring in accordance with “JIS B 9960-1:2019 (IEC 60204-1:2016) Safety of machinery - Electrical equipment of machines - Part 1: General requirements”.**

Description from “7.2.1 General” of JIS B 9960-1:2019:

Overcurrent protection shall be provided where the current in a circuit can exceed either the rating of any component or the allowable current of the conductors, whichever is the lesser value. The ratings or settings to be selected are detailed in 7.2.10.

**⚠ WARNING****Do not install the product to a combustible material.**

If the product is installed near a combustible material, a fire may result.

**Do not place heavy objects on cables or pinch them.**

Otherwise, the cover of the cable may tear or excessive stress is applied, causing poor continuity and insulation degradation.

**Do not connect the communication connector used for this product to other devices.**

A malfunction or damage may occur.

**Do not use or store the product in an environment where there is strong electromagnetic waves or radiation.**

A malfunction or failure may occur.

**Because precision instruments are integrated, do not lay the product sideways or subject the product to vibration or impact during transportation.**

Component damage may occur.

**Do not perform disassembly or modification of products that are not specified in this manual.**

An injury, accident, malfunction, or failure may occur; in addition, the specifications described in this manual may not be satisfied.

**Install a safety fence to prevent entry into the actuator operation range.****Insulate unused wires.**

A malfunction, failure, or electric shock may occur.

**If the system is such that the machine stops in the event of a system failure such as an emergency stop or a power failure, design and implement a safety circuit or a safety device to prevent damages to the devices and injuries to people.****Install the product indoors and in a dry place.**

In a place where water can splash onto the product or where humidity is high (80% or more and with condensation), an electric leakage or fire accident may occur.

**Perform class D grounding (ground resistance: 100  $\Omega$  or less) for the product.**

An electric leakage may occur and cause an electric shock or malfunction.

**Perform the wiring of the product securely so as not to cause miswiring or loosening of connectors, as confirmed in this instruction manual. Also, check the insulation of the wiring.**

Make sure that the wires do not contact other circuits and there is no ground fault and insulation failure between terminals. Otherwise, an overcurrent may flow into the product and cause damage. This may result in an abnormal operation or fire.

**Insulate unused wires.**

A malfunction, failure, or electric shock may occur.

**When restarting after emergency stop or abnormal stop, check that it is safe for the actuator to operate.****Design safety circuits or devices as the entire system including hardware in order to prevent damage to the device or an accident resulting in injury or death in the event that a machine stops due to system abnormality such as an emergency stop or a power failure.****When wiring the product, refer to this Instruction Manual or any other relevant instruction manuals to make sure that the wiring is correct and connectors are firmly connected.**

Otherwise, abnormal operation or the flow of an overcurrent may result. Overcurrent may cause abnormal operation, damage, or fire.

 **WARNING**

**When installing the actuator in a direction other than horizontal, select the type with brake.**

If the motor is not equipped with a brake, the movable parts may fall off at servo OFF (including emergency stops and alarms) or power OFF, which may result in injury or damage to the workpiece.

**Do not carry or install the product by holding its cable or the movable section.**

**An injury or cable disconnection may occur.**

## 2.1 Environment

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- Confirm the ambient temperature and atmosphere listed in the product specifications when storing or using the product.
- Install the product where it is not subjected to direct sunlight and away from a heating element. Also, avoid dust, corrosive gas, explosive gas, inflammable gas, and combustible material. Chemical resistance has not been considered for the product.
- This product cannot be mounted or used in wet or oily locations.
- Doing so could cause electricity leakage or fires. Oil and oil mist are strictly prohibited.
- If there is heat generation from the equipment in the surroundings, or if heat gets stuck, please take measures to keep the ambient temperature at 0 to 40°C, such as installing a fan on the control panel.
- Install the controller so that the exhaust port faces up and down and the power supply connector on the front panel faces down. Allow at least 50 mm of space on both the top and bottom surfaces to allow for natural convection.
- Use the setting tool (S-Tools setting software) to set parameters. Leave a space of at least 70 mm in front of the controller, so that the connector can be attached and removed.
- Provide a safety fence to prevent access to the movable range of the electric actuator. In case of an emergency, install the product in a place where the emergency stop button switch can be easily operated. The emergency stop button switch must not be automatically reset, and the structure and wiring must not allow a person to reset the switch inadvertently.

## 2.2 Unpacking

### CAUTION

**Do not carry heavy products alone.**

**Do not stand on the package.**

**In order to prevent deforming the package, do not place heavy objects and objects of which their load concentrates.**

**Do not apply unnecessary force to any part of the product.**

**When carrying or handling the product, use extreme care not to apply impact to the product (for example, do not drop the product).**

**When taking the product out of the package, hold the product body.**

**Place the product horizontally when not in use.**

Check that the model number ordered and the model number indicated on the product are the same.  
Check the exterior of the product for any damage.

#### ECMG-SNNR30-X\*DNN

No.	Product
1	Input/output unit (ECMG-SNNR30-X*DNN)
2	INSTRUCTION MANUAL

#### ECMG-SNNN30-Y\*DNN

No.	Product
1	Input/output unit (ECMG-SNNN30-Y*DNN)
2	INSTRUCTION MANUAL

## 2.3 Connection and wiring methods between units

### WARNING

**Perform the wiring with the power supply turned OFF.**

Touching the electrical wiring connections (bare charging part) may cause electric shock.

**Do not touch the charging part with bare hands.**

Doing so may cause electric shock.

**Read and fully understand this instruction manual before performing the electrical wiring.**

### CAUTION

**Check the working voltage and polarity before wiring and energizing.**

A wrong wiring may cause failure.

**Take countermeasures against lightning surges in the equipment side.**

The product is not resistant to lightning surges.

For an AC voltage, use it in the installation category 2.

**To prevent the wiring connection from loosening or coming off, retighten the screws of the terminal block with a specified torque, and insert the connectors correctly.**

This may cause fire, electric shock or malfunction of the equipment.

**Use a dedicated communication cable conforming to the CC-Link specifications.**

**Secure a sufficient bending radius of the communication cable to avoid excessive bending.**

**Secure distance from the communication cable to the power line and the high voltage line so that it is not affected by noise. Keep away.**

For connecting between units and wiring with power supply and S-Tools, etc., refer to Instruction Manual (SM-A62471) for details.

### 2.3.1 Wiring to output and input devices

#### ■ Connector terminal list of Input/Output Connectors (Input/output unit)

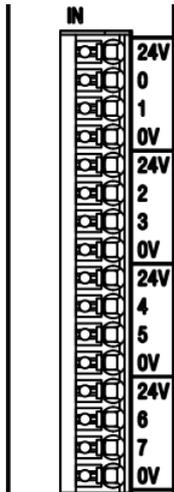
##### < IN (input) connector terminal list >

Terminal name	Function name	Description of function
24V	Power supply for output device (+)	It outputs 24V DC power for output devices such as sensors.
0~7	Input0~7	Inputs signals from output devices such as sensors.
0V	Power supply for output equipment (-)	It outputs 0V DC power for output devices such as sensors.

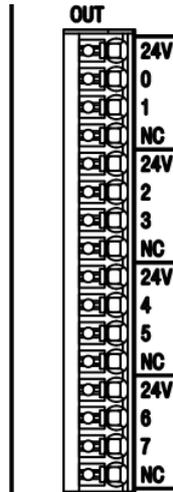
##### < OUT (output) connector terminal list >

Terminal name	Function name	Description of function
24V	Power supply for input device (+)	It outputs 24V DC power for input devices such as solenoid valves.
0~7	Output0~7	It outputs signals to input devices such as solenoid valves.
0V	Power supply for input equipment (-)	It outputs 0V DC power for input devices such as solenoid valves.
NC	No connection	This terminal is not connected internally. Do not connect anything to it.

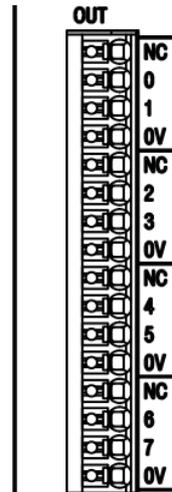
Input type connector  
NPN 8 point, PNP 8points



Output type connector  
NPN 8 points



PNP 8 points



Use electrical wiring with the following specifications to connecting to the input/output connectors.

Single wire connection cross-sectional area	0.2mm <sup>2</sup> ~1.5mm <sup>2</sup> (AWG28~AWG16)
Stranded wire connection cross-sectional area	0.2mm <sup>2</sup> ~1.5mm <sup>2</sup> (AWG28~AWG16)
Lead wire stripping area	8~9mm from the tip of the lead wire

Recommended ferrules  
example Weidmüller For 1-wire

Item	Model number	Compatible Wire (mm <sup>2</sup> )
H0,25/12 HBL	9025760000	0.25
H0,34/12 TK	9025770000	0.34
H0,5/14 OR	0690700000	0.5
H0,75/14T HBL	9021040000	0.75

example Weidmüller for 2-wire

Item	Model number	Compatible Wire (mm <sup>2</sup> )
H0,5/16 ZH OR	9037210000	0.5

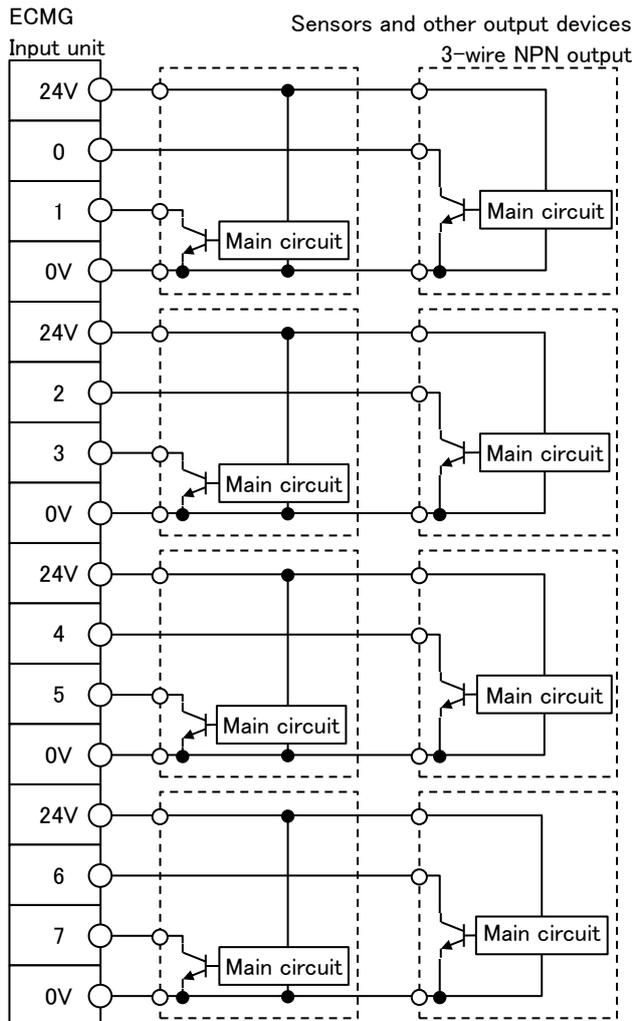
■ Wiring of input/output cables

**CAUTION**

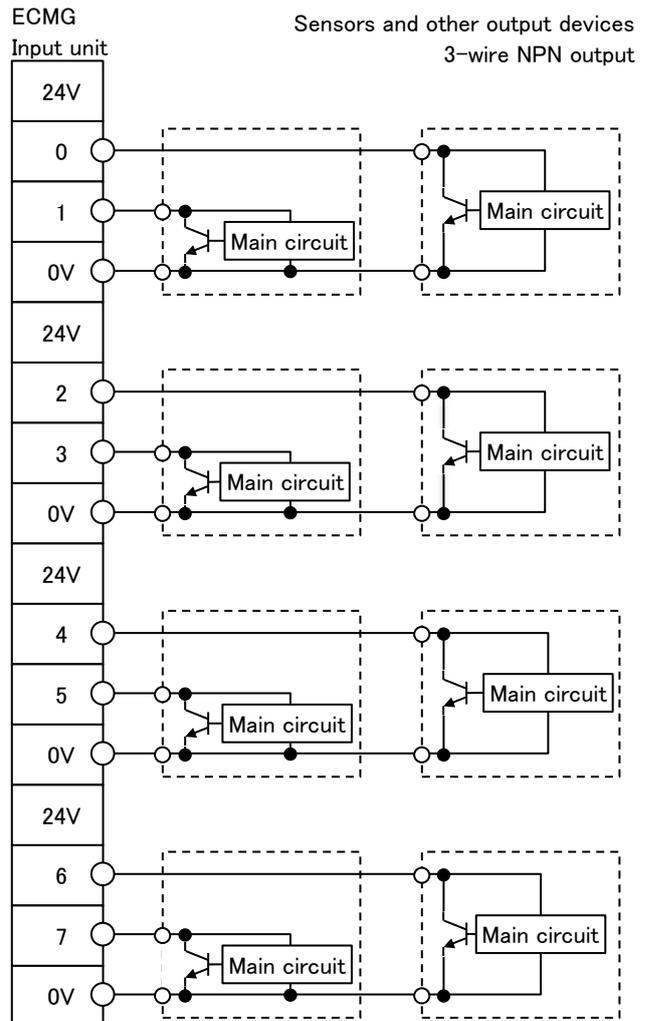
To prevent wiring errors, double-check the wiring before turning on the power.  
Use S-Tools to check that the input and output signals are correct after power is applied.

IN (input) connector wiring

NPN 8 points Connected to a 3-wire output device

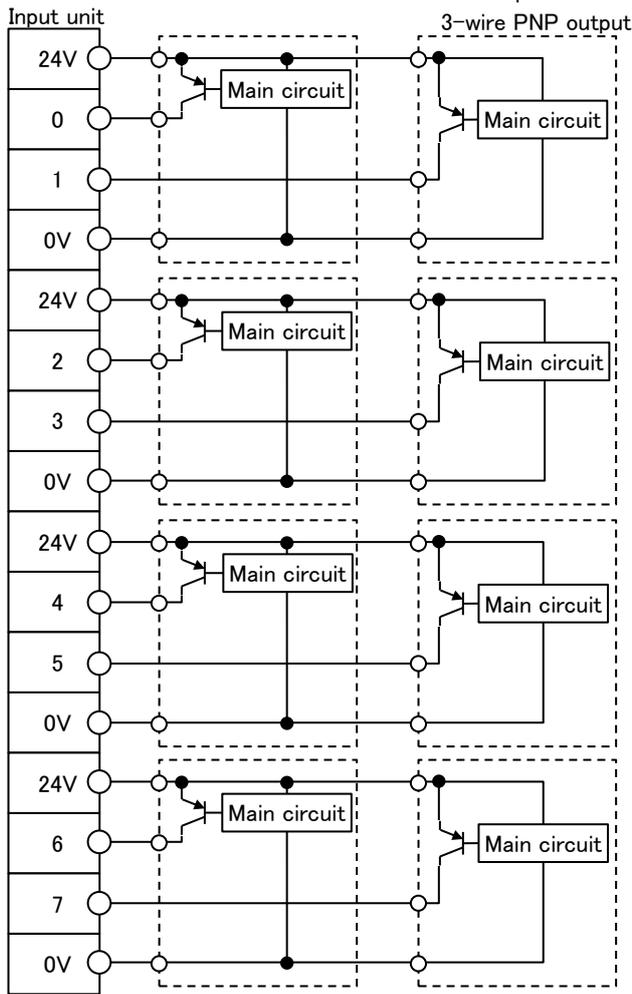


NPN 8points Connected to a 2-wire output device



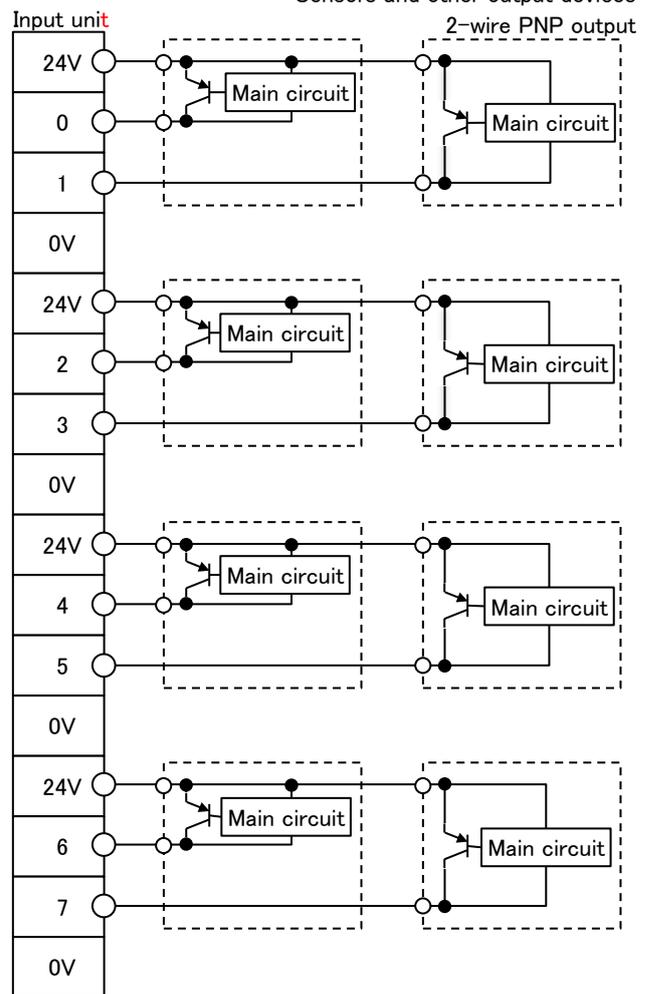
PNP 8 points Connected to a 3-wire output device  
ECMG

Sensors and other output devices



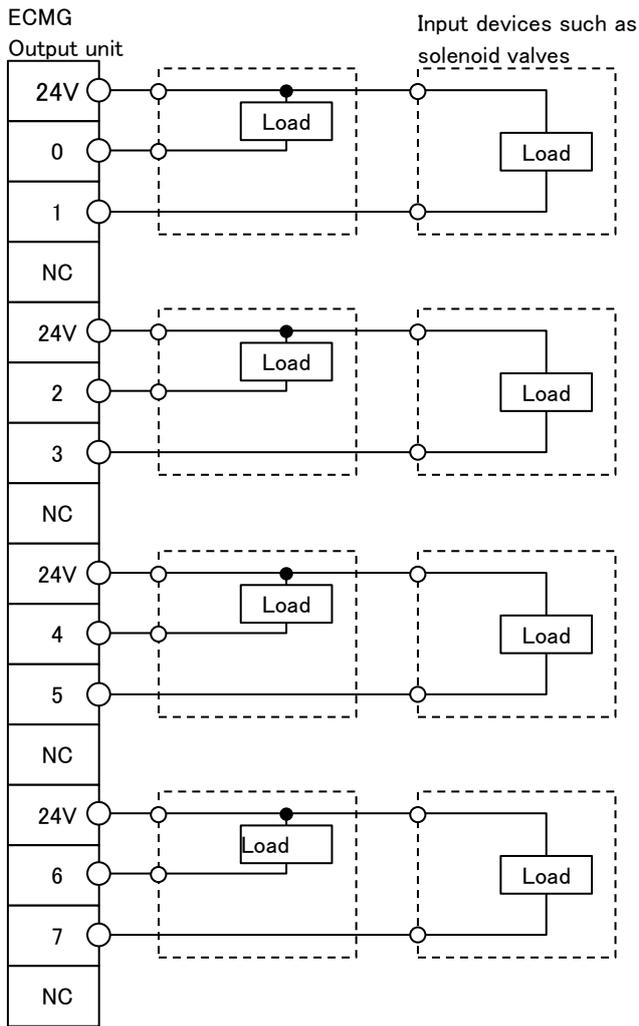
PNP 8 points Connected to a 2-wire output device  
ECMG

Sensors and other output devices

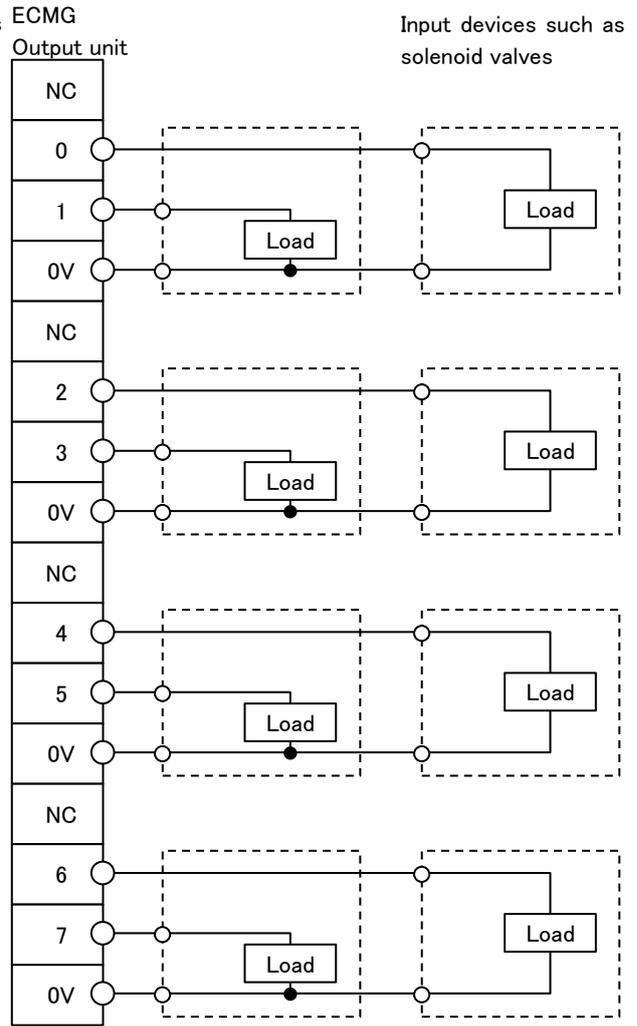


OUT (output) connector wiring

NPN 8 points Connecting to input devices



PNP 8 points Connecting to input devices



## 3. USAGE

### 3.1 Send/Receive data (input/output unit)

The following data is transmitted and received between the PLC and the controller, and cyclic transmission is used for all data transmission and reception. Refer to Instruction Manual (SM-A62471) for the communication method.

Part Name	Description
Input/output signals	Controls the controller from the PLC.

#### ■ Input/output signals

The items listed in the table below (signal name) are transmitted and received.

Classification	Item (signal name)
Data to be written to the controller by the PLC	Output n, alarm reset,
Data to be read from the controller by the PLC	Input n, alarm, warning, and DIO power supply status



The input unit can read out the input n signal, and the output unit can write into the output n signal.

<Data to be written to the controller by the PLC>

Signal name	Explanation
Output n	Sets the output signal (n=0 to 7).
Alarm reset	Executes the alarm reset when switched from OFF to ON.

<Data to be read from the controller by the PLC>

Signal name	Explanation
Input n	The input signal status is output. (n=0 to 7)
Alarm	Turns OFF when an alarm occurs, and turns ON when no alarm occurs.
Warning	Turns OFF when a warning occurs, and turns ON when no warning occurs.
DIO power supply status	The signal is off when the DIO power is off, and it is on when the DIO power is on.

## 3.2 Setting parameters

Parameters can be set and changed from PLC or S-Tools. Refer to the S-Tools setting software Instruction Manual (SM-A11147) for specific setting instructions and other details.

### 3.2.1 Parameters List

Name	Description	Setting range	Initial value	Unit
Input signal filter Note 1, Note 2	Set the period during which the unit does not respond to the input signals from external devices (sensors, etc.). Set the parameter for each unit. It prevents malfunctions caused by noise and chattering.	0 to 20	5	ms
Input hold time Note 1, Note 2	Set the time during which the input signal ON/OFF status is held. Set the parameter for each unit. Even if the input signal changes in status within the set time, it will be held in the previous status for the set time.	0 to 200	0	ms
Output at emergency stop Note 1, Note 3	Set the output to be triggered when the emergency stop signal is input to the communication unit. Set the parameter for each unit.	HOLD, OFF, ON Note 2	HOLD	None
Output at alarm Note 1, Note 3, Note 4	Set the output to be triggered when an alarm occurs in the input/output unit. Set the parameter for each unit.	HOLD, OFF, ON Note 2	HOLD	None
Output at communication error Note 1 Note 3	Set the output to be triggered when an error occurs in communication between the host device (PLC, etc.) and the communication unit. Set the parameter for each unit.	HOLD, OFF, ON Note 2	HOLD	None
Number of times the input/output turns on Threshold value	A warning will be output when the number of times the input/output turns on exceeds the determined threshold value. No warning is output when the setting value is 0. Set the parameter for each unit.	0 to 999999999	0	times

Note 1: Power cycle or software reset is required for the parameter settings to take effect.

Note 2: Parameters for input type

Note 3: Parameters for output type

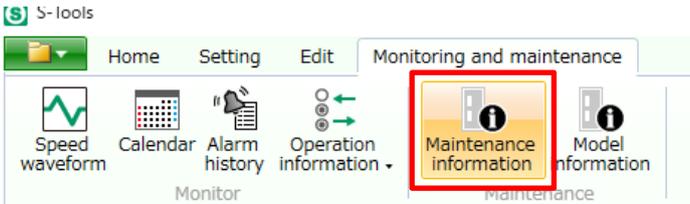
Note 4: If an alarm occurs when the power is turned on, the parameter is set to OFF regardless of the setting.

### 3.2.2 Setting threshold values

Set the threshold value for the number of times the input/output turns on from the PLC or S-Tools. Refer to the Instruction Manual (SM-A 62471) for setting from the PLC.

#### How to set threshold values (using S-Tools)

- 1 Select the [Monitor and maintenance] tab of S-Tools and click the [Maintenance information] button.



- 2 Enter the value to set in the text box in the [Change value] column for the threshold that you want to change and click the [Write] button.

Read

Maintenance information

	Current value		Warning Threshold value	Changed value	
Integrated running distance	<input type="text"/> km	Initialize	<input type="text"/> km	<input type="text"/> km	Write
Integrated number of travel times	<input type="text"/> Time(s)	Initialize	<input type="text"/> Time(s)	<input type="text"/> Time(s)	Write
Integrated operating time	<input type="text"/> Second	Initialize	<input type="text"/> Second	<input type="text"/> Second	Write

Data in "Integrated running distance" is invalid when FFLD Series is selected.

---

Temperature Information

	Current value		Warning Threshold value	Changed value	
Temperature	<input type="text"/> °C		<input type="text"/> °C	<input type="text"/> °C	Write Initialize

Temperature information can be read, written and initialized only when the ECMG Series is selected.  
 An alarm is triggered when the drive unit temperature exceeds 90°C.  
 Set the threshold within the range of 0 to 85.

Part Name	Description
Threshold for number of times the input/output turns on	A warning will be output when the number of times the input/output turns on exceeds the determined threshold value. No warning is output when the setting value is 0.

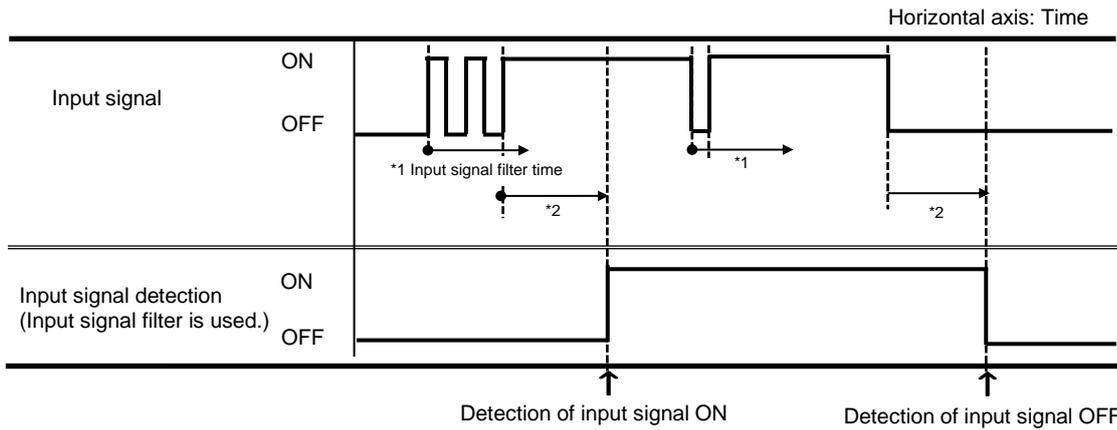
### 3.3 Operation timing chart



The parameters for input type include “input signal filter” and “input hold time.” Adjust the parameters if the operation is affected by chattering, etc.

#### 3.3.1 Detection timing by input signal filter

The “input signal filter” parameter is designed to set the period during which the input signal does not respond.

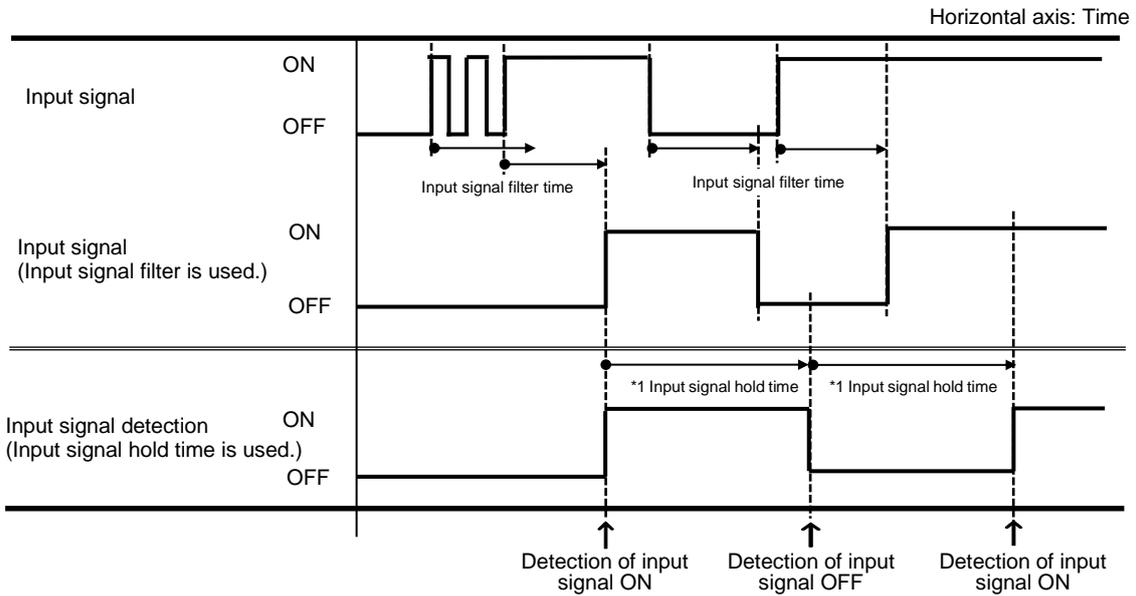


\*1 After the input signal changes from OFF to ON (ON to OFF), the signal change will not be detected during the period set by the “input signal filter” parameter.

\*2 If the signal does not change during the period set by the “input signal filter” parameter after the input signal changes from OFF to ON (ON to OFF), the change will be detected.

### 3.3.2 Detection timing by input hold time

The “input hold time” parameter is designed to set the period for which the input signal status is held.



\*1 After the input signal (after the input filter is used) changes from OFF to ON (ON to OFF), the signal status will be held for the period set by the “input signal hold time” parameter.

## 4. MAINTENANCE AND INSPECTION

### WARNING

**Do not perform disassembly or modification of products that are not specified in this manual.**

An injury, accident, malfunction, or failure may occur; in addition, the specifications described in this manual may not be satisfied.

**Do not attach or remove wires and connectors with the power turned on.**

A malfunction, failure, or electric shock may occur.

**Do not work with wet hands.**

Doing so may cause electric shock.

**Do not touch the heat sink and cement resistance inside the controller or the motor of an actuator.**

Electric shock or burns may result.

**Install the product before wiring.**

An electric shock may occur.

**Before performing inspection, wait five minutes or longer after turning off the power and check the voltage with a tester.**

An electric shock may occur.

### CAUTION

**Take measures to prevent a third person from turning on the power unexpectedly when performing maintenance, inspection, or repair.**

**Wiring and inspections must be performed by specialists.**

**Use a power cable with a sufficient capacity that allows the maximum instantaneous current.**

A heat generation or damage may occur during operation.

**Perform periodic inspections (two to three times a year) to confirm that the product operates properly.**

**Turn off the power immediately if abnormal heat, smoke, odor, sound, or vibration occurs in the product.**

Damage to the product or fire may occur.

### 4.1 Precautions on Product Disposal

#### CAUTION

**When disposing of the product, comply with “Waste Management and Public Cleansing Act” and have an industrial waste disposal company dispose of the product.**

# 5. TROUBLESHOOTING

## 5.1 Problems, Causes, and Solutions

If the product does not operate as intended, confirm the table below for a possible solution.

Problem	Cause	Solution
The ST lamp does not light or flash even when the power supply is turned ON.	Wiring is not correct.	Check the power supply wiring.
	The cable is broken.	Confirm that the wiring is neither pinched nor disconnected. Check the connector and terminal.
	Product is malfunctioning or is damaged.	It will need to be repaired. Check "5.1.1 Items to Check When a Problem Occurs" and then contact us.
	The power supply is malfunctioning.	Repair or replace the power supply.
	Power capacity is insufficient.	Use a power supply with a larger capacity.
The ST lamp remains lit in red.	Alarm has been issued.	Check the alarm and its cause in "5.2 Alarm Indications and Countermeasures" and then remove it.
	There is an abnormality in system.	It will need to be repaired. Check "5.1.1 Items to Check When a Problem Occurs" and then contact us.
Product does not operate as intended with PLC signal.	The input signal is unstable.	The input from the host system may be chattering. Adjust the input signal filter or input hold time parameter.
	Wiring is not correct.	Check the wiring.
Product cannot be operated with PLC.	It is in TOOL mode.	Use the setting tool (S-Tools) to change it to PLC mode.
	Wiring is not correct.	Check the wiring.
	The cable is broken.	Confirm that the wiring is neither pinched nor disconnected. Check the connector and terminal.

If you have any other questions or concerns, contact your nearest CKD sales office or distributor.

## 5.1.1 Items to Check When a Problem Occurs

1	<p>Check the state of the controller LEDs.  Refer to "1.6 LED indication" for information on LED indications.  * Refer to Instruction Manual (SM-A62471) for the LED indication of the communication unit.</p>
2	Check whether there is an error on the PLC.
3	Check the voltage of the control power supply (24 VDC).
4	<p>Check the alarm details.  Alarm details can be checked using the S-Tools setting software.</p>
5	Check the communication status with the PLC using the PLC development tool or S-Tools.
6	<p>Confirm that the cable is neither "disconnected" nor "pinched," and that it is connected properly.  When checking conductivity, turn the power supply OFF and disconnect the wiring to prevent electric shock.</p>
7	Confirm that anti-noise measures (such as connecting a grounding wire or installing a surge suppressor) have been implemented.
8	Check the history leading up to the trouble occurring and the operation condition when the trouble occurred.
9	Check the product's serial No.

\*Check the cause of the problem according to the above items. Also, refer to "5.1.1 Items to Check When a Problem Occurs" or "5.2 Alarm Indications and Countermeasures" as a solution.

## 5.2 Alarm Indications and Countermeasures

### CAUTION

**When an alarm occurs, eliminate the cause of the alarm.**

Repeated operation under the condition that an alarm is generated may impose a load on the actuator and controller, accelerate degradation of the product, and cause damage.

**Consider the possibility of actuator or controller malfunctions.**

If an alarm related to the operation of the actuator such as "overload (C)" occurs, the actuator or controller may be malfunctioning. If the alarm recurs after performing the countermeasures listed in the table below and turning the controller power back on, contact CKD.



Alarms generated by the communication unit are not output by the drive unit. If an error occurs on the drive unit side, check whether an alarm has occurred on the communication unit.

### ■ Alarm

These are output when an error that affects the operation of the actuator is detected in the controller. There are two types of alarms depending on the degree of error: alarms that can be reset, and alarms that require the power to be turned ON again.

Alarm code	Alarm item	Description	Solution	Alarm reset
0x1000 to 0x1FFF	Memory (Read)	An error has been detected in reading data from memory at power-on.	<p>"0x1300 to 0x13FF" indicates that there is an error in the parameter data. Initialize the parameter data and power cycle.</p> <p>"0x1500 to 0x15FF" indicates that there is an error in the point data. Initialize the point data and power cycle.</p> <p>"0x1700 to 0x170F" indicates that there is an error in the alarm data. Initialize the alarm data and power cycle.</p> <p>"0x1800 to 0x180F" indicates that there is an error in the maintenance data. Initialize the maintenance data and power cycle.</p> <p>"0x1B00 to 0x1B0F" indicates that there is an error in the actuator information in the drive unit (A type). Overwrite the information of the actuator connected last time with the information of the actuator being connected and power cycle.</p> <p>"0x1B10 to 0x1B1F" indicates that there is an error in the actuator information in the drive unit (B type). Initialize or overwrite the actuator information, and turn the power on again.</p> <p>Other codes indicate that there is an error in the data inside. If the error reoccurs even after power cycling, contact your nearest CKD sales office or distributor.</p>	No
0x2000 to 0x2FFF	Memory (Write)	An error has been detected in writing data into memory when changing data.	If the error reoccurs even after power cycling, contact your nearest CKD sales office or distributor.	No
0x3000 to 0x30FF	Temperature	The temperature in the controller is high.	Check the ambient temperature. If the error reoccurs even after power cycling, contact your nearest CKD sales office or distributor.	No
0x3100 to 0x31FF	Current	An overcurrent flowed from the power supply.	If the error reoccurs even after power cycling, contact your nearest CKD sales office or distributor.	No
0x3210 to 0x321F	Encoder for other models connected	Indicates that an encoder that is not compatible with the controller is connected.	If the error reoccurs even after power cycling, contact your nearest CKD sales office or distributor.	No
0x3220 to 0x322F	Encoder identification abnormality	Indicates that there is an abnormality in the identification of the encoder type (incremental/absolute).	If the error reoccurs even after power cycling, contact your nearest CKD sales office or distributor.	No

Alarm code	Alarm item	Description	Solution	Alarm reset
0x3230 to 0x32FF	Encoder not connected	Indicates an abnormality in the connection state between the controller and actuator.	Check the connection between the cable and the connector. If the error reoccurs even after power cycling, contact your nearest CKD sales office or distributor.	No
0x3400 to 0x341F	Software reset error	Indicates that internal cyclic communication with the communication unit could not be resumed after performing a software reset of the drive unit.	Turn on the power again.	No
0x3400 to 0x342F	Encoder not connected	Indicates an abnormality in the connection state between the controller and actuator.	Check the connection between the cable and the connector. If the error reoccurs even after power cycling, contact your nearest CKD sales office or distributor.	No
0x3800 to 0x38FF	TOOL Not connected	There is a problem with the connector connection while using the product in TOOL mode.	Check the connection between the cable and the connector. If the connector is disconnected, connect the connector. After changing the mode to PLC mode, reset the alarm.	Yes
0x3900 to 0x39FF	Interface	Indicates an error in the interface.	If the error reoccurs even after power cycling, contact your nearest CKD sales office or distributor.	No
0x3A00 to 0x3A0F	Actuator Model number error	Indicates that the model number of the actuator connected last time and actuator being connected are different when the power is turned ON.	Reconnect to the previously connected actuator. Or, overwrite the information of the actuator connected last time with the information of the actuator being connected and turn the power ON again.	No
0x3A10 to 0x3A1F	Actuator information not set	Indicates that actuator information is not set in the controller when the drive unit (B type) is powered on.	Set the actuator information and turn on the power again.	No
0x3A20 to 0x3A2F	Changing actuator information	Indicates that the drive unit (B type) has not been turned on again after the actuator information was changed.	Turn on the power again.	No
0x3A30 to 0x3A3F	Actuator information error (ECG only)	Indicates that an actuator not compatible with the ECMG series is connected.	Contact your nearest CKD sales office or distributor.	No
0x3B00 to 0x3B0F	Number of axes error (Not connected)	Indicates that an operable axis cannot be detected.	Check that the drive unit is connected to the communication unit, and then turn the power on again. Check the LED indication of the drive unit to see if there is any abnormality with the drive unit.	No
0x3B10 to 0x3B1F	Number of axes error (Excess)	Indicates that the communication unit has detected more than 17 axes.	Check if nine or more drive units are connected to one communication unit.	No
0x3B20 to 0x3B2F	Axis number error (Duplicate)	Indicates a duplicate axis number.	Set the axis number again. Refer to Instruction Manual (SM-A62471) for how to set the axis number.	No

Alarm code	Alarm item	Description	Solution	Alarm reset
0x3B30 to 0x3B3F	Axis number error (Out of range)	Indicates that the axis number is out of range.	Set the axis number again. Refer to Instruction Manual (SM-A62471) for how to set the axis number.	No
0x3B40 to 0x3B4F	Number of units error (Excess)	Indicates that the communication unit has detected nine or more drive units.	Check if nine or more drive units are connected to one communication unit.	No
0x3B50 to 0x3B5F	Axis number writing error (At startup)	Indicates failure to set the axis number at power ON.	Turn on the power again.	No
0x3C00 to 0x3C8F	Internal cyclic communication error (At startup)	Indicates an error in internal cyclic communication at power ON.	Check that there is no abnormality with the connection between units and turn the power on again.	No
0x3D00 to 0x3D8F	Internal cyclic communication error	Indicates an error in internal cyclic communication.	If this alarm is generated in both the communication unit and the drive unit, release the alarm in the drive unit before releasing the alarm in the communication unit.	Yes
0x3F00 to 0x3F0F	Drive unit mismatch	Indicates that the drive unit connected to the communication unit has changed since the last startup.	Confirm that the axis number, point data, and user parameters are set correctly, update the drive unit information from S-Tools, and turn the power on again. For information on how to update the drive unit information, refer to Instruction Manual (SM-A62471)..	No
0x4000 to 0x40FF	Parameter data	There is an error in the parameter data.	"0x4010 to 0x401F" indicates that there is an error in the setting of the home position offset amount. "0x4020 to 0x402F" indicates that there is an error in the setting of the home position return speed. Reconfigure the user parameters and perform an alarm reset.	Yes
0x4100 to 0x41FF	Point data (Position)	When a point travel command is input, there is an error in the point data of the point number.	The final target position exceeds the range of the soft limit, or the final target position is 360 deg or more in FGRC series. Reconfigure the following point data and reset the alarm. Point data: position, pressing distance	Yes
0x4200 to 0x42FF	Point Data (Speed)	When a point travel command is input, there is an error in the point data of the point number.	The point data setting is outside the setting range. Reconfigure the following point data and reset the alarm. For "0x4202", review the setting of "Pressing speed" in the point data. For "0x4212", review the "Speed" setting of the point data. For "0x4222", review the "Acceleration" setting of the point data. For "0x4232", review the "Deceleration" setting of the point data.	Yes
0x4300 to 0x43FF	Point data (Pressing)	When a point travel command is input, there is an error in the point data of the point number.	The point data setting is outside the setting range. Reconfigure the following point data and reset the alarm. Point data: pressing rate	Yes
0x4500 to 0x450F	CC-Link data error (Version)	The protocol version of CC-Link differs between the upper device and the communication unit.	Check whether the version information of the upper device matches that of the communication unit, and then turn the power on again.	No
0x4510 to 0x451F	CC-Link data error (The number of stations occupied)	The number of stations occupied is insufficient for the data capacity required from the setting of the operation mode of each drive unit.	Check that there are no problems with the operation mode (CC-Link) and the number of stations occupied, and then turn the power on again.	No

Alarm code	Alarm item	Description	Solution	Alarm reset
0x4600 to 0x460F	Operation mode setting error	The data size of internal cyclic communication exceeds the controller specification.	Review the operation mode setting.	No
0x4700 to 0x470F	Axis number setting error	An axis number other than 1 to 16 is set.	Review the axis number.	No
0x5000 to 0x5FFF	Internal non-cyclic communication error	Indicates an error in the internal non-cyclic communication.	Perform an alarm reset.	Yes
0x6000 to 0x60FF	Servo ON	There is an error in the encoder data signal for motor excitation when the servo is turned on for the first time after power-on.	Check the connection of the cable and the connector connecting the controller and the actuator. Check that the actuator is not restrained and reset the alarm. For a B-type drive unit, check that the actuator information setting matches the connected actuator. Refer to "" for how to set actuator information.	Yes
0x6200 to 0x62FF	Home position return	The home position cannot be detected even after traveling a distance longer than the stroke of the actuator when returning to the home position.	Check the connection of the cable and the connector connecting the controller and the actuator. Confirm that there is no problem, and then reset the alarm.	Yes
0x6400 to 0x64FF	Outside soft limit	The present position is outside the range of the soft limit during point travel.	If the alarm occurs due to an overshoot when positioning close to the soft limit, check the load conditions. The alarm will also occur when a point travel command is input from outside the range of the soft limit. In this case, move the actuator manually so that the present position is within the range of the soft limit. Confirm that there is no problem, and then reset the alarm.	Yes
0x6500 to 0x65FF	Overload (M)	The fingers cannot travel.	It occurs when the actuator cannot operate for a certain period of time or is pushed back in the direction opposite to the direction of operation while the actuator is in operation except during pressing operation. Check the load and operating conditions. Check if there is any object within the movable range that interferes with the operation. Confirm that there is no problem, and then reset the alarm.	Yes
0x6600 to 0x66FF	Overload (P)	The fingers have been pushed back to the pressing start point by external force when pressing.	Check the load and operating conditions. Confirm that there is no problem, and then reset the alarm.	Yes
0x6700 to 0x67FF	Overload (S)	The fingers cannot stop.	Check the load and operating conditions. Confirm that there is no problem, and then reset the alarm.	Yes
0x6800 to 0x68FF	Overload (H)	The fingers have become misaligned when stopping.	Check the load and operating conditions. Check the setting of the "Holding current at stop" in the parameter data. Confirm that there is no problem, and then reset the alarm.	Yes
0x6900 to 0x69FF	Overload (C)	An overcurrent has flown into the motor.	Check the load and operating conditions. Confirm that there is no problem, and then reset the alarm.	Yes
0x6A00 to 0x6AFF	Overload (D)	There is a problem in controlling the position.	Check the load and operating conditions. Confirm that there is no problem, and then reset the alarm.	Yes
0x6B00 to 0x6BFF	Overload (T)	Excessive torque output has continued.	Check the load and operating conditions. Confirm that there is no problem, and then reset the alarm.	Yes
0x6C00 to 0x6CFF	Home position return (C)	Excessive load is detected during home position return in the FGRC.	Check that there are no workpieces to collide with within the homing operation range. Confirm that there is no problem, and then reset the alarm.	Yes

Alarm code	Alarm item	Description	Solution	Alarm reset
0x7000 to 0x7FFF	Memory (Initialize)	An error has been detected in initializing memory data when changing data.	If the error reoccurs even after power cycling, contact your nearest CKD sales office or distributor.	No



When an alarm occurs, the actuator is in the servo OFF state. In case of an actuator with a brake, the brake is applied and the holding torque is applied. In case of an actuator without brake, the dynamic brake is applied but the holding torque is not applied.

## ■ Warning

These are output when a minor error that will not affect the operation of the actuator is detected in the controller. They can be canceled by changing controller settings.

Alarm code	Alarm item	Phenomenon	Cause/Solution
0x0101	Calendar Initialization	The date setting has been initialized due to an error in the calendar function.	The internal power supply was cut off and the date setting could not be retained. Reset the date of calendar function. The warning is canceled when the resetting is completed.
0x0111	Calendar writing error	Indicates that the date write was not complete.	Reset the date of calendar function. If the error occurs again even after resetting, please contact us.
0x0201	Maintenance data (Running distance)	The integrated running distance has exceeded the threshold.	The integrated running distance has exceeded the threshold set in the user parameter. After performing maintenance, reconfigure the threshold. The warning is cleared when the threshold exceeds the integrated running distance.
0x0211	Maintenance data (Number of travels)	The integrated number of travels has exceeded the threshold.	The integrated number of travels has exceeded the threshold set in the user parameter. After performing maintenance, reconfigure the threshold. The warning is cleared when the threshold exceeds the integrated number of travels.
0x0221	Maintenance data (Operating time)	The integrated operating time has exceeded the threshold.	The integrated operating time has exceeded the threshold set in the user parameter. After performing maintenance, reconfigure the threshold. The warning is cleared when the threshold exceeds the integrated operating time.
0x0401	Power supply voltage drop	The power supply voltage has dropped below a certain value.	The power supply voltage detected by the controller is less than 21.6 V while the power supply is ON. Adjust the power supply voltage. The warning is canceled when the power supply voltage detected by the controller is 21.6 V or more.
0x0501	Temperature error (drive unit)	Drive unit temperature exceeds the threshold	The drive unit temperature exceeds the threshold set in the user parameter. After checking the operating conditions, reconfigure the threshold. The warning is cleared when the drive unit temperature falls below the threshold.

# 6. PRODUCT COMPLIANCE

Refer to Instruction Manual (SM-A62471).

## 7. WARRANTY PROVISIONS

### 7.1 Warranty Conditions

#### ■ Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified below, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD's facilities free of charge.

However, following failures are excluded from this warranty:

- Failure caused by handling or use of the product under conditions and in environments not conforming to those stated in the catalog, the Specifications, or this Instruction Manual.
- Failure caused by incorrect use such as careless handling or improper management.
- Failure not caused by the product.
- Failure caused by use not intended for the product.
- Failure caused by modifications/alterations or repairs not carried out by CKD.
- Failure that could have been avoided if the customer's machinery or device, into which the product is incorporated, had functions and structures generally provided in the industry.
- Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
- Failure caused by acts of nature and disasters beyond control of CKD.

The warranty stated herein covers only the delivered product itself. Any loss or damage induced by failure of the delivered product is excluded from this warranty.

#### ■ Confirmation of product compatibility

It is the responsibility of the customer to confirm compatibility of the product with any system, machinery, or device used by the customer.

#### ■ Others

The terms and conditions of this warranty stipulate basic matters.

When the terms and conditions of the warranty described in individual specification drawings or the Specifications are different from those of this warranty, the specification drawings or the Specifications shall have a higher priority.

### 7.2 Warranty Period

The product is warranted for one (1) year from the date of delivery to the location specified by the customer.